**TENDER NOTIFICATION FOR**

**TECHNICAL : PART - A**

**DESIGN, SUPPLY , ERECTION, TESTING & COMMISSIONING & MAINTENANCE OF**

**120 KWp ROOF TOP SOLAR PHOTO VOLTAIC POWER SYSTEM**

**AT**

**SANSKAR ASHRAM COMPLEX, DILSHAD GARDEN, DELHI**

## NIT NO : F.1/NBH/SP/DSCST/2015-16

## Due Date for Submission: 27/7/2015

**GOVERNMENT OF NCT OF DELHI**
**Department for the welfare of SC/ST/OBC/Minorities**
**2nd Floor, B-Block Vikas Bhawan, I.P. ESTATE, NEW DELHI-110002**

**Notice inviting tender for Design, Supply, Erection, Testing & Commissioning & Maintenance of 120 Kwp roof top Solar Photo Voltaic Power System at Sanskar Ashram Complex, Dilshad Garden, Delhi.** Sealed tenders are invited under Two-bid system from reputed firms through e-tendering.

**Schedule of Tender**

| | |
|---|---|
| Tender Enquiry No. | F.1/NBH/SP/DSCST/2015-16 |
| Date of release of tender through e-procurement solution | 27.07.2015 at 06.00 PM |
| Last date/time for downloading of Tender documents | 26.08.2015 at 12.00 Noon |
| Pre-Bid Meeting/Technical Queries, if any | 12.08.2015 at 12.00 Noon |
| Last date/time for submission of technical bid and EMD | 26.08.2015 at 2.00 PM |
| Date/Time of opening of technical Bids & EMD | 26.08.2015 at 4.00 PM |
| Date/Time of opening of financial Bids | To be decided later on. |

Financial Bids' will be opened only after scrutiny of documents of `*Technical Bids'* submitted by the firms and only those firms which qualify in the technical bid shall be eligible for opening of the financial bid. Corrigendum will be issued online only, if any.

In case, the day of bid opening happens to be a holiday, the Bids will be opened on the next working day at same time.

**( R.P. Meena )**
**Dy. Director (Admn.)**

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# SECTION – I: REQUEST FOR QUOTATION

## 1 Event Information

1.1 Department for the welfare of SC/ST/OBC/Minorities, Government of NCt of Delhi invites sealed tenders in 2 separate envelops. Two copies of offer in one envelop super scribed "Techno-Commercial Offer- Part A" should contain the complete techno commercial offer and two copies of offer in the second envelope super scribed "Financial Offer- Part B" shall contain the Price data for:

1.1.1 DESIGN, SUPPLY OF ROOF TOP SOLAR PHOTO VOLTAIC POWER SYSTEM

1.1.2 ERECTION, TESTING, COMMISSIONING & MAINTENANCE OF 120 KW ROOF TOP SOLAR PHOTO VOLTAIC POWER SYSTEM

The bidder must meet the qualification requirements as specified in clause 2.0 stated below**.**

The above 2 sealed envelopes shall be enclosed in a third envelope duly super scribed as —

**"BID FOR ROOF TOP SOLAR PHOTO VOLTAIC POWER SYSTEM"**

**NIT No.F.1/NBH/SP/DSCST/2015-16 Due on Date: 27/7/2015**

**1.2** The tender document can be obtained free of cost from Department for the welfare of SC/ST/OBC/Minorities, B Block, 2nd Floor Vikas Bhawan IP Estate, New Delhi-110002 . The tender papers will be issued on all working days upto 26/8/2015 upto 12.00 Noon. The tender documents & detail terms and conditions can also be downloaded from the website : **govtprocurement.delhi.govt.in & scstwelfare.delhigovt.nic.in**

1.3 Offers will be received upto **26/8/2015 upto 2.00 P.M.** at the address given below. Part A of the bid shall be opened on **26/8/2015 at 4.00 PM**. Part B of the bid will be opened in case of techno-commercially qualified bidders and the date of opening of the same shall be intimated in due course of time. It is the sole responsibility of the bidder to ensure that the bid documents reach this office on or before the last date:

**Deputy Director (Admin)**
**Department for the welfare of SC/ST/OBC/Minorities,**
**Government of NCT of Delhi, 2nd Floor, B Block**
**Vikas bhawan, New Delhi – 110002**

1.4 Department for the welfare of SC/ST/OBC/Minorities reserves the right to accept/reject any or all tenders without assigning any reason thereof and alter the quantity of materials mentioned in the Tender documents at the time of placing purchase/ work orders. Tender will be summarily rejected if:

1.4.1 Earnest Money Deposit (EMD) of Rs. 5,00,,000/- ( Rupees Five Lakh ) is not deposited in shape of Bank Draft/Pay Order/FDR/BG drawn in favour of Department for the welfare of SC/ST/OBC/Minorities payable at Delhi.

1.4.2 Tender is received after due date and time.

## 2 Qualification Criteria:-

The prospective bidder must qualify all of the following requirements to be eligible to participate in the bidding. Bidders who meet following requirements will be considered as successful bidder and management has a right to disqualify those bidders who do not meet these requirements.

a) Bidders must have executed the works of like nature and have extensive experience of carrying out similar types of works.

b) Bidder should have executed at least three (3) projects aggregating to a capacity of not less than 200 KW Roof top Solar PV Plant

c) The Bidders shall have adequate after sales service infrastructure including fully trained manpower and necessary tools and plant within NCR. Details for the same shall need to be furnished with the offer

d) The bidder must have an experience of integration of various plant& equipments including power conditioning unit, associated electrical and related civil structures.

e) The bidder must have ISO 9001certification

f) The Bidder should have BIS / IEC approval for their modules , Inverters, other electrical / Electronics system components / controls, cables

e) Bidder must provide proof of minimum annual turnover of Rs. 5.0 crore during the last three financial years

f) Bidder should have valid Registration No. of Sales Tax/VAT/Service Tax, whichever is applicable.

g) Bidder shall offer only indigenously manufactured PV modules and also bidder shall have own facility for manufacturing of modules as per the international Quality standard process and testing

**Successful Bidder must provide the TIN No under Delhi VAT Act at the time of Award of Contract.**

h) Bidder should have PAN No & should fulfill all statutory compliances like PF, ESI registration etc.

I) Firms who are debarred/blacklisted in other utilities in India will not be considered.

i) Department reserves the right to carry out capability assessment of the Bidders and decision of the competent authority shall be final in this regard.

The bidder shall submit all necessary documentary evidence to establish that they meet the above qualifying requirements.

# 3 Bidding and Award Process

Bidders are requested to submit their offer strictly in line with this tender document. NO DEVIATION IS ACCEPTABLE. Department for the welfare of SC/ST/OBC/Minorities shall response to the clarifications raised by various bidders and the same will be distributed to all participating bidders through website. Pre-bid meeting to response the technical queries will be held on **12/8/2015 at 12.00 Noon** in the office of Dy Director (admn),DSCST, at B Block, Vikas Bhawan, New Delhi-110002.

## 3.1 BID SUBMISSION

The bidders are required to submit the bids in 2(two) parts and submitted in original to the following address:-

**Deputy Director (Admin)**
**Department for the welfare of SC/ST/OBC/Minorities,**
**Government of NCT of Delhi, 2nd Floor, B Block**
**Vikas bhawan, New Delhi – 110002**

PART A :: **TECHNO-COMMERCIAL BID** comprising of following

- EMD of requisite amount
- Documentary evidence in support of qualifying criteria
- All pages of bid document duly signed and stamped with seal
- Acceptance to Commercial Terms and Conditions viz delivery schedule/period, payment terms, BG etc.
- Duly signed the Bid form (attached in Annexure-II)

PART B :: **FINANCIAL BID** comprising of

- Price strictly in the Format enclosed in **SECTION IV**

## 3.2 TIME SCHEDULE

The bidders should complete the following within dates specified as under:

| SNo. | Steps | Comprising of | Due Date |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **1** | Technical Queries, if any | All Queries related to RFQ | **12/8/2015 at 12.00 Noon** |
| **2** | **PART A Technical and Commercial Bid**<br><br>**PART B FINANCIAL BID** | • EMD of requisite amount<br>• Documentary evidence in support of qualifying criteria<br>• Technical literature / list of makes etc.<br>• All pages of bid document duly signed and stamped with seal<br>• Acceptance to Commercial Terms and conditions viz Delivery schedule / period, Payment terms, BG etc.<br>• Duly signed Bid form.<br><br>• Price strictly in the Format enclosed (section IV) indicating breaking up regarding basic price, taxes & duties etc. | **26/8/2015 at 2.00 PM** |

This is a two part bid process. Bidders are to submit the bids in 2 (two) parts

Both these parts should be furnished in separate sealed covers super scribing NIT no. DUE DATE OF SUBMISSION, with particulars as **PART-A TECHNICAL BID & COMMERCIAL TERMS & CONDITIONS** and **Part-B FINANCIAL BID** and these sealed envelopes should again be placed in another sealed envelope which should be super scribed with —

"**Tender Notice No. & Due date of opening**". The same shall be submitted before the due date & time specified.

**Part – A** :: Techno-commercial Bid should not contain any cost information whatsoever and shall be submitted within the due date 26/8/2015 at 2.00 PM. After techno-commercial evaluation, the qualified bidders will be informed immediately.

**PART B** :: This envelope will be opened after techno-commercial evaluation and only of the qualified bidders.

Notwithstanding anything stated above, the Department reserves the right to assess bidders' capability to perform the contract, should the circumstances warrant such assessment in the overall interest of the Department. In this regard the decision of the Department is final.

# 4 Award Decision

4.1 Department for the welfare of SC/ST/OBC/Minorities intends to award the business on a lowest bid basis, so contractors are encouraged to submit the bid competitively. The decision to place order/LOI solely depends on the cost competitiveness across multiple lots, quality, delivery and bidder‘s capacity.

4.2 In case any contractor is found unsatisfactory during the execution process, the award will be cancelled and Department for the welfare of SC/ST/OBC/Minorities reserves the right to award other contractors who are found fit.

# 5 Market Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the Terms & Conditions. Bidders must agree to these rules prior to participating. In addition to other remedies available, we reserves the right to exclude a bidder from participating in future markets due to the bidder’s violation of any of the rules or obligations contained in the Terms & Condition. Bidders who violate the marketplace rule or engage in behavior that disrupts the fair execution of the marketplace restricts a bidder to length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace.
- Breach of the terms published in Request for Quotation/NIT.

# 6 Contact Information

Technical/commercial clarification, if any, as regards this RFQ shall be sought in writing and sent by post/courier to following address

**Deputy Director (Admin)**
**Department for the welfare of SC/ST/OBC/Minorities,**
**Government of NCT of Delhi, 2nd Floor, B Block**
**Vikas bhawan, New Delhi – 110002**

## SECTION – II: INSTRUCTION TO BIDDERS

# 1 GENERAL

6.1 Department for the welfare of SC/ST/OBC/Minorities , hereinafter referred to as "The Department" is desirous for establishment of roof top solar Photo voltaic power system at Sanskar Ashram Complex, Dilshad Garden Delhi. The Department has now floated this tender for roof top solar PV system at the following location and the works as notified in this tender document.

| ROOF TOP SOLAR PV SYSTEM | | |
|---|---|---|
| **Sl No.** | **Location** | **Capacity(KWp)** |
| **1** | **Boys Hostel** | **120 KWp** |
| **2** | **Girls Hostel** | |
| **3** | **Nehru Boys Hostel** | |
| **4** | **Kamla Nehru girls Hostel** | |
| **5** | **NSIC Training centre** | |

6.2 Bidder to independently assess the possibility of installing the above indicated capacity based on the modules configuration and layout.

6.3 Department for the welfare of SC/ST/OBC/Minorities reserves the rights to change site location due to any unforeseen problems faced at the time of installation. Under these circumstances the Bidder shall agree for the alternate site provided by Department for the welfare of SC/ST/OBC/Minorities with equivalent area and capacity so as to fulfill the final requirements of Department for the welfare of SC/ST/OBC/Minorities without any cost implication.

## 7 SCOPE OF WORK

Scope of work shall include Detailed Engineering Design, Planning, manufacturing, supply, Construction / Erection, Testing, Commissioning and maintenance for Ten years from the date of commissioning of Roof Top solar PV plant at Sanskar Ashram complex as a turnkey contract according to terms and conditions .

**Detailed specifications/ scope of work shall be as mentioned in SECTION-IV**

## 8 DISCLAIMER

8.1 This Document includes statements, which reflect various assumptions, which may or may not be correct. Each Bidder/ Bidding Consortium should conduct its own estimation and analysis and should check the accuracy, reliability and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.

8.2 Neither Department nor its employees will have any liability whatsoever to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage whatsoever which may arise from or be incurred or suffered in connection with anything contained in this Document, any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Department or its employees, or otherwise a rising in any way from the selection process for the work.

8.3 Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy itself that Documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.

8.4 This Document and the information contained herein are strictly confidential and are for the use of only the person(s) to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient‘s professional advisors).

## 9 COST OF BIDDING

The Bidder shall bear all cost associated with the preparation and submission of its Bid and the Department will in no case be responsible or liable for those costs.

## 10 BIDDING DOCUMENTS

10.1 The Scope of Work, Bidding Procedures and Contract Terms are described in the Bidding Documents. In addition to the covering letter acccompanying Bidding Documents, the Bidding Documents include:

(a) Request for Quotation (RFQ) - Section - I
(b) Instructions to Bidders (ITB) - Section - II
(c) Commercial Terms & Conditions - Section -III
(d) Bill of Quantity/Price Format - Section IV

The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, Terms and Specifications. Failure to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.

## 11 AMENDMENT OF BIDDING DOCUMENTS

11.1 At any time prior to the deadline for submission of Bids, the Department may for any reasons, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment.

11.2 The Amendment shall be part of the Bidding Documents, and it will be notified in writing by Fax/e-mail to all the Bidders who have received the Bidding Documents and confirmed their participation to Bid, and will be binding on them.

11.3 In order to afford prospective Bidders reasonable time in which to take the Amendment into account in preparing their Bids, the Department may, at its discretion, extend the deadline for the submission of Bids.

## 12 PREPARATION OF BIDS

### 12.1 LANGUAGE OF BID

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the Department, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

### 12.2 DOCUMENTS COMPRISING THE BID

The Bid prepared and submitted by the Bidder shall comprise the following components:

a) Bid Form, Price & other Schedules (STRICTLY AS PER FORMAT).

b) All the Bids must be accompanied with the required EMD, as mentioned in the Section – I, against each tender.

## 12.3 BID FORM

The Bidder shall submit “Original” Bid Form and the appropriate Price Schedules and technical specifications enclosed with the Bidding Documents.

## 12.4 EMD

Pursuant to Clause 8.0(b) above, the bidder shall furnish, as part of its bid, a EMD amounting to Rs. 5,00,000/- ( Rupees Five Lakh) as already specified in the Section-I. The EMD is required to protect the Department against the risk of Bidder‘s conduct which would warrant forfeiture.

The EMD shall be denominated in any of the following form:

a) Demand Draft/Pay Order drawn in favors of Department for the welfare of SC/ST/OBC/Minorities, payable at Delhi.

b) Bank Guarantee/Fixed Deposit Receipts (FDR) from a scheduled bank in favors of Department for the welfare of SC/ST/OBC/Minorities valid for 06 (Six) months after last date of receipt of tenders

c) Earnest money given by all the bidders except the lower bidder shall be refunded within 6 (six) weeks from the date of opening of price bid. The amount of EMD by the lowest bidder shall be adjustable in the security bank guarantee.

The EMD may be forfeited in case of:

a) If the Bidder withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form

or

b) In the case of a successful Bidder, if the Bidder does not
   a. Accept the Purchase Order,

   or

   b. Furnish the required performance security BG.

## 13 BID PRICES

13.1 Bidders shall quote for the entire Scope of work with a break-up of prices for individual items. The tenderer is required, at his expense, to obtain all the information he may require to enable him to submit his tender including necessary visits to the site to ascertain the local conditions, procurement of necessary materials, labour, etc., requirements of the local/government/public authorities in such matters.

13.2 Prices quoted by the Bidder shall be "Firm" and not subject to any price adjustment during the performance of the Contract. A Bid submitted with an adjustable price will be treated as non -responsive and rejected.

## 14 BID CURRENCIES

Prices shall be quoted in Indian Rupees Only.

## 15 PERIOD OF VALIDITY OF BIDS

Rates quoted by the bidder shall be valid upto six months from the date of issue of the tender.

## 16 ALTERNATIVE BIDS

Bidders shall submit Bids, which comply with the Bidding Documents. Alternative Bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the Bidding Documents.

## 17 FORMAT AND SIGNING OF BID

The original Bid Form and accompanying documents(as specified in Clause 9.0), clearly marked "Original Bid", must be received by the Department at the date, time and place specified pursuant to Clauses15.0 and16.0.

The original copy of the Bid shall be typed or written in indelible ink and shall be Signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written Power-of-Attorney accompanying the Bid.

The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

## 18 SUBMISSION OF BIDS:

18.1 Bid submission: One original (hard copies) of all the Bid Documents shall be sealed and submitted to the Department before the closing time for submission of the bid.

18.2 The Technical Documents and the EMD shall be enclosed in a sealed envelope and the said envelope shall be super scribed with — “Technical Bid & Commercial Terms & Conditions “. The price bid shall be inside another sealed envelope with super scribed — “Financial Bid“. Both these envelopes shall be sealed inside another big envelope. All the envelopes should bear the Name and Address of the Bidder and marking for the Original. The envelopes should be super scribed with —“Tender Notice No. & Due Date of opening.”

18.3 The Bidder has the option of sending the Bids in person. Bids submitted by Email/Telex/Telegram /Fax will be rejected. No request from any Bidder to the Department to collect the proposals from Courier/Airlines/Cargo Agents etc shall be entertained by the Department.

## 19 DEADLINE FOR SUBMISSION OF BIDS

19.1 The original Bid, together with the required copies, must be received by the Department at the address specified no later than 2.00 P.M. on 26/8/2015.

19.2 The Department may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in which case all rights and obligations of the Department and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended

## 20 ONE BID PER BIDDER

Each Bidder shall submit only one Bid by itself. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

## 21 LATE BIDS

Any Bid received by the Department after the deadline for submission of Bids prescribed by the Department will be declared "Late" and rejected and returned unopened to the Bidder.

## 22 MODIFICATIONS AND WITHDRAWAL OF BIDS

The Bidder is not allowed to modify or withdraw its Bid after the Bid‘s submission.

## 23 EVALUATION OF BID

### 23.1 PROCESS TO BE CONFIDENTIAL

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Department's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

### 23.2 CLARIFICATION OF BIDS

To assist in the examination, evaluation and comparison of Bids, the Department may, at its discretion, ask the Bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted.

## 23.3 PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS

23.3.1 Department will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order.

23.3.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

23.3.3 Prior to the detailed evaluation, Department will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

23.3.4 Bid determined as not substantially responsive will be rejected by the Department and/or the Department and may not subsequently be made responsive by the Bidder by correction of the non - conformity.

## 24 EVALUATION AND COMPARISON OF BIDS

24.1 The evaluation of Bids shall be done based on the delivered cost competitiveness basis.

24.2 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes: In the first stage, the Bids would be subjected to a responsiveness check. The Technical Proposals and the conditional ties of the Bidders would be evaluated.

24.3 Subsequently, the Financial Proposals along with Supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids shall be considered for final evaluation.

24.4 The Department's evaluation of a Bid will take into account, in addition to the Bid price, the following factors, in the manner and to the extent indicated in this Clause:

a) Work completion schedule
b) Conformance to Qualifying Criteria
c) Deviations from Bidding Documents

Bidders shall base their Bid price on the terms and conditions specified in the Bidding Documents.

The cost of all quantifiable deviations and omissions from the specification, terms and conditions specified in Bidding Documents shall be evaluated. The Department will make its own assessment of the cost of any deviation for the purpose of ensuring fair comparison of Bids.

Any adjustments in price, which result from the above procedures, shall be added for the purposes of comparative evaluation only to arrive at an "Evaluated Bid Price." Bid Prices quoted by Bidders shall remain unaltered.

## 25 AWARD OF CONTRACT

### 25.1 CONTACTING THE DEPARTMENT

25.1.1 From the time of Bid opening to the time of contract award, if any Bidder wishes to contact the Department on any matter related to the Bid, it should do so in writing.

25.1.2 Any effort by a Bidder to influence the Department and/or in the Department‘s decisions in respect of Bid evaluation, Bid comparison or Contract Award, will result in the rejection of the Bidder‘s Bid.

### 25.2 THE DEPARTMENT ’S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BID

The Department reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Department‘s action.

The Department will award the Contract to the successful Bidder whose Bid has been determined to be the lowest-evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to satisfactorily perform the Contract. Department reserves the right to award order to other bidders in the tender, provided it is required for progress of project & provided he agrees to come to the lowest rate.

### 25.3 THE DEPARTMENT’S RIGHT TO VARY QUANTITIES

The Department reserves the right to vary the quantity i.e. Increase or decrease the numbers/quantities without any change in terms and conditions during the execution of the Order.

### 25.4 LETTER OF INTENT/ NOTIFICATION OF AWARD

The letter of intent/ Notification of Award shall be issued to the successful Bidder

whose bids have been considered responsive, techno-commercially acceptable and evaluated to be the lowest (L1). The successful Bidder shall be required to furnish a letter of acceptance within 7 days of issue of the letter of intent /Notification of Award by Department.

## 21 CORRUPT OR FRADULENT PRACTICES

The Department requires that the Bidders observe the highest standard of ethics during the procurement and execution of the Project. In pursuance of this policy, the Department defines, for the purposes of this provision, the terms set forth below as follows:

a) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

b) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Department, and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non -competitive levels and to deprive the Department of the benefits of free and open competition.

c) Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

d) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.

Furthermore, Bidders shall be aware of the provision stated in the Terms and Conditions of Contract.

# SECTION – III: TERMS AND CONDITIONS

1. **DEFINITIONS:**

The following terms shall have the meaning hereby assigned to them except where the context otherwise requires:

a. **Department** shall mean **Department for the welfare of SC/ST/OBC/Minorities** , having its office at B Block 2nd Floor Vikas Bhawan IP Estate Delhi-110002 and shall include its authorized representatives, agents, successors and assigns**.**

b. **Engineer in Charge (EIC)** shall be the person authorized by the Department or from time to time duly appointed by the Department for the purpose of the contract.

c. **Contractor** shall mean the successful Tenderer / vendor to whom the contract has been awarded**.**

d. **Sub-Contractor** shall mean the persons, firm or Department to whom any part of the contract has been sublet by the Contractor with the prior written consent of the Department**.**

e. **Contract**, shall mean and include the general terms and conditions, technical specifications, drawings, priced bill of quantities, schedule of rates and prices, if any, tender, Department's letter of intent, the work order and any correspondence letters concerned to the tender, when completed**.**

f. **Site**, shall mean the actual place in over or under which, permanent works or temporary works is to be executed by the Contractor**.**

g. **Contract Price** shall mean the sum named in the letter of acceptance, subject to such additions thereto and /or deductions there from as may be made under the provisions hereinafter contained.

h. **Temporary Works** shall mean all temporary works of every kind required in or about the execution or maintenance of the works**.**

i. **Permanent Works** shall mean the permanent works to be executed and maintained in accordance with the Contract**.**

j. **Specifications** shall mean specification referred to in the tender and any modification thereof or addition thereto as may, from time to time be instructed by the Department/ the Structural Consultant**.**

k. **Drawings** shall mean the drawings issued along with this tender and any modification in such drawings issued by the Architect/Structural Consultant of the Department from time to time.

l. **Approved,** shall mean approved in writing by Department including subsequent written confirmation of previous verbal approval and "approval" means approval in writing by Department, including as aforesaid.

m. **Language and Measurement:**

The order issued to the contractor by the Department and all correspondence and documents relating to the order placed on the contractor shall be written in

English language.

Metric System shall be followed for all dimensions, units etc., the mode of measurement shall be as per IS 1200.

n. **Cost:**

The word "Cost" shall be deemed to be all inclusive, firm price basis and also including overhead costs and all taxes whether on or off the site.

2. **PERFORMANCE BOND:**

2.1) The contractor to furnish security Performance Bank Guarantee issued on behalf of Contractor in the prescribed format within fifteen (15) days from the date of issuance of Work Order for due performance of this Contract. The same shall be released after completion of the job.

2.2) The security Performance Bank Guarantee shall be of Ten percent (10%) of total contract value and shall be valid till five years from the date of commissioning of PV plant. The same shall be returned to the contractor after completion of five years from the date of commissioning of PV plant and then he has to submit the performance bank guarantee of 5% of the total contract value for a period of five (5) years.

2.3) Performance Bank Guarantee shall be issued from any nationalized bank as per Department format.

2.5) The Department shall reserve the right to invoke the performance bond unconditionally and without recourse to the Contractor, if there is failure to perform any part of the Contract for whatsoever reason. This clause is pertaining to performance of contractual obligations and the decision of Department shall be final in this regard.

2.6) In the event, in Department sole judgment, the Contractor has fulfilled all its obligations under this Contract, Department shall release the performance bank guarantee without interest, within seven (7) days from the last date up to which the performance bank guarantee is to be kept valid or if it is assessed by the Department that Contractor has not fulfilled its obligation then the performance bank guarantee shall be extended by the Contractor till that period as requested by the Department.

**3.0) TERMS OF PAYMENT:**

**3.1) <u>Payment for Supply contract</u>**

Payment shall be made after successful commissioning of project. The Contractor shall submit the bill along with duly checked final measurements and completion certificate towards the successful completion of the Contract as certified by the EIC**.**

**4.0) TAXES & DUTIES:**

Prices are inclusive of all taxes, duties, Construction Cess & octroi turn over tax etc. livable by State or Central Government or local bodies shall be to contractor's account including any duties which may be levied by the Govt. during currency of this order(except service tax). However, IT / VAT as per applicable rate will be deducted from your bills as Tax Deduction at Source (TDS).

However service tax as applicable shall be paid extra on submission of Service Tax Registration and self declaration on your letter head stating that you have

deposited/or will deposit the Tax as per the applicable service tax laws.

**5.0) TENDER RATES & PRICES ALL INCLUSIVE:**

5.1) The prices/rates quoted for each item/work in the BOQ shall be inclusive of all direct and indirect costs, insurances, statutory charges, statutory fees, royalties, taxes on quarried items, duties, only service tax shall be shown separately. i.e. sales tax, consignment tax, octroi / local tax, incidental charges, cost of complying to other local authorities etc., and any other costs that may be involved in completing the works as required, fulfillment of all obligations under the Contract and to the satisfaction of the Department.

5.2) The rates quoted for each item/work in the BOQ by the Contractor shall remain firm until the successful completion of the Contract as certified by the Engineer In Charge including any extension (s) of time that may have been granted to the contractor under the scope of this Contract and shall not be subject to escalation on any account. The rates quoted for each item/work in the BOQ shall be deemed to include and cover all cost, expenses and liabilities to every description and all risk of every kind to be taken in executing, completing and handing over the work to the satisfaction of the Department.

5.3) The Contractor shall on his own and at his own expense obtain all necessary permits and permissions to execute the job, including required registrations, agent's etc. to perform its obligation under this Contract and shall indemnify the Department in all related matters.

**6.0) MATERIALS & WORKMANSHIP:**

6.1) Quality Assurance Programme:

The Contractor before the start of work shall submit for approval a quality assurance programme to the EIC indicating measures that he proposes to implement to ensure that the quality of work shall be in accordance with requirements, specifications laid down in the Contract. The Contractor shall strictly adhere to this programme and any failure attributable to the Contractor shall attract the penal provisions determined by the EIC.

6.2) Quality of equipment / components and workmanship and tests:
The Contractor shall manufacture all equipment / components from international standard procedures and the sources with quality controls as approved by the Department & as per Department specifications. Contractor shall provide all requisite facilities for field tests and laboratory tests shall be carried out in the laboratory having ISO Certified Testing Lab for which no extra payment shall be made. The Contractor shall maintain mandatory Test Register with Engineer-in-Charge as provide in latest Indian Standard Specifications.

All equipment and workmanship shall be of the respective kinds described in the Contract and in accordance with the Engineer-in-Charge's instructions and shall be subjected from time to time to such tests as the Engineer-in-Charge may direct at the place of manufacture or fabrication or on the site or at such other places or places as may be specified in the Contract, or at all or any of such places. The Contractor shall provide at no additional cost to the Department such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples of materials before incorporation in the works for testing

as may be selected and required by the EIC.

6.3) Inspection of operations:

The Engineer-in-Charge or any person authorized by them shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

6.4) Examination of work before covering up:

No work shall be covered up or put out of view without the approval of the EIC or his representative and the Contractor shall afford full opportunity to the EIC or his representative to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the EIC or his representative whenever any such work or foundations is or are ready or about to be ready for examination and the EIC or his representative shall, without unreasonable delay, unless he considers it unnecessary, attend for the purpose of the examining such foundations.

**7.0) MOBILISATION:**

The Contractor shall have to mobilize their Plants & Equipments, Tools & Tackles, Work Labour Force, project team including Engineering Staff and materials required for execution of work within seven days (7) of receipt of Work Order whichever is earlier.

**8.0) DEFECT LIABLITY PERIOD:**

The defects liability period shall be 120 (one hundred twenty) calendar months from the date of the successful completion of the contract as certified by the EIC including any extension (s) of time that may have been granted to the Contractor under the scope of this Contract. In case any defect in the work is observed during the defect liability period, the same shall be rectified by the Contractor at own cost including supply of all materials (as per prevailing rates), labour, equipments and any other appliance in this regards for the fulfillment of all obligations under the Contract and to the satisfaction of the Department.

**9.0) DAMAGE OF PRIVATE PROPERTIES / LIFE:**

The Contractor shall be responsible for all risk to the works to be performed under its obligation under the Contract and for trespassers, and shall make good at his own expenses all losses and damages whether to the works, themselves, or to any other property of the Department or the lives, persons or property of other forms, whatsoever cause, in connection with the works, although all reasonable and proper precautions may have been taken by the contractor, and in case Department is called upon to make good any such costs, loss or damages or to pay compensation to any person(s) sustaining damages by reason of any act, or any negligence or omission on the part of the Contractor, the amount of any costs or charges (including costs and charges towards legal proceedings) which the Department may incur in reference thereto, shall be charged to the Contractor. The Contractor shall reimburse such costs immediately to the Department.

**10.0) SITE OFFICE AND SITE FACILITIES:**

The Contractor shall also make his own arrangement for the accommodation/conveyance requirements for its staff. He shall be provided at site the adequate open space for construction of site store for storing the materials, tools, tackles etc. All the Contractor's storage will be within the site premises in a manner affording convenient access for identification and inspection at all times. The storage of arrangements shall be subject to IS: 4082. All the incoming and outgoing materials, equipment, tools, tackles and any other items related to said work shall be entered into the register kept for this purpose and shall be in the safe custody of Contractor, however Department does not hold any responsibility for any loss or damage caused to Contractor's material etc.

10.1) The Contractor shall strictly control the labour so that the site is not polluted, made dirty or littered with debris, wastes or the likes.

10.2) Any person, labour found creating mess or litter or pollution shall be removed from the site immediately at the Contractors cost and shall also be subject to penalty at the discretion of the EIC.

**10.3) <u>Water & Power</u>**:

Water and Electricity Power shall be arranged by the Contractor at his own.

**10.4) <u>Watching & Lighting</u>:**

The Contractor shall in connection with the works provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary for the protection of works, or for the safety and convenience of the public or others. The care, housekeeping and safety of the materials and works within the works site shall be sole responsibility of the Contractor.

**11.0) TIME & COMPLETION PERIOD:**

Time is the essence of this Project and the Project shall be completed within 06 months from the date of issue of Letter of Intent or Work Order whichever is earlier, including mobilization period and monsoon.

The Contractor shall within 7 (seven) days of the issue of letter of intent or work order whichever is earlier provide a detailed execution program regarding the Project taking into account the following including restricted working hours due to residential area for the approval of the Department:

The Contractor shall carryout the works as per the approved schedule / program of work.

**12.0) LIQUIDATED DAMAGES:**

In the event of the Contractor’s failure to complete the work or any part there of within the Contract Period including the interim milestone dates, the Contractor shall be liable to pay the Department liquidated damages calculated at the rate of **0.5 % of the contract value per week of delay or part there of subject to a maximum of 5 ( Five ) % of the contract value**, for the period between the date for Contractual Completion and the Date of Actual Completion, as certified by the EIC.

The Department may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies in its possession, which are due or which may become due to the Contractor. The levy payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works

on time or from any other part of his obligation and liabilities under the Contract. Once the maximum is reached the Department reserves the right for termination of contract without any liabilities to the Department.

In the event of an extension of time being granted by the EIC, in writing for the Completion of the works, this clause shall be applicable after the expiry of such an extended period.

**13.0) EXTENSION OF TIME LIMIT & TIME OVER RUN:**

If delay is not attributable to the Contractor, the extension of time may be considered at the discretion of the Department without prejudice to the right of the Department for recovery of liquidated damages. This is also subject to the Contractor having taken sufficient precautions to mitigate the delay and submitted to the Department a full-detailed particular of any extension of time to which he may consider himself entitled within 10 days after such work has been commenced or such circumstances have arisen. The extension of time may be granted and without any financial increment in the contract price to the Department.

**14.0) RELEASE OF INFORMATION AND CONFIDENTIALITY:**

The Contractor shall not communicate or use in advertising, publicity, sales release or in any medium photograph or reproduction of the works under this contract, or description of the site, dimensions, quantity or any other information concerning the works unless prior written permission is obtained by Department. The Contractor shall keep all the information obtained directly or indirectly through appointment of this contract confidential and shall not reveal the same to any other party without the prior written permission of the Department. The technical information, drawing and other related documents forming part of order and the information obtained during the course of execution under this order shall be the Department's exclusive property and shall not be used for any other purpose except for the execution of the order. The technical information drawing, records and other document shall not be copied, transferred, or divulged and/or disclosed to third party in full/part, not misused in any form whatsoever except to the extent for the execution of this order. This technical information, drawing and other related documents shall be returned to the Department with all approved copies and duplicates including drawing/plans as are prepared by the Contactor during the executions of this order, if any, immediately after they have been used for agreed purpose.

In the event of any breach of this provision, the contractor shall indemnify the Department against any loss, cost or damage or claim by any party in respect of such breach.

**15.0) SITE REPRESENTATIVE, SITE SUPERVISION AND ADVANCE INTIMATION:**

15.1) The Contractor shall have to appoint and authorize a Site In Charge/ Project Manager (PM) along with its project team, who shall be available always at site till the completion of the contract as certified by the Department's Engineer In Charge (EIC).

15.2) The Contractor shall be responsible for supervising the works by employing competent and experienced engineers and support teams to inspect the work and check the quality of work to ensure that the work is carried out in accordance with the drawings, specifications and instructions of the EIC. Such inspection and supervision shall not relieve the Contractor from any of his obligations towards use of material, workmanship, sequence of working and completion of project as per the

stipulated period.

15.3) On receipt of the Work Order the Contractor shall furnish to the Department, for approval, the proposed site setup with list of Engineers, Supervisors and other staff to be deployed by him with their dates of joining.

15.4) The Contractor's Project Manager shall obtain the written approval and instructions from the EIC prior to commencement of any works at site. The Project Manager (PM) shall give written advance intimation for approval of all activities including deployment of resources, procurement of materials, concrete pours etc., shall be given to EIC by PM.

**16.0) AWARD / SUBLETTING OF CONTRACT:**

The Department reserves the right to reduce/ award consolidated order or separate orders for one or more parts against above work.

The Contractor will not be permitted to sublet his job in whole or Part without the prior written permission of the Department. The Contractor shall submit to the Department a list of Sub- Contractor, suppliers (not less than three names) for the approval of the Department. The Department may approve all or any of the names or reject all names, which in his opinion do not meet the prerequisite qualifications. The Contractor shall re-submit a fresh list of names for approval. Further in the event that none of the names submitted by the contractor are acceptable to the Department, the Department may suggest names to the Contractor and it shall be binding upon the Contractor to accept the names suggested.

**17.0) SITE LOCATION:**

The Contractor must see the site of the work, surrounding locality, local traffic rules, site approaches etc. carefully. No claim of any sort shall be entertained on account of any site conditions. If any approach from main road is required or existing approach is to be improved and maintained, for cartage and materials by the contractor, the same shall be provided, improved and maintained by him at his own cost.

**18.0) SAFETY REGULATIONS:**

18.1) The Contractor shall ensure adequate safely precautions at site as required under the law of the land and shall be entirely responsible for the complete safety of their workmen as well as other workers at site and premises.

18.2) The Contractor shall indemnify the Department from any consequence arising due to contractor's failure in respect to safety compliance.

18.3) First Aid facilities at easily accessible place shall be provided by the Contractor at his own cost as per provisions of Labour act or as advised by the Department wherever works are carried out.

18.4) All critical injuries shall be reported promptly to the Department. The report shall cover type, nature, cause, physician's report and actions for prevention of those types again.

18.5) To ensure effective enforcement of the rules and regulations relating to safety precautions, arrangements made by the Contractor shall be open to

inspection by the Department.

18.6) The cost so incurred by the Contractor in providing for safety standards and requirements as above shall be deemed to be included in the rates quoted for various items under the scope of Contract and no extra amounts shall be payable to the contractor on this account.

18.7) The Contractor shall furnish to the Department within seven days from issue of Work Order, for approval of Department, the proposed safety programme on how it intends to implement the safety procedures and precautions to ensure that the site is accident free.

**19.0) CO-ORDINATION WITH OTHER AGENCIES:**

The Contractor shall execute the work in strict consultation with the Department and in co-ordination with other agencies appointed by the Department who will also simultaneously execute the components of work allotted to them.

The Contractor at his own cost shall also extend their site facilities, plant and equipments on written request of the Department/ EIC for use by other contractors appointed by the Department.

**20.0) MAINTENANCE OF WORK:**

The Contractor shall maintain in perfect condition all works executed till the completion of the entire work allotted to him. Where phased handing-over of completed portion of the work is required, the provisions mentioned herein will apply to each phase.

**21.0) TESTING OF MATERIALS:**

All materials received at site shall be accompanied by the Test certificate of the manufacturer. The Engineer-In-Charge reserves the right to instruct any material to be further tested in an approved laboratory for which the Contractor shall make no additional claims. Where ever test requirements are not specified in the specifications relevant IS code of practice shall govern.

**22.0) STATUTORY OBLIGATIONS:**

The Contractor shall take all steps as may be necessary to comply with the various applicable laws/rules including the provisions of contract labour (Regulation & Abolition Act) 1970 as amended, Minimum wages Act, 1984, Workman Compensation Act, ESI Act, PF Act, Bonus Act and all other applicable laws and rules framed there under including any statutory approval required from the Central/State Governments, Ministry of Labour. Contractor is liable for registration of the Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the rules framed there under with the Delhi Building and other Construction Workers Welfare Board. Broadly, the compliance shall be as detailed in **ANNEXURE I** enclosed.

Before issue of Work order it would be mandatory for the Contractor to furnish the Department the permanent PF code no, ESI registration, registration under W.C.T Act.

**23.0) ENVIRONMENTAL, HEALTH & SAFETY PLAN:**

Contractor will ensure that the Environment, Health & Safety (EHS) requirements are clearly understood and faithfully implemented at all levels at site as per instruction of Department.

Contractors must comply with the following requirements:

a) Comply with all of the elements of the EHS Plan and any regulations applicable to the work.

b) Comply with the procedures provided in the interests of Environment, Health and Safety.

c) Ensure that all of their employees designated to work are properly trained and competent.

d) Ensure that all plant and equipment they bring on to site has been inspected and serviced in accordance with legal requirement and manufacturer's or suppliers' instructions.

e) Make arrangements to ensure that all employees designated to work on or visit the site present themselves for site induction prior to commencement of work.

f) Provide details of any hazardous substances to be brought onsite.

g) Ensure that a responsible person accompanies any of their visitors to site.

All Contractor/workers are accountable for the following:

1. Use the correct tools and equipment for the job and use safety equipment and protective clothing supplied, e.g. helmets, goggles, ear protection, etc. as instructed.

2. Keep tools in good condition.

3. Report to the Supervisor any unsafe or unhealthy condition or any defects in plant or equipment.

4. Develop a concern for safety for themselves and for others.

5. Prohibit horseplay.

6. Not to operate any item of plant unless they have been specifically trained and are authorized to do so.

## 24.0) GENERAL CONDITIONS:

24.1) No idle labour charges will be admissible in the event of any suspension of work by the Department or stoppage caused in the work resulting in contractors' labour or equipments being rendered idle due to any cause at any time.

24.2) If the Contractor needs to carry out any work or rework due to change in drawings or structural consultants instructions, the Contractor shall take the prior permission of the Department/ EIC before commencing such works. The Contractors quoted price shall include such rework or incidentals due to quantity variation, or methodology to carry out the works, wherever required and shall not be entitled for any extra payment or extension of time.

24.3) The Department reserves the right to claim and recover from the security deposit the damages/ losses incurred due to non-compliance to work delay in the progress of work by the Contractor as agreed upon. The decision of the Department in this regard shall be final and binding.

24.4) The Contractor agrees to abide by other terms and conditions stipulated by the Department from time to time in addition to the above for the proper and satisfactory performance of their obligations under this Contract.

**25.0) INSURANCE:**

The Contractor at its own cost shall also arrange, secure and maintain the following insurance covers: -

**25.1) WORKMEN COMPENSATION:**

The Contactor shall take insurance policy under the Workman Compensation Act to cover such workers, who are not covered under ESI and PF by the Contractor however engaged to undertake the jobs covered under this order and a copy of this insurance policy will be given to Engineer-In-Charge. This insurance policy shall be kept valid at all times. In case there are no workers involved other than those who are covered under ESI and PF by the Contractor, the Contractor shall certify for the same.

The Contractor shall keep the Department indemnified at all times, against all claims of compensation under the provisions of Workmen Compensation Act 1923 and as amended from time to time or any compensation payable under any other law for the time being workman engaged by the Contactor/sub-Contactor/sub-agent in carrying out the job involved under this order and against costs and expenses, if any, incurred by the Department in connection therewith and without prejudice to make any recovery.

The Department shall be entitled to deduct any money due to or to become due to the Contractor, money paid or payable by way of compensation as aforesaid or cost or expenses in connection with any claims thereto and the Contactor shall abide by the decision of the Department as to the sum payable by the Contactor under the provisions of this clause.

**25.2) THIRD PARTY INSURANCE**

Before commencing the execution of the work the Contractor shall insure against any damage or loss or injury which may occur to any property or to any person or any employee or representative of any outside Agency/Department engaged or not engaged for the work of the Department, by or arising out the execution of the permanent work or temporary work or in carrying out of this work order.

**26.0) TERMINATION OF CONTRACT:**

If in case the Contractor;

a) becomes bankrupt or insolvent, has a receiving order issued against it compounds with its creditors, or if the Contractor is a corporation a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction) a receiver is appointed over any part of its undertaking or assets or if the Contractor takes or suffers any other analogous action in consequence of debt.

b) Assigns or transfers the Contract or any right or interest therein in violation of the provision of given work to sub-contractor.

c) In the judgment of the Department, has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this Sub-clause

"Corrupt practice" means the offering, giving, receiving or soliciting of any thing of value to influence the action of a public official in the procurement process or in Contract execution.
"Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a Contract to the detriment of Department and includes collusive practice among tenderers (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition.

d) Has abandoned or repudiated the Contract

e) Has without valid reason failed to commence work on the Facilities promptly or has suspended days after receiving a written instruction from the Department to proceed.

f) Persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause.

g) Refuses or is unable to provide sufficient materials services or labour to execute and complete the Facilities in the manner specified in the program furnished and at rate of progress that give reasonable assurance to the Department that the Contractor can attain completion of the Facilities by the time for completion.

Then Department may, without prejudice to any other rights it may possess under the Contract, give a notice to the Contractor stating the nature of the default and requiring the Contractor to remedy the same. If the Contractor fails to remedy or to take steps to remedy the same within fourteen (14) days of its receipt of such notice then Department may terminate the Contract forthwith by giving a notice of termination to the Contractor.

In case, Contractor fails to carry out the work as specified in the schedule or left in between, it will be got done through any other agency at contractors' risk and cost, the same shall be recovered from the amount payable to the Contractor.

In case the Contractor fails to start work / to carry out the work within the specified period i.e. mutually agreed schedule and the work is not found to be satisfactory, the Department reserves the right to terminate the contract, at any stage without assigning any reasons thereof. In such case the Department shall have the right to forfeit the entire / part amount of EMD / Security Deposit.

**27.0) SETTLEMENT OF DISPUTES/ ARBITRATION:**

**27.1)** To the best of their ability, the parties hereto shall endeavor to resolve amicably between themselves all disputes arising in connection with this work order. If the same remain unresolved within thirty (30) days of the matter being raised by either party, either party may refer the dispute for settlement by arbitration. The arbitration to be undertaken by the arbitrator appointed by the Department. The arbitration proceeding shall be conducted in accordance with this provisions of the Indian Arbitration & Conciliation Act, 1996.

**28.0) QUANTITIES IN THE BOQ:**

Department reserves the right of deletion of any item in full or in part or to reduce, increase or to modify the Scope of Work. The rates quoted by the Contractor shall remain firm even if there are any variations in the quantities mentioned in the Bill of Quantities, or due to any idling of resources due to non availability of fronts, details, etc.

**29.0) VARIATIONS AND EXTRA ITEMS**

29.1) The Contractor shall carry out and complete the works in every respect in accordance with this Contract and In accordance with the directions and to the satisfaction of the Engineer in charge.

29.2) The Engineer In Charge may, at his discretion, from time to time, issue further drawings and/ or written instructions, details, directions and explanations which are herein after referred to as "EIC's Instructions" in regard to:

a) The variation or modification of the design, quality, specification or quantity of works or the omission or substitution of any work.
b) The timing or sequencing of work.
c) Any discrepancy between the drawing and / or the Bill of Quantities and / or Specifications.
d) The removal from the site of any materials/ equipment/ resources brought thereon by the Contractor and the substitution of the same thereof.
e) The Execution of additional works of any kind necessary for the completion of the work.
f) The removal and /or re-execution of any works executed by the Contractor.
g) The substitution from the site of the works of any person employed there upon.
h) The amending and making good of any defects under clause "Defects Liability"
i) The opening up for inspection of any work covered up.
j) Changes in lines, levels, positions and dimensions of any part of the Work.

29.3) The Contractor shall forthwith comply with and duly execute any work comprised in such EIC's instructions provided always that verbal instructions, directions and explanations given to the Contractor or his supervisor upon the works by the Engineer In Charge shall if involving a variation be confirmed in writing by the Contractor within seven days and the Engineer in charge's written approval is obtained.

29.4) If compliance with the Engineer In Charge's Instructions as aforesaid involves work beyond that contemplated by the Contract, then unless the same were issued owing to some breach of this Contract by the Contractor, the EIC shall pay to the Contractor the cost of the said work as an extra to be valued and as hereinafter provided.

29.5) No such variation shall in any way vitiate or invalidate the Contract but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the final certification.

29.6) No such variations shall be carried out by the Contractor without instructions, in writing from the Engineer in charge. Provided that no instructions in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an instruction given under this clause, but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities. If the Engineer in charge shall consider it desirable to give any instructions verbally, the Contractor shall comply with such an instruction and any confirmation in writing of such verbal instruction given by the Engineer in charge whether before or after the carrying out of such work, shall be deemed to be an instruction in writing within

the meaning of this clause. Provided further that if the Contractor shall within 7 days confirm in writing to the Engineer in charge and such confirmation shall not be contradicted in writing within 30 days by the Engineer in charge, it shall be deemed to be an instruction in writing by the Engineer in charge.

29.7) all extra or additional work done on the instructions of the Engineer In Charge shall be valued at the rates and prices set out in the Contract. If the Contract does not contain any rates or prices applicable to the extra or additional work, then suitable rates or prices shall be agreed upon between Department and the Contractor as per the following, in the order of preference:

(i) The rate shall be derived from any one of the quoted rates for similar items of work in the tender.

(ii) In case similar items are not available in the tender, then rates shall be worked out as per the following:

a) The direct cost of labour including indirect charges thereon. The labour components shall be computed wherever possible from the related BIS Codes and the quantity of materials to be based on consumption factor as per standard norms or as accepted by the EIC.
b) The material cost inclusive of taxes, levies, fees, duties etc. as delivered to the site. Proof of cost in form of invoices to be submitted along with the extra work claims & other working documents.
c) The Plant & Equipment cost inclusive of hire charges of plant & equipment and operational charges as per standard norms or as accepted by the EIC.
d) In addition the Contractor shall be entitled to payment towards overheads and profit.

29.8) In cases where the items of works are not accepted as complete, or not fully in accordance with the Specification, the Engineer in Charge shall make payments of such items at such reduced rates, as he may consider reasonable in approval of Interim Bills and the Final Bill.

29.9) In all cases the Contractor shall furnish detailed Rate Analysis along with necessary details as and when required by the Engineer in Charge. The Engineer in Charge on establishing the validity of such claims shall certify the amount payable for such work and rates so determined shall be final and binding on the Contractor.

29.10) The quantities of the various kinds of work to be done and materials to be furnished under this Contract as listed in the Bill of Quantities are estimated and approximate only and shall be subject to re-measurement upon completion. The Contractor shall make no claim for anticipated profits, for loss of profits or for damages because no work is ordered under certain items or because of a difference between the quantities of the various kinds of work to be done or materials actually delivered and the estimated quantities set forth in the Bill of Quantities.

29.11) The rate/ prices quoted by the Contractor in the Bills of Quantities shall be firm irrespective of any variation in the quantities of individual items of work and / or in the Total Contract Sum.

**30.0) EXECUTION OF ADDITIONAL WORKS**

The Contractor shall be bound to carry out any items of work necessary for the completion of the works even though such items may not be part of his offer. Such work shall be instructed in writing by the Engineer in Charge and formal amendment

to the work order.

**31.0) FORCE MAJEURE**

If either Party is unable to carry out his obligations under this Contract due to an Act of God, war, riot, blockade, strike (i.e. national/ state or city), lockout, flood or earthquake or Government orders/ restrictions not within the control of the parties hereto which results in an inability, in spite of due diligence of either party in performing its obligation in time, this Contract shall remain effective, but the obligation which the affected party is unable to carry out shall be suspended for a period equal to the duration of the relevant circumstances provided that :

a) The non-performing party shall give the other Party prior written notice describing particulars of the inability including but not limited to the nature of occurrence with its expected duration and the steps which the non-forming parties is taking to fulfill its obligation.
b) Upon receipt of such notice the other party shall discuss the matter with the non- performing party with a view to helping the non-performing party to fulfill its obligations. This clause does not envisage financial assistance.
c) If in any event the Force Majeure situation continues for a period of three weeks both the parties shall meet again and discuss whether the Contract can be amended to overcome the Force Majeure situation so the Project can proceed further.

Notwithstanding anything contained to the contrary it is clarified that economic hardship, non-availability of material, labour and transport shall not constitute Force Majeure. The overall responsibilities and obligations of the parties shall not be excused by reasons of Force Majeure situation.

Not withstanding the above if the Force Majeure continues for a period of Six months or more in that event without prejudice to the rights of the parties, the Department shall have the right thereafter to terminate this contract.

**32.0) INDEMNITY:**

Contractor shall indemnify and save harmless Department against and from any and all liabilities, claims, damages, losses or expenses arising due to or resulting from:

32.1) any breach non-observance or non-performance by contractor or its employees or agents of any of the provisions of this Contract.

32.2) any act or omission of contractor or its employees or agents.

32.3) any negligence or breach of duty on the part of contractor, its employees or agents including any wrongful use by it or them of any property or goods belonging to or by Department or any other third party at site including adjoining neighbors.

32.4) Contractor shall at all times indemnify Department against all liabilities to other persons, including employees or agents of Department or other contractors for bodily injury, damage to property or other loss which may arise out of or in consequence of the execution or completion of Project and against all costs charges and expenses that may arise.

## Annexure - I

The Contractor must submit the following to Engineer-In-Charge before commencement of work:

a) An Electrical license. (If applicable)

b) PF Code No. and all employees to have PF A/c No. under PF every Act, 1952.

c) All employees to have a temporary or permanent ESI Card as per ESI Act.

d) ESI Registration No.

e) PAN No.

f) Work Contract Tax/VAT Registration Number.

g) Labour License under Contract Labour Act (R & A) Act 1970.

Annexure - II

**BID FORM**

To

**Deputy Director (Admin)**
**Department for the welfare of SC/ST/OBC/Minorities,**
**Government of NCT of Delhi, 2nd Floor, B Block**
**Vikas bhawan, New Delhi – 110002**

Sir,

We understand that **Department for the welfare of SC/ST/OBC/Minorities** is desirous for installation of **Roof top solar photo voltaic system in Sanskar Ashram Complex**, Dilshad Garden, Delhi.

1. Having examined the Bidding Documents for the above named works, we the undersigned, offer to provide our services in full conformity with the term and conditions and technical specifications for the sum as per price bid or such other sums as may be determined in accordance with the terms and conditions of the contract .The above amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

2. If our Bid is accepted, we under take to provide our services as per completion schedule mentioned in the tender document from the date of award of work order/letter of intent.

3. If our Bid is accepted, we will furnish a performance bank guarantee for due performance of the Contract in accordance with the Terms and Conditions.

5. We agree to abide by this Bid for a period of 120 days from the due date of bid submission and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

6 Unless and until Letter of Intent is issued, this Bid, together with your written acceptance there of, shall constitute a binding contract between us.

7. We understand that you are not bound to accept the lowest, or any bid you may receive.

8. There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract.

Dated this..... day of..... 2015

Signature..... In the capacity of ……

.....duly authorized to sign for and on behalf of (IN CAPITAL LETTERS) .....

Annexure - III

**FORMAT FOR BANK GUARANTEE**

*(To be issued in a Non Judicial Stamp Paper of Rs.50/-purchased in the name of the bank)*

Whereas [*name of the Bidder*] (herein after called the "Bidder") has submitted its bid dated [*date of submission of bid*] for the carrying out of [*name and/or description of the Job*] (here after called the "Bid").

KNOW ALL PEOPLE by these presents that WE [name of bank] at [*Branch Name and address*],having our registered office at[*address of the registered office of the bank*] (herein after called the "Bank"),are bound unto Department for the welfare of SC/ST/OBC/Minorities, with it's Corporate Office at 2nd Floor B Block, Vikas bhawan, Delhi-2 , (herein after called —the "Purchaser")in the sum of Rs. ……./- (Rupees ……only) for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents.
Sealed with the Common Seal of the said Bank this_____ day of_____ 2015

THE CONDITIONS of this obligation are:

1 If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form ; or

2. If the Bidder, having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity:

(a) fails or refuses to execute the Contract Form ,if required; or
(b) fails or refuses to furnish the performance security, In accordance with the Instructions to Bidders/ Terms and Conditions;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that is its demand the purchaser will note that amount claimed by it is due to it, owing to the occurrence of one or both of the two condition(s), specifying the occurred condition or condition(s).

1. This guarantee will remain in force up the period of Five years (60 months) after the due date of submission bid, and any demand in respect thereof should reach the Bank not later than the above date.

(Stamp & signature of the bank)

Signature of the witness

# SECTION : IV

# TECHNICAL : PART - A

# DESIGN, SUPPLY, ERECTION,

# TESTING, COMMISSIONING and MAINTENANCE

# OF

# 120 KWp ROOF TOP SOLAR PHOTO VOLTAIC

# POWER SYSTEM

# SCHEDULE OF PRICE : PART - B

**Department for the welfare of SC/ST/OBC/Minorities**
**Government of NCT of Delhi**

**B BLOCK, VIKAS BHAWAN, NEW DELHI-110002**

# LIST OF DOCUMENTS

## PART - A : TECHNICAL

| Sl No | Description | Doc Ref No. |
|---|---|---|
| 1 | Technical Specification | |
| 2 | Project data | BSE-PV-PRO-01 |
| 3 | PV Poly. Crys. Module Technical data | BSE-PV-MOD-01 |
| 4 | Inverter Technical data | BSE-PV-INV-01 |
| 5 | Equipment Technical data | BSE-PV-EQP-01 |
| 6 | Components Preferred Make | BSE-PV-CMP-01 |

Bidders is required to submit the mentioned data sheets duly filled along with the technical offer.

## PART - B PRICE SCHEDULE

| Sl No | Description | Doc Ref No. |
|---|---|---|
| 1 | SCHEDULE OF PRICE | BSE-PV- PSH – 01 |

# PART - A

# TECHNICAL SPECIFICATION FOR

# ROOF TOP SOLAR PHOTO VOLTAIC SYSTEM

## CONTENTS

# PART – A

# TECHNICAL SPECIFICATION

# ROOF TOP SOLAR PHOTO VOLTAIC SYSTEM

1.0 **SCOPE**

1.1 Scope of work shall include Detailed Engineering Design, Planning, Manufacturing, supply, Construction / Erection, Testing, Commissioning, Initial Operation for 5 years and Annual Maintenance for additional Five years of the solar roof top photo voltaic power plant.

1.2 Solar roof top photovoltaic plant at Sanskar Ashram complex shall be installed in accordance with Delhi Electricity Regulatory commission (DERC) Net Metering for Renewable Energy Regulation 2014. Bidders are instructed to read the said regulation carefully. Application, Registration, Clearance work from appropriate power distribution licensee/ Electrical inspector/Any other agency whatever applicable shall be in the scope of the bidder.

1.3 Roof Top solar PV plant at **Sanakar Ashram** complex indicated below as a turnkey contract according to terms and conditions.

| **ROOF TOP SOLAR PV SYSTEM** | | |
|---|---|---|
| **PV SYS.** | **Location** | **Capacity(KWp)** |
| **1** | **Boys Home** | **120 KWp** |

| | | |
|---|---|---|
| **2** | **Girls Home** | |
| **3** | **Nehru Boys Hostel** | |
| **4** | **Kamla Nehru Girls Hostel** | |
| **5** | **NSIC Training centre** | |

Bidder to independently assess the possibility of installing the above indicated capacity based on the modules configuration and layout.

1.4 The contract shall be in accordance with all applicable regulations and permits so that the solar PV plant fulfils the power feed into 415 V 3 phase 50HZ grid with guaranteed performance.

1.5 Basic project planning, sequencing and scheduling, solar resource assessment, energy yield predictions for project life cycle, Detailed Engineering design, System component selection,

Preparing system drawings and all other requirements as required for successful commissioning and interconnecting the solar PV plant to transmission utility grid at 415V 3 Phase 50 Hz systems.

1.6 Manufacturing, supply, sourcing, procurement, transportation of all solar PV plant equipments, required insurance, electrical components, mechanical engineering components, construction

machinery and equipments as required for development, implementation, construction, testing, commissioning and interconnection of the utility scale solar PV plant to transmission utility grid shall be in the scope of bidder.

1.7 The scope shall also include design and construction of civil, structural and architectural works at site for the solar PV system equipment, painting as applicable. The bidder shall arrange all required materials such as reinforcement bars; cement etc. However, bidder shall indicate the ceiling requirement of reinforcement steel and cement in the proposal. All other structural steel shall be arranged by the bidder.

1.8 The bidder shall asses the capacity of roof loading according to modules and supporting

structural weights. If necessary the bidder shall arrange and install required materials to strengthen the roof so as to take care the modules loading condition for continuous successful operation.

1.9 Arranging for power and electricity during construction, assistance for obtaining permits and approvals from all local authorities, government statutory bodies, obtaining permissions from electrical inspectorate, relay testing and charging of transmission cable as required for completion and commission of plant shall be in scope of bidder.

1.10 Site preparation and leveling , assembly and construction of the entire solar PV system, all pre installation checks such as physical damages , site management and supervision, labor provision, testing and commissioning of PV system and commissioning and interconnection of the utility scale solar PV plant to transmission utility shall be in scope of bidder.

1.11 The equipment and operations not included, that are necessary for proper functioning of the solar PV system and fulfillment of the guaranteed performance, rules, regulation, and applicable codes shall be included by the bidder.

1.12 Commissioning of the solar PV system with preliminary tests monthly and quarterly performance evaluations and performance tests as required by Department for the welfare of SC/ST/OBC/Minorities.

Total period for design, manufacture, supply, erection, testing & commissioning of the proposed solar PV system should be **6 months** from the date of issue of Work order.

1.13 **PREQUALIFICATION REQUIREMENT**

The following criteria shall be applicable for the eligibility criteria to participate in the bidding. Bidders who meet following requirements will be considered as successful bidders and management has a right to disqualify those bidders who do not meet these requirements:-

- Bidders must have executed the work of like nature and have extensive experience of carrying out similar types of work.

- Bidders should have executed at least three (3) projects aggregating to a capacity of not less than 200 KW roof top solar PV plant.
- The Bidders shall have adequate after sales service infrastructure including fully trained manpower and necessary tools and plant within NCR. Details for the same shall need to be furnished with the offer.
- The bidder must have an experience of integration of various plant & equipments including power conditioning unit, associated electrical and related civil structures.
- Bidder should have executed at least three (3) projects aggregating to a capacity of not less than 200 KW Roof top Solar PV Plant.
- The bidder must have ISO 9001certification.
- The Bidder should have BIS / IEC approval for their modules , Inverters, other electrical /electronic system components / controls, cables.
- Bidder shall offer only indigenously manufactured PV modules and also bidder shall have own facility for manufacturing of modules as per the international quality standard process and testing.
- Firms who are debarred/blacklisted in other utilities in India will not be considered.
- Owner reserves the right to carry out capability assessment of the bidders and owner's decision shall be final in this regard.

1.14 **Technical Offer**: To be submitted in a separate envelop super scribed

"Technical offers for 120 KWp Grid Connected Roof Top solar PV Power System at Sanskar Ashram Complex" and submitted as per **Part A**

1.15 **Price Offer :** To be submitted in a separate envelope super scribed

"Price Offer for 120 KWp (Specify Capacity) Grid Connected Roof Top SPV Power Plant at Sanskar Ashram Complex" and submitted as per **Part B.**

Tender document duly filled in and signed along with official seal, must be put in the proper envelope, duly sealed and should be submitted to this office as per the date stipulated

The details of projects already executed by the bidder shall be furnished along with bidding document.

## 2.0 REQUIRED EQUIPMENT AND SERVICES

### 2.1 PV Module:

Module for this project shall be based on multi crystalline technology

### 2.2 INVERTER

Following are the specific requirements for all proposed central inverters:

- Inverters should be approved by the module manufacturer for the compatibility; such documentary evidence is required to be submitted by the bidder upon award of contract.
- Transformer less inverters shall be preferred. Restriction of DC components on AC side shall be achieved.
- Maximum power point tracker (MPPT) - Inverter configurations should be equipped with multiple independent MPP trackers resulting in enhanced system performance.
- Inverters shall be capable of operating at varying power factor preferably in between 0.9 lag to Unity and shall be able to inject or absorb reactive power.
- Inverters shall be equipped with power islanding prevention system and shall be capable of low and high voltage ride through feature.
- DC and AC Isolation switchgear – All the inverters must be equipped with standard isolation switchgear at the input and output.
- String connection box - these shall be preferred from the reputed suppliers.
- Inverters should be equipped with appropriately designed filters at either ends and sine wave filters at the AC end.
- Inverters shall be equipped with all required hardware for data collection and communication with SCADA system. It shall have a facility of direct external communication to client.

- Inverters shall be equipped with appropriately sized forced ventilation system.
- There shall be redundancy in operation with standby fans.
- Inverters with outdoor duty installation shall have a minimum degree of protection of IP54. For indoor installation degree of protection can be IP20.
- Inverter shall have protection against:
  - Over current
  - Ground Fault Detector
  - Over temperature
  - Over voltage
  - Reverse current

## 2.3 ELECTRICAL CHARACTERISTICS

**DC System**: This shall essentially be applicable from solar PV up to the inverter. The operating voltage of inverters shall essentially depend upon the MPPT range; however the maximum system voltage should be less than 1000V.

**LV System**: AC Low Voltage System shall link to inverter specifications; however the output power should have 415 Volts three phases with a nominal frequency of 50Hz. The permissible variation in AC voltage shall be +/- 10 % and frequency variation shall be 47.5 Hz to 51.5 Hz.

## 2.4 CLIMATIC CONDITIONS

The following conditions may be considered by bidders for their project component selection and system designs.

| | |
|---|---|
| Ambient temperature (Max) | : up to 48°C |
| All equipments shall be designed | : 50°C ambient. |
| Open storage temperature(Max) | : up to 48°C. |
| Humidity | : up to 98RH% |
| Maximum wind speed | : 44 to 47m/s |
| Seismic location | : Zone IV, high risk |
| Site locations | : Sanskar Ashram Complex, Dilshad Garden, Delhi |

## 2.5 SITE PREPARATION

- Site survey shall be conducted by the bidder.
- Bidders are therefore advised to understand the site condition with a visit to project site before submitting the bidding document.
- The site preparation shall include all the work as required for installation of a grid connected Roof top solar PV plant as per international practices.
- Based on the site visit prior to bidding and based on previous experience, bidders are expected to estimate the volume of work required.
- **Site Office and Material storage**: The bidders shall have their own onsite project management office and site warehouse for material storage with required security.

## 2.6 WEATHER INSTRUMENT

THE bidder shall provide a weather instrument, to provide adequate meteorological data to evaluate system performance. Station shall essentially include following sensors with instruments for monitoring :

- Global irradiation on tilted plain
- Ambient temperature
- Wind speed and direction
- Relative humidity.

Dedicated pyranometers shall be used for measurement of global irradiation on tilted plane Weather instrument along with data logger shall be located at strategic point and shall be capable of collecting the data points and sample frequency. The weather instrument shall have capability of recording and storing environmental data without AC power for two (2) days.

## 2.7 INTER-ROW SPACING FOR PV MOUNTING STRUCTURES

In addition to optimizing the inter-row pitch for minimum shading, adequate inter- row spacing shall be maintained for cleaning of modules.

## 2.8 LIGHTNING PROTECTION SYSTEM

The entire PV plant area including all buildings will be protected from lightning. The protection system shall be followed as per the relevant standard .

The air terminals shall provide an umbrella protection against direct lightning strike covering a radial distance of maximum 60m. The air terminal will be capable of handling multiple strikes of lightning current and should be maintenance free after installation.

The earthing for the lightning discharges shall be provided as per relevant standard.

## 2.9 WATER SUPPLY AND DRAINAGE SYSTEM

The solar PV plant shall have independent water tanks of adequate capacity and data shall be furnished. Water source for these tanks shall be from Department for welfare of SC/ST/OBC/Minorities who will provide water connection at a single location; further distribution is required to be constructed by bidder. The water supply system shall be complete with adequately sized electrical pumps and a standby for each type. The system shall also include all the pipes, valves and plumbing works as required to complete the system.

## 2.11 FIRE FIGHTING AND DETECTION SYSTEM

The solar PV plant shall be equipped with suitable fire protection and fighting systems for entire PV array area, all control rooms and switchyard as per the NFPA fire safety standards and local fire authority requirements.

## 2.12 SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM

The Solar power system shall incorporate a communication system to monitor the output of each string , inverter, switchgear up to grid , so that system faults can be detected and rectified .

Data loggers shall be used to collect data from the weather instrument ,solar irradiance instrument, inverters, meters, and the transformers to transfer data once a day to a server which will carry out key functions:

All the String combiner boxes, inverters, RMUs, MV Switchgear, and utility metering shall be integrated with SCADA system.

The bidder shall provide the configuration of the proposed SCADA system along with Supervisory Station which refer to the server and software responsible for communicating

with the field equipments, and then to the HMI software running on workstations in the control room.

The SCADA system shall be composed of an integrated operator human-machine interface (HMI), input/output (I/O), remote telemetry units (RTU), PLCs communication infrastructure and software.

An industrial network shall be distributed throughout the field for communication to field devices.

The data acquisition shall be through a desk top computer with latest configuration. The bidder shall provide external communications link to Department for SC/ST/OBC/Minorities to access all data acquisition and real time performance monitoring. Bidders shall provide all necessary hardware as required during entire setup.

The recorded data shall be sequential right from string to metering. The data shall be compatible and transferable to MS Office excel.

Source of power for SCADA system and all related hardware shall be from auxiliary power supply. An additional UPS having a minimum 4 hours backup shall be provided dedicatedly for this system.

In addition to conventional parameters (V, I, KW, KVA, KVAr etc.) below is the general list of monitoring and recording parameters.

**Plant:**

- String parameters
- String failure detection
- Daily Power generation in kWh
- Monthly power generation in kWh
- Annual power generation power in kWh
- Power generation from the date of commissioning
- Plant Performance Ratios
- Instantaneous PR (Current value) Day's average PR

- Month's average PR
- Quarterly average PR
- Annual average
- Performance Ratio

**Meteorological**

- Global Horizontal Irradiation
- Ambient air temperature
- Module temperature
- Wind speed and direction

The SCADA system shall include all the required hardware, software, all types cabling and cable mounting system for complete installation and commissioning of system.

## 2.13 CIVIL INFRASTRUCTURE

Prior to installation of solar PV Plant, appropriate PV panel mounting technique shall be finalized subsequent to load bearing capacities and wing pressure studies. Solar panel structure mounting shall be done using concrete pillars. Bidders are not allowed to drill the roof top during installation.

## 2.14 RESOURCE ASSESSMENT AND ENERGY YIELD

The bidders shall be legally bound for a **plant performance committed during the submission of techno-commercial bids.** Long term energy yield prediction for the defects liability, warranty shall essentially be a key parameter in short listing of bidders.

In addition to first year energy yields, bidders shall submit long term prediction clearly indicating the PV module initial and annual degradations.

## 2.15 TURNKEY THE BIDDER'S BASIC OBLIGATIONS

The bidder shall be bounded by the following basic obligations.

- Adherence to all the sections of this document along with all the enclosed document
  are essentially a key obligation of the bidder.
- Bidders shall independently conduct resource assessment and predict energy yields clearly specifying losses and degradation over project lifecycle. Department for the welfare of SC/ST/OBC/Minorities shall closely monitor these losses and degradation, and shall link with project performance.

- Wherever standard codes are provided in the document, stringent codes shall be followed by the bidder. Wherever codes are not mentioned latest relevant IS, BIS and IEC codes shall be followed.

- The project being a turnkey contract, scope shall include everything as required for successful implementation, commissioning and operating the plant for its lifecycle of twenty five years.

- Bidder shall perform works strictly adhering to technical documents and drawings approved by Department for the welfare of SC/ST/OBC/Minorities as well as requirements established by the applicable technical regulations.

Bidders are also required to submit conceptual design and drawings, with their proposed project components. This shall essentially include but not be limited to:

- All the submittals as indicated in technical specifications for key project components
- Reference resource including insolation data, temperature and wind.
- Energy yield report.
- Conceptual overall plant layout.
- Module Mounting structure , Rows configuration with inter-row pitch..
- Project Equipment Delivery & implementation schedule.
- Electrical schematics for typical solar PV array, inverter, modular plot and power evacuation.
- Control and monitoring –PLC –SCADA Configuration.

## 3.0 CODES & STANDARDS

PV modules shall typically be tested for durability and reliability according to standards developed by the International Electro technical Commission. Standards IEC61215 which shall includes the tests for thermal cycling, humidity and freezing, mechanical stress and twist, hail resistance and performance under fixed test conditions.

PV system quality standards shall comply to the following standards

| | |
|---|---|
| IEC 61215 | Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval |
| IEC 61730 | PV module safety qualification |
| IEC 60364-4-41 | Protection against electric shock |
| IEC 61701 | Resistance to salt mist and corrosion |
| IEC 60904 | Photovoltaic devices |
| EN 50380 | Datasheet and nameplate information for photovoltaic modules |
| UL 1703 | Comply with the National Electric Code (NEC), OSHA and the National Fire Prevention Association. |
| IEC 61853 | standards for PV module performance testing and energy rating are under development with Part 1: Irradiance and temperature performance measurements and power rating is set to release soon. Delivery of modules subsequent to release should comply with this standard. |
| EN 61000-6-1:2007 | Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light Immunity for residential, commercial and light environments. |
| EN 61000-6-2:2005 | Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments |
| EN 61000-6-3:2007 | Electromagnetic compatibility (EMC). Generic standards. Emission standards for residential, commercial and light-industrial environments |
| EN 61000-6-4:2007 | Electromagnetic compatibility (EMC). Generic standards Emission standards for industrial environments |

| | |
|---|---|
| EN 55022: 2006 | Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement |
| EN 50178: 1997 | Electronic equipment for use in power installations |
| IEC 61683: 1999 | Photovoltaic systems – Power conditioners – Procedure for measuring efficiency |
| IEC 61727: 2004 | Characteristics of the Utility Interface |
| IEC 62116: 2008 | Testing procedure of Islanding Prevention Methods for Utility-Interactive Photovoltaic Inverters |
| IS – 800 – 2007 | Code of Practice for General Construction in Steel |
| IS – 875 -Part-III | Code of Practice for design loads (other than Earthquake) for buildings and structures P3- Wind Load. |
| IS – 875 -Part-V | Code of Practice for design loads (other than Earthquake) for buildings and structures P5- Special Loads and Combination |
| IS801 | Code of practice for use of Cold-formed light gauge steel structural members in construction. |
| IS – 808 | Hot rolled steel beams, channels and angle sections |
| IS – 1730 | Dimensions for steel plates, sheets and strips for structural and General Engineering Purpose |
| IS – 3502 | Steel Chequered plates |
| IS – 816 | Code of practice for use of metal arc welding for general construction in mild steel. |
| IS – 822 | Code of procedure for inspection of welds |
| IS – 2629 1985 | Recommended Practice for Hot-Dip Galvanizing of Iron and Steel |
| IEC 61730 | PV component standards |
| IEC 60664 | Creepage distances and clearances |
| IEC 50548 | Junction boxes |
| UL-1741 | Combiner boxes |
| EN 60715 | Chromated DIN Rail |
| UL-SU 6703 | Fuses |
| IEC 529 | Degree of protection provided by enclosures |

| | |
|---|---|
| IEC 60228, class 5 | Tinned fine copper strands |
| IEC 60811 | Resistant too chemicals and oils |
| UL4703 | Photovoltaic Wires |
| IEC 60332-1 | Fire performance |
| IEC 61034 | Smoke emission |
| IEC 60287 | Conductor temperature |
| IEC 60754-1 | Halogen free |
| IEC 60216 | Temperature index and service life of over 20 years |
| IS 13947 | Low Voltage AC Switchgear and Control Gears Specifications |
| IS 8623 | Low Voltage AC Switchgear and Control gear assemblies |
| IS 4237 | General requirements for AC switchgear & control gear for voltage not exceeding 1000V. |
| IS 2147 | Degree of protection for enclosures for low voltage switchgear and control gear |
| IS 5082 | Electrolytic Copper / Aluminum |
| IS 14697 | AC Electric Meters |
| IS 3043 | Earthing |
| IS 2551 | Danger Notice Plates |
| IS 2516 | Circuit Breakers, voltages up to 1000 Volts |
| IS 375 | Marking & Arrangement for Switchgear, Bus Bars, main connections and auxiliary wiring |
| IS 7098 | XLPE insulated PVC sheathed cables for working voltages up to and including 1100 volts |
| IS 3961 | Recommended current ratings for cables |
| IS 8130 | Conductors for insulated cables. |
| IS 3975 | Mild steel wires, strips and tapes for armoring of cables. |
| IEC 60255 | Electrical Relays |
| IS 9921 | Part I to V – Alternating current disconnectors and earthing |

| | |
|---|---|
| | Switches |
| IS 4237 | General Requirement for switchgear for voltage not exceeding 1.1kV. |
| IS 2309 | Lightning |
| NFPA 70 | Fire protection of transformers and transformer vaults |
| NFPA 15 | Water spray fixed systems |

The certified product conforms to the EU health, safety and environmental requirements

Solar PV modules are required to be listed by Underwriters Laboratories (UL), or another equivalent recognized Laboratory.

Compliance to power quality and grid codes for utility scale solar projects is essential for all proposed systems.

## 4.0 DESIGN BASIS

The bidders are expected to independently understand and analyse the site conditions prior to system configuration. Bidder shall offer client with multiple options of system configurations based on product availability and capacities subsequently it will be client's call for selecting most optimum system. However entire project shall have uniform capacities, makes and configurations.

## 4.1 INVERTER EFFICIENCY

Minimum acceptable peak efficiency shall be 98.5% however preference may be given to inverters having higher efficiency than desired.

## 4.2 ENERGY YIELD COMPUTATION

Energy yield prediction essentially depends on simulations and loss assumptions. Bidders must use Licensed *PVsyst version 6* as the simulation tool for energy yield predictions. A lower version is not acceptable.

Simulation must take into account all losses including AC losses. PVsyst simulation report shall clearly mention details of simulation parameters, near shading definition, horizon shading definition, main results and loss diagram.

Assumption of losses largely depends on past experience of bidders in similar locations and climatic conditions; however following loss benchmarks may be maintained for computation.

**FOR LOSS ASSUMPTION**

| | |
|---|---|
| Shading | Shading loss can be simulated by optimizing the inter-row pitch and modeling of plant. The site can be considered free from any near obstacles and horizon.<br>The max. benchmark for shading loss shall be specified |
| Incident angle | This shall essentially depend on modules proposed by bidders and technique. Accordingly the loss can be simulated. |
| Low Irradiance | Low irradiance loss essentially depends on the characteristics of the module and the intensity of the incident radiation. This value shall depend on module selected and the solar resource data used for simulation Module |
| Temperature | For every °C temperature rise in temperature above STC shall reduce the efficiency of PV module. Minimum benchmark for this negative coefficient shall be specified |
| Soiling | Bidders are advised to evaluate the dust profile on site and define the O&M strategy. Bidders shall justify the soiling loss assumption along with bids. |
| Module quality | Module quality loss essentially depends on manufacturer's specification. Bidders shall provide with manufacturer's confirmation on variation of power from nominal to actual |
| Module mismatch | Although this loss depends on the bidder's capability, bidders shall submit manufacturer's confirmation on uniform current/voltage profiles for delivered lot of modules. |

| | |
|---|---|
| Cable | Electrical resistance in the cable between the modules and the input terminals of the inverter give rise to ohmic losses ($I^2R$). Maximum benchmark for this assumptions shall be specified. |
| Inverter Performance | Minimum benchmark for this efficiency shall be specified |
| AC losses | AC losses shall occur in four areas, LV AC cabling, LV/MV transformers, MV AC cabling, MV/HV transformer up to metering. Bidders are expected to provide detailed losses segregating said areas with appropriate justifications |
| Downtime | Grid availability of 99.5% may be considered for energy yield computation by the bidders |
| Plant availability | Bidders are expected to offer maximum plant availability; Department for the welfare of SC/ST/OBC/Minorities assumes 100% plant availability for project economics. |

### 4.3 PV MODULE DEGRADATION

Bidders shall specify the initial and annual degradation thereon for 25 years. The values shall
be supported by manufacturer's confirmation based on past experience and track record on proposed modules.

THE bidders shall be legally bound to provide a linear performance guarantee ensuring that entire plant will be fully functional with desired output for 120 months from the date of commissioning. PV modules will be guaranteed against manufacturing defect. Defects liability
shall include but not limited to glass, frame bowing, de-lamination, water ingress, junction box arcing, hot spots, etc.
The product guarantee will not be limited for modules but will also include termination connectors, cables and all associated accessories. In the event of failure during guarantee

period, manufacturer shall replace module free of cost or refund the then current market price of modules.

In addition to the product guarantee, manufacturers shall grant linear nominal power guarantees for a period of 25 years. Under these guarantees manufacturer shall ensure that module will deliver nominal power output based on manufacturer provided annual degradation rate. The output shall be measured at string level. The nominal power guarantees shall be in lieu of manufacturing defects and workmanship; the minimum set terms shall be as below:

Linear warranty will be measured annually against committed degradation for the defined period.

· 0 to 5 years – for a period of five years from the date of commissioning, if any module produces a nominal power output below 95% as set out in manufacturer's data sheet, the bidder / manufacturer shall replace module free of cost with a new guarantee for balance period. Else, refund the then current market price of modules.

·

· 6 to 12 years – for a period of seven years from the date of completing five years of nominal power guarantee, if any module produces a nominal power output below 90% as set out in

· manufacturer's data sheet, The bidder / manufacturer shall replace module free of cost with a new guarantee for balance period. Else, refund the then current market price of modules.

·

· 13 to 18 years – for a period of six years from the date of completing twelve years of nominal power guarantee, if any module produces a nominal power output below 85% as set out in manufacturer's data sheet, the bidder / manufacturer shall replace module free of cost with a new guarantee for balance period. Else, refund the then current market price of modules.

·

·

· 19 to 25 years – for a period of seven years from the date of completing eighteen years of nominal power guarantee, if any module produces a nominal power output below 80% as set out in manufacturer's data sheet, the bidder / manufacturer shall replace module free of cost with a new guarantee for balance period. Else, refund the then current market price of modules.

## 4.4 PRODUCT LIFE

Although the products will be guaranteed for five years, however, power performance will be
guaranteed for 25 years. The design life for the modules is expected to be over 25 years from
commissioning; manufacturers shall submit accelerated lifetime laboratory test reports upon
winning the bid for the contract.

## 4.5 NOMINAL POWER RATING

For the proposed development of plant, the bidders are expected to offer respective ratings based on manufacturer's production availability and compliance with the client's benchmarked track record.

## 4.6 NOMINAL POWER TOLERANCE

The nominal power tolerance of modules shall not be beyond ±3%, however preference may be given to manufacturers giving the least tolerance.

## 4.7 MODULE EFFICIENCY

Minimum acceptable efficiency of all the modules under standard test conditions is 14.4%; however preference may be given to modules having higher efficiency than desired.

## 4.8 TEMPERATURE COEFFICIENTS

Variation in temperature has a significant effect on electrical parameters of PV modules; The expected temperature coefficients for all the proposed modules shall be furnished by manufacturers:

Temperature Coefficient of $P_{mpp}$ : *** %/°C

Temperature Coefficient of $V_{oc}$ : *** %/°C

## 4.9 PREFERRED MODULE MAKE

Department for welfare of SC/ST/OBC/Minorities essentially would like to go for preferred list of module manufactures indicated in Solar PV System components preferred make (Data Sheet No : BSE-PV-CMP-001) .

Manufacturers shall have a production track record for a minimum of 2 - 5 years and bidder having successfully executed atleast three roof top projects using those crystalline modules .

Modules proposed by the bidder shall have a minimum operational track record preferably in the Indian climatic conditions. Offers shall be supported by client testimonial for technical performance.

## 4.10 SPECIFIC CONSTRUCTION REQUIREMENTS

In addition to the best construction requirements of respective manufacturers, following are the specific requirements for all the crystalline modules:

All the modules shall be equipped with IP67 or higher protection level junction box and appropriately sized output power cable of symmetric length with twist locking connectors.

Fill factor for proposed PV modules shall not be less than 0.7.

In order to minimize power loss due to partial shading on modules, all modules shall be equipped with bypass diodes.

Modules shall be capable of withstanding adequate wind pressure or the local wind loading, whichever is greater.

Modules may be subjected to high intensity hail storms thus appropriate measures should be taken for selecting glass.

Module frames shall be corrosion resistant and shall have adequate holes for mounting, water

drain and connecting ground conductor. All modules shall be appropriately grounded.

In addition to the techno commercial offer all the manufacturers shall submit following documents

- IEC Certificates
- Technical literature giving complete specifications and information of modules
- Handling plan of modules right through from loading at manufacturer's factory to installation. General Arrangement drawing of module, showing front and rear view, overall dimensions, installation plans, termination arrangements, packing dimensions and weights.
- Independent test characteristics
    - Current verses voltage at various irradiance levels.
    - Power verses voltage at various irradiance levels.

- Open circuit voltage verses irradiance under standard test conditions.
- Short circuit current verses irradiance under standard test conditions.
- Power verses temperature variation
- Open circuit voltage verses temperature variation
- Short circuit current verses temperature variation
- Installation manual and flash lists of the modules.
- Fill Factor Test

All the modules shall be furnished with radio frequency identification tags mentioning following information;

- Model number and unique serial number for each module.
- Manufacturer of solar cells and Module
- Month and year of the manufacture
- Country of origin
- Current verses voltage at various irradiance levels
- Power verses voltage at various irradiance levels.
- Date and year of obtaining IEC PV module qualification certificate
- Details of test lab issuing IEC certificate
- Other relevant information on traceability of solar cells and modules

Inverters shall be compliant to most recent standards (and latest amendments if any) developed by the IEC and BIS.

## 4.11 POWER QUALITY REQUIREMENTS

The Solar Photovoltaic Power plant shall be installed strictly in accordance with Central Electricity Authority “Technical Standards for Connectivity of the Distributed Generation Resources” Regulations 2013.

## 4.12 MODULE SUPPORTING STRUCTURES

The mounting structures should be tested for stability with minimum deflection and sagging. Maximum permissible limit for sagging shall be 5mm for designed wind speed. Minimum clearance as required shall be maintained from the floor at the lower height end of mounting
structure.

Cold form structures shall be preferred for supporting the solar PV modules and hot rolled C channel structures as per Indian standards for columns and support members.

All the structure members shall be hot dipped galvanized in accordance to IS2629. Minimum thickness of galvanization should be 120 microns.

All mounting hardware shall be stainless steel with adequate protection against all climatic conditions. Module mounting bolts shall be covered with an anti-theft synthetic resin with a melting point of 300°C.

Mounting structures shall be designed to facilitate easy replacement of solar PV modules.

Structure shall be designed with 10mm distance between two modules.

Structure shall have provision to connect the earth cable joining one structure to the other connecting modules and structure to same ground potential.

Structure design shall include a method of fastening the DC cables to the structure at every 30cm without causing tearing or fluttering of cables.

Adequate air gap shall be maintained between the modules and mounting structures, this isolation shall be achieved by appropriately sized UV resistant EPDM washers.

## 5.0 OPERATION AND CONTROL PHILOSOPHY

### PV MODULE CLEANING

Bidder shall furnish the complete operation of the system with reliable monitoring , protection interlock logics along with set values, power evacuation etc. The detailed write up for operation and maintenance of the system shall be furnished.

Cleaning of modules directly relates to soiling loss. Bidders shall present with cleaning schedules and assumptions made for soiling loss in energy yield predictions. Routine cleaning of the PV panels shall be carried out by the bidder after each 15 days from the date of commissioning of PV Plant. Charges for the cleaning of PV modules after each 15 days shall be included in AMC. Bidders shall furnish the procedure in the O&M manual /instructions of PV modules for routine cleaning.

For regular plant operations and maintenance, Department for the welfare of SC/ST/OBC/minorities will provide water at one point; irrespective of source of supply, The bidder shall route the water to water tanks and piping as required. Cleaning of

modules shall be done by sprinkling of water on the PV modules with a pressure specified by manufacturer. Bidder shall source water from onsite reservoirs.

**6.0 MANDATORY SPARE PARTS**

The bidder shall include the startup & commissioning spares in their quoted price .

Bidder shall submit list of spares recommended by respective project component suppliers. The list shall include spares required for five years of operation, with justification on the recommended spares and consumable quantities.

**7.0 SPECIAL MAINTENANCE TOOLS & TACKLES**

The bidder shall arrange to supply the special tools & tackles required for the maintenance of

their equipments free of cost. The bidder shall furnish the list of maintenance tools along with bidding document

**8.0 STORAGE AT SITE**

After receipt of plant equipment and materials at site, these shall be properly stored as per standard practice which includes closed/semi-closed storage and open storage:

**9.0 INSPECTION AND TEST**

All materials used in the manufacture of solar plant equipment shall be of high quality and free from defects and imperfections and of recent manufacture and unused materials. All materials shall conform to the latest applicable Indian standards & codes. Liberal factors of safety shall be used throughout the design for all parts of the equipment when subject to the most severe operating conditions. .

All works shall be performed and completed in accordance with the best modern international shop practice in the manufacture of high grade equipment.

**10.0 PERFORMANCE GUARANTEE**

The bidder shall guarantee that the offered system equipment shall meet the ratings and performance requirements as specified. All equipment with their components shall be guaranteed for the satisfactory performance as required herein from the date of releasing it into

regular service which shall be after satisfactory test and trial runs of the equipment.

All plant equipment, should comply to the specified capacity requirement, construction materials and other technical details shall be guaranteed during site tests:

Bidders shall independently carry out performance estimation based on their solar resource data and proposed project components. The performance estimation shall be presented in the form of percentage performance ratio (PR). Further in the document these values shall be referred to as guaranteed performance values / levels.

The bidders shall be legally bound for the plant performance estimation committed during the submission of techno-commercial bids. Any such binding shall be for a minimum period equivalent to defects liability, warranty period.

It will be bidder's responsibility for arranging all the consumables, instrumentation, material and human resources as required for complete commissioning, start-up tests and performance ratio comparisons.

The start-up tests shall be the first step for provisional acceptance of plant. These tests shall essentially include

- Open circuit voltage.
- Short circuit current.
- Validation of irradiation monitoring equipment
- DC current test
- Performance ratio test
- Fill Factor Test

The start-up test shall be carried immediately after 7 days of physical completion of plant.

The performance ratio test shall verify whether the solar PV plant is performing at or above the agreed value and shall be conducted as specified below.

The PR measured on-site shall be compared with the guaranteed performance levels provided by the bidder for the specified time period. Details of on-site measurement of PR and the procedure and equations shall be furnished along with bidding document.

Measuring instruments to record on-site data shall include a pyranometer with standard accuracy levels, temperature sensor, data logging systems and operator approved grid meters.

The Bidder shall be responsible to conduct the first PR test (as a part of start-up test) after achieving physical completion and synchronizing the plant with the grid and by complying with all relevant requirements from utility.

The Performance test shall be conducted for a minimum of five consecutive days of operation during daylight hours or until a total irradiation has been received at irradiance levels greater than 800W/$m^2$. The operation data shall be recorded at 15 minute intervals for validating the PR values guaranteed by the bidder. In case of disruption due to any component failure, the test shall be repeated.

The PR values shall be computed based on actual energy exported to the grid. Subsequent to operational approval, regular PR monitoring shall be performed and reported to Department for the welfare of SC/ST/OBC/minorities.

If the Bidder fails to achieve the guaranteed performance levels, bidder shall at its own cost rectify all the defects identified during the test and take necessary steps/efforts to pass the PR test within the stipulated time span. Subsequent to rectification the PR shall be re-tested, if the
values are again below the guaranteed performance levels, the bidder will be liable to pay the client as agreed within the contract.

**WARRANTIES**

**PRODUCT WARRANTY**

The bidders shall be legally bound to provide a performance guarantee ensuring that entire plant will be fully functional with desired output for 120 months from the date of commissioning. Consequently irrespective of manufacturer’s guarantee to the bidders , the

system equipment shall be guaranteed for a minimum period of ten years. This warrantee will not be limited only for solar modules and inverters but will also include all associated accessories, instrumentation and control.

**EXTENDED WARRANTY**

It is essential that the product should give a consistent performance for 25 years life cycle of the project. All the bidders should give an option of extended manufacturer's comprehensive warranties with onsite support beyond the guarantee period of 10 years up to 25 years.

The bidders are required to maintain adequate inventory spares on site during the product warranty period and extended warranty period. It is expected manufacturers shall provide satisfactory training to client's technical team at regular interval as decided by the client

The Department for the welfare of SC/ST/OBC/minorities solar PV project shall be implemented through a turnkey contract and comprehensive warranties of 10 years from the date of commissioning and commercial operations. The project warranties shall essentially include but will not be limited to:

**DEFECTS WARRANTY**

The contract shall provide ten years comprehensive warranty for the entire solar PV plant right from PV modules to the point of power evacuation and metering. The bidder shall warranty the project free from any and all defects including unseen and latent in all project components and workmanship.
In case of any manufacturing defect or underperformance of any project component, the bidder shall guarantee supply, installation, testing and commissioning of defective project component/s at no cost to the Department for the welfare of SC/ST/OBC/minorities.

In case of defects due to improper handling of project components by bidder's team, bidder shall be responsible for repairing any / all defects.

Department for the welfare of SC/ST/OBC/minorities shall reserve the right to get monetary compensated for loss of energy generation caused due to plant unavailability.

Project components warranty can essentially be construed as guarantees / warranties provided by the project component manufacturers beyond the defects liability period, performance warranty period and extended warranties.

Warranties and condition thereof for key project components are separately specified in general technical specification. All such warranty for any of the project components shall be transferred to the Department for the welfare of SC/ST/OBC/minorities after completion of ten years.

Department for the welfare of SC/ST/OBC/minorities shall reserve the right to call for extended warranties from the manufactures; same shall be agreed by the bidder and product manufacturer.

**PERFORMANCE RATIO (PR) WARRANTY**

In addition to the PR value for project start-up performance tests, bidders are required to submit long terms performance ratio (PR) values along with the techno-commercial bid. Plant
performance evaluation during the defects liability shall be one of the key criteria for evaluation of bidders.

Bidders shall be legally bound for warranting PR value for the defects liability, Guaranteed performance values provided by the bidder shall comply with Meteonorm 7 software for
solar resource data and PVsyst version 6 for simulation of energy yields. PR values as obtained from PV syst version 6 shall include all AC losses up to the point of interconnection and metering.

The first performance test shall be conducted immediately after 7 days of physical acceptance of plant. Subsequent PR comparisons will be made from the SCADA data obtained based on real time measurement. The schedule for comparison shall be: Monthly PR values for the first year of operation.

Monetary liability shall be computed considering the then energy prices of the power purchasing company.

## 11.0 ERECTION AND COMMISSIONING

The Bidder shall execute the complete erection, testing and commissioning and performance testing of the offered solar PV system. The Bidder shall furnish the parts list for all the offered system equipment as well as sectional drawings with complete technical details to the Engineer prior to erection.

For executing the works, the Bidder shall furnish the required services of erection supervisors, fitters, riggers and skilled/semiskilled alongwith erection tools, tackles and other required construction equipment etc to carry out the work effectively and within the contracted delivery period. These erection aids, tools & tackles shall be remain at site till the completion of the plant.
Minor alterations and adjustments in the fabricated structures and erection shall be carried out to suit the site conditions, without any cost implications.

The Bidder shall be responsible for the correctness of the electrical & mechanical connections between all equipment in the scope of supply. The Engineer will check whether all works have been carried out/ installed in accordance with the approved drawings/design as per specification. Any fault revealed during Engineer's inspection, shall be made good by the Bidder to the complete satisfaction of the Engineer before the plant is taken over. Any workmanship or materials inspected in the field and found not to comply with the specification shall be replaced or repaired at the Bidder's expense. All expenses incurred by such replacement or repairs shall be borne by the Bidder.

The Bidder shall appoint a competent Engineer as Project Manager for complete execution of all project activities. The site project manager shall give his full time and attention for supervision of works. In case the site project manager's work performance is unsatisfactory the Bidder to take actions for immediate alternate arrangement.

All equipment and items supplied and erected by the Bidder shall be covered under Fire and other relevant insurance upto the end of running and maintenance period .

The Bidder at all times shall work in co-ordination with the Department for the welfare of SC/ST/OBC/minorities engineer and their staff and offer them all reasonable facilities to become familiar with the erection, operation and maintenance of the offered equipment.

## 12.0 DOCUMENTS

**Bidder to furnish the following documents along with bidding document:-**

- All Technical Data ,Specification; prices with delivery; and guarantee data
- Energy yield predictions and system configuration
- The materials of construction of various components of equipment including the make, model number, rating etc.
- Weight of all equipment, dimensions including the weight of any oversize package to be transported.
- List of tests, the bidder proposes to carry out at manufacturer's works and at site after installation including those pertaining to their sub-Bidders shall be clearly brought in the proposal
- All required mandatory as well as startup commissioning spare parts with unit prices for all equipment offered including the bought out materials.
- A PERT (Programme Evaluation & Review Technique) chart of design, engineering, procurement, manufacture, testing, delivery, installation, commissioning at site, testing of complete solar system equipment proposed along with associated electrical & control instrumentation; and civil & structural work shall be furnished.
- Bidders shall furnish the required quantity of structural steel materials; reinforcement bars; cement for the system
- Schematic arrangement of the complete solar system and scope of equipment with technical data /Rating.
- Layout drawings showing the equipment and systems
- Dimensioned outline drawings of various equipment offered showing dimensions, weights etc with descriptive literature as applicable.
- Electrical single line diagram, Switch gear Drawings with proposed interlocks, safety features etc as well as earthing system etc.
- Control panel layouts, schematic diagrams, logic diagrams etc.
- Bidder shall indicate his scope of work, terminal points and description of all major equipment and system/s in bid.

Bidder shall note that during detailed engineering, the elevations and sizes, levels of various buildings shall be checked by bidder for needed coordination. No price adjustment shall be applicable for any such reason or modification whatsoever. The equipment in buildings shall be suitably located keeping in view of the maintenance space requirements.

## 13.0 INSTRUCTION MANUALS

At least one (1) month prior to the dispatch of the equipment, requisite copies of installation, testing and adjustment after installation, operation, maintenance and spare parts manuals shall be furnished. These manuals shall contain every drawing and information required for installation, testing, setting and adjustment of all system components after installation, operation and maintenance of equipment/ system. The data shall include the following particulars besides, other data needed for servicing the components and ordering their spare parts.

Marked erection prints identifying the components parts of the equipment, as transported, with its assembly drawings, shall be furnished.

Detailed dimensioned assembly and cross-sectional drawings and description of all auxiliaries and manufacturing drawings identifying all spare parts for re-order shall be supplied.

## 14.0 WORK SCHEDULE

The bidder shall include in the proposal for furnishing the complete work schedule covering the Solar photovoltaic field modules, Inverter panels, Electrical evacuation system Panels /equipment , system cabling and the required auxiliaries . The program shall be in the form of Master network or PERT Chart identifying key phases in various areas of the total works like design, procurement, manufacture, supply, erection, testing and commissioning and all field activities pertaining to this system for its completion within a period of 3 months from the date of award of work.

The bidder shall include below mentioned tasks in work schedule:

- Commencement and completion of all engineering design work.
- Selection of equipment/equipment vendor/sub-Bidder commencement and completion of all sub Bidders works indicating expected manufacture and shipment time.
- Manufacturing components and sub-assemblies.

- Assembling, testing, dispatch and receipt at site.
- Procurement of bought out materials including cables etc
- site Fabrication/ Erection schedule
- Civil works
- Erection of equipment and electrical works
- No load testing & commissioning
- Performance test

| Department for welfare of SC/ST/OBC/Minorities | SOLAR PV SYSTEM - BIDDER'S CHECK LIST | | |
|---|---|---|---|
| **S No** | **Bidder's Qualification data** | | |
| 1 | Tender doc. received date and time | | |
| 2 | Earnest money deposit of Rs 10,00,000 ( Ten lakh) | | |
| 3 | All pages of bid document duly signed and stamped with seal | | |
| 4 | Having Experience of carrying out similar type of works | | |
| 5 | Executed at least 3 projects aggregating capacity not less than 200 KW | | |
| 6 | Adequate after sales and service including trained manpower within NCR | | |
| 7 | Experience of integration of various plant and equipment of solar system | | |
| 8 | ISO -9001 Certification | | |
| 9 | BIS /IEC approvals for Modules, Inverters and other components | | |
| 10 | Minimum annaual turnover of Rs 10 crore during last three financial years | | |
| 11 | Valid registration No of sales tax / VAT / service tax | | |
| 12 | Indigenous manufacturing facility for modules as per international standards | | |
| 13 | Any remarks such as debarred/ Black listed in other utilities in India | | |
| 14 | Filled Data sheets | | |
| a | PV modules , inverter& components | | |
| b | Project data | | |

| | | | |
|---|---|---|---|
| c | Project scope of work | | |
| d | Schematic and Layout drgs. | | |
| 15 | Format for EMD bank guarantee submission , duly signed | | |
| 16 | Acceptance of commercial terms and condition | | |
| a | Delivery schedule / period | | |
| b | Payment terms | | |
| c | Bank guarantee | | |
| 17 | Period of validity of bids -120 days | | |
| 18 | Project completion time 180 days from issuance of work order. | | |
| | | | |

| Department for welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>COMPNENTS PREFERRED MAKE | DATA SHEET NO:<br><br>BSE– PV- CMP - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi**

**System Capacity : 120 KWp**

| SNo. | EQUIPMENT / COMPONENT | MAKE |
|---|---|---|
| 1 | **PV Module** | Vikram solar / Solar World / Moserbaer/ Tata BP Solar/ |
| | | Titan / Photon |
| | | |
| 2 | **Inverter** | ABB / AEG/ GE / Siemens /SMA/ Schneider |
| | | |
| 3 | **String Combiner Boxes** | Reputed Make |
| | | |
| 4 | **Monitoring System** | Reputed Make |
| | | |
| 5 | **DC cable** | Amercable /Betaflam /Keylios (Polycab) / Lapp Kabel |
| | | /Prysmian (Ravin Cables) /Solar Plast |
| | | |
| 6 | **DC Fuses** | Cooper Bussmann Littelfuse Mersen /Siba /TE |
| | | |
| 7 | **Surge Protection Devices** | ABB /Citel /DEHNguard /Erico /Ferraz Shawmut |
| | | |
| 8 | **Transformers** | ABB / Crompton/ Kirloskar/Voltamp |
| | | |
| 9 | **MV Switchgear** | ABB/Schneider/Siemens |
| | | |
| 10 | **MV cables** | KEI/Polycab/Ravin/Universal |

| | | | |
|---|---|---|---|
| | | | |
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | **Sheet No : 1 / 3** |

| **Department for welfare of SC/ST/OBC/Minorities** | **SECTION : 4 SOLAR PV SYSTEM COMPNENTS PREFERRED MAKE** | **DATA SHEET NO: BSE– PV- CMP - 01** |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi**

**System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | DATA |
|---|---|---|
| **11** | **MV End termination Kit** | Birla-3M/M Seal /Raychem |
| | | |
| **12** | **MV Joining Kit** | Birla-3M /M Seal/ Raychem |
| | | |
| **13** | **Protection Relays** | ABB/Areva /Siemens/Scheider |
| | | |
| **14** | **Current Transformers** | Automatic Electric/Kappa |
| | | |
| **15** | **Trivector Meters** | ABB/Conzerv/L&T/Genus/Secure/Lendis Gyr |
| | | |
| **16** | **Electronic Digital Meters** | ABB/Conzerv/L&T/ Genus/Secure/Lendis Gyr |
| | | |
| **17** | **Lead Acid Batteries** | Exide/Hoppecke |
| | | |
| **18** | **LV Cables** | KEI/Nicco/Polycab/Universal/Gemscab/KEC |
| | | |
| **19** | **Bus trunking** | C & S/L & T/Schneider/Siemens |
| | | |
| **20** | **Cable Glands** | Comet /Cosmos |
| | | |

| Department for welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>COMPNENTS PREFERRED MAKE | DATA SHEET NO:<br><br>BSE– PV- CMP - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi**

**System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | DATA |
|---|---|---|
| 22 | **Bimetallic Cable lugs** | Comet /Cosmos/Dowells |
| | | |
| 23 | **Distribution Boards** | Hager (L&T)<br>Havells/Legrand/Schneider/Siemens |
| | | |
| 24 | **LV Switchgear** | ABB/L & T/Schneider/Siemens |
| | | |
| 25 | **LED Indicating Lamps** | L & T/Schneider/Siemens/Tecnik |
| | | |
| 26 | **Load Managers** | ABB/Automatic Electric/Conzerv/L&T |
| | | |
| 27 | **PVC Insulated Copper wires** | Finolex/Polycab/Anchor/Ravin/KEI |
| | | |
| 28 | **Cable trays** | Asian Ancillaries/Elcon/Profab Engineers |
| | | |
| | | |
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| | | |

| Department for welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>EQUIPMENT TECHNICAL DATA | DATA SHEET NO:<br>BSE – PV- EQP - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi**
**System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | UNIT | DATA |
|---|---|---|---|
| **01** | **String Combiner Box** | | |
| | Dimensions (H x W x D) in mm | | |
| | Maximum permissible DC voltage | | |
| | Maximum permissible DC current | | |
| | No of string connections | | |
| | Fuse rating | | |
| | Isolation breaker data | | |
| | Operating temperature range | | |
| | String voltage monitoring data | | |
| | String current monitoring data | | |
| | Network Communication data | | |
| | Earthing | | |
| | Weight | | |
| | Operating temperature | | |
| | Relative humidity | | |
| | Enclosure protection class | | |
| | | | |
| 02 | **DC isolation breaker** | | |
| | Make / Model / Type | | |
| | Rated voltage | | |
| | Rated current | | |
| | No of poles | | |

| | | | |
|---|---|---|---|
| | Short circuit withstand rating | | |
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | **Sheet No : 1 / 8** |

| **Department for Welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>EQUIPMENT TECHNICAL DATA** | **DATA SHEET NO:<br>BSE – PV-EQP- 01** |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi**
**System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | UNIT | DATA |
|---|---|---|---|
| | System interlock detail | | |
| | | | |
| 03 | **DC load break switch** | | |
| | Make / Model / Type | | |
| | Rated voltage | | |
| | Rated current | | |
| | No of poles | | |
| | Short circuit withstand rating | | |
| | Rated breaking capacity | | |
| | Rated making capacity | | |
| | System interlock detail | | |
| | | | |
| 04 | **AC isolation breaker** | | |
| | Make / Model / Type | | |
| | Rated voltage | | |
| | Rated current | | |
| | Rated frequency | | |
| | No of poles | | |
| | Short circuit withstand rating | | |
| | System interlock detail | | |
| **05** | **AC load break switch** | | |

| | | | |
|---|---|---|---|
| | Make / Model / Type | | |
| | Rated voltage | | |
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | **Sheet No ; 2 / 8** |

| **Department for welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>EQUIPMENT TECHNICAL DATA** | | **DATA SHEET NO:<br>BSE – PV-EQP- 01** |
|---|---|---|---|
| **PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi<br>System Capacity : 120 KWp** | | | |
| **SNo.** | **SPEC. DETAILS** | **UNIT** | **DATA** |
| | Rated current | | |
| | Rated frequency | | |
| | No of poles | | |
| | Short circuit withstand rating | | |
| | Rated breaking capacity | | |
| | Rated making capacity | | |
| | System interlock detail | | |
| | | | |
| **06** | **Bus bars** | | |
| | Material | | |
| | Dimension data | | |
| | Rated current | | |
| | Short time withstanding current | | |
| | insulation | | |
| | Connection / Termination | | |
| | Bus bar support materials | | |
| | | | |
| **07** | **Current Transformer** | | |
| | Make / Model / Type | | |

| | | | |
|---|---|---|---|
| | Pry/ Sec Current | | |
| | Transformer ratio | | |
| | Accuracy class | | |
| | Burden rating | | |
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | **Sheet No ; 3 / 8** |

| **Department for welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>EQUIPMENT TECHNICAL DATA** | **DATA SHEET NO:<br>BSE – PV-EQP- 01** |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi**
**System Capacity : 120 KWp**

| Son. | SPEC. DETAILS | UNIT | DATA |
|---|---|---|---|
| **08** | **Potential Transformer** | | |
| | Make / Model / Type | | |
| | Pry/ Sec Voltage | | |
| | Transformer ratio | | |
| | Accuracy class | | |
| | Burden | | |
| **09** | **Voltmeter** | | |
| | Make / Model / Type | | |
| | Dimension | | |
| | Voltage Range | | |
| | Accuracy | | |
| | Selector switch Make / Type / Rating | | |
| | | | |
| **10** | **Ammeter** | | |
| | Make / Model / Type | | |
| | Dimension | | |
| | Voltage Range | | |

| | | | |
|---|---|---|---|
| | Accuracy | | |
| | Selector switch Make / Type / Rating | | |
| | | | |
| **11** | **Trivector Meter** | | |
| | Make / Model / Type | | |
| | Input voltage rating / wiring type | | |





**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi**
**System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | UNIT | DATA |
|---|---|---|---|
| | Input current rating | | |
| | Accuracy class | | |
| | | | |
| **12** | **Power factor Meter** | | |
| | Make / Model / Type | | |
| | Accuracy class | | |
| | | | |
| **13** | **Frequency Meter** | | |
| | Make / Model / Type | | |
| | Accuracy class | | |
| | | | |
| **14** | **Protection Relays** | | |
| **14 A** | **Instantaneous Over current ( short circuit)** | | |
| | Make / Model /Type | | |
| | Adjustable range | | |

| | | | |
|---|---|---|---|
| | Set value ; Alarm / Trip | | |
| | | | |
| **14 B** | **Earth fault** | | |
| | Make / Model /Type | | |
| | Range | | |
| | Set value | | |
| | | | |
| | | | |





| SNo. | SPEC. DETAILS | UNIT | DATA |
|---|---|---|---|
| **14 C** | **Over current** | | |
| | Make / Model /Type | | |
| | Adjustable range | | |
| | Set value ; Alarm / Trip | | |
| | | | |
| **14 D** | **Over voltage / Under voltage relay** | | |
| | Make / Model /Type | | |
| | Adjustable range | | |
| | Set value ; Alarm / Trip | | |
| | | | |
| **14 E** | **Over frequency / Under frequency relay** | | |
| | Make / Model /Type | | |
| | Adjustable range | | |

| | | | |
|---|---|---|---|
| | Set value ; Alarm / Trip | | |
| | | | |
| **15** | **Auxiliary relays** | | |
| | Make / Model /Type | | |
| | Voltage rating | | |
| | Contact type / Rating | | |
| | | | |
| **16** | **Breaker Panel** | | |
| | Dimension | | |
| | Enclosure protection class | | |





| SNo. | SPEC. DETAILS | UNIT | DATA |
|---|---|---|---|
| | Paint colour / Finish | | |
| | Earthing | | |
| | | | |
| **17** | **GHI Instrument** | | |
| | Make / Model /Type | | |
| | Range | | |
| | Accuracy | | |
| | Mounting & Dimensional detail | | |
| | | | |
| **18** | **Wind speed Instrument** | | |
| | Make / Model /Type | | |

| | | | |
|---|---|---|---|
| | Range | | |
| | Accuracy | | |
| | Mounting & Dimensional detail | | |
| | | | |
| **20** | **Ambient Temperature Measuring instrument** | | |
| | Make / Model /Type | | |
| | Range | | |
| | Accuracy | | |
| | Mounting & Dimensional detail | | |
| | | | |
| | | | |
| | | | |





**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi**
**System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | UNIT | DATA |
|---|---|---|---|
| **21** | **Data Acquisition / Monitoring system** | | |
| | Make / Model /Type | | |
| | System I/ O data | | |
| | Processor detail | | |
| | Power supply | | |
| | Network / communication data | | |
| | System cabinet details | | |
| | | | |
| **22** | **Cables** | | |

| | | | |
|---|---|---|---|
| **22 A** | **DC cable (Power & Control)** | | |
| | Conductor size | | |
| | Sheath insulation | | |
| | Armor type / material | | |
| | Voltage grade | | |
| | | | |
| **22 B** | **AC cable (Power & Control)** | | |
| | Conductor size | | |
| | Sheath insulation | | |
| | Armor type / material | | |
| | Voltage grade | | |
| | | | |
| **23** | System , Equipment / Panel Earthing detail | | |
| | | | |

| Department for welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>INVERTER TECHNICAL DATA | DATA SHEET NO:<br>BSE – PV- INV - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi** **System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | TYPE1 | TYPE2 | TYPE3 |
|---|---|---|---|---|
| 1 | **Inverter Type** : | | | |
| | Make / model No. | | | |
| 2 | **Standards** | | | |
| | Confirm to standard codes | | | |
| | Safety | | | |
| | Quality | | | |
| | | | | |
| 3 | **Climatic condition** | | | |
| | Altitude | | | |
| | Ambient temperature deg C | | | |
| | Relative humidity % | | | |
| | | | | |
| 4 | **Technical Data** | | | |
| | System installation / Cooling | | | |
| | Electric system | | | |
| | Insulation system | | | |
| | Main circuit control method | | | |
| | Switching method | | | |
| | Controller power supply | | | |
| | | | | |
| 5 | **Electrical** | | | |
| | Rated output power W | | | |
| | Rated output voltage Vac | | | |

| Sanskar Ashram Complex, Dilshad Garden, Delhi | Sheet No :1 / 8 |
|---|---|

| Department for welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>INVERTER TECHNICAL DATA | DATA SHEET NO:<br>BSE – PV-INV - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | TYPE1 | TYPE2 | TYPE3 |
|---|---|---|---|---|
| | Rated output current Aac | | | |
| | Rated input voltage V dc | | | |
| | Maximum input voltage V dc | | | |
| | Operating voltage Range Vdc | | | |
| | Operating votage range at rated power Vdc | | | |
| | Operating voltage range Vac | | | |
| | Operating frequency range Hz | | | |
| | Maximum efficiency % | | | |
| | European efficiency % | | | |
| | Power factor | | | |
| | Harmonic distortion of output current | | | |
| | Noice level at rated power | | | |
| | | | | |
| **6** | **Dielectric strength** | | | |
| | Between input terminal of main circuit DC and Earth | | | |
| | Between output terminal of main circuit AC and Earth | | | |
| | Between output terminal of contact signal and Earth | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| **7** | **Protection relays** | | | |
| | Over voltage relay set at Voltage / time | | | |
| | Under voltage relay set at voltage / time | | | |
| | Over frequency Relay set frequency / time | | | |
| | Under frequency relay set frequency / time | | | |
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | | **Sheet No :2 / 8** |

| **Department for welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>INVERTER TECHNICAL DATA** | | **DATA SHEET NO:<br>BSE – PV-INV - 01** | |
|---|---|---|---|---|
| **PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi : 120 KWp** | | | **System Capacity** | |
| **SNo.** | **SPEC. DETAILS** | **TYPE1** | **TYPE2** | **TYPE3** |
| **8** | **Operation and control** | | | |
| | Monitoring the voltage of PV array to control Inverter On/Off | | | |
| | Manual On /Off acc. to PV array volt, output volt & power | | | |
| | Auto On / off acc. to PV array volt, output volt & power | | | |
| | Communication mode | | | |
| | Power control function | | | |
| | Maximum power point tracking (MPPT) control | | | |
| | Constant voltage control | | | |
| | Power factor control | | | |
| | Input over current control function | | | |
| | Output over current control function | | | |

| | | | | |
|---|---|---|---|---|
| | Output power control | | | |
| | Output voltage control | | | |
| | Power factor control | | | |
| | Reactive power control | | | |
| | Soft start function | | | |
| | Parallel operation | | | |
| | Grid protective function | | | |
| **9** | **Protective functions to stop the inverter** | | | |
| | Lower Dc voltage during start up condition | | | |
| | Lower DC input power | | | |
| | Waiting status for start Up | | | |
| | Insolation Shortage | | | |



| **Department for welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>INVERTER TECHNICAL DATA** | **DATA SHEET NO:<br>BSE – PV-INV - 01** |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi** **System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | TYPE1 | TYPE2 | TYPE3 |
|---|---|---|---|---|
| | DC input Over voltage | | | |
| | DC Bus over voltage | | | |
| | DC bus under voltage | | | |
| | DC Input over current | | | |
| | Converter unit DC over current | | | |
| | Output AC overvoltage | | | |
| | Output AC over current | | | |
| | Inverter Case temperature high | | | |
| | Converter unit temperature high | | | |

| | | | | |
|---|---|---|---|---|
| | Power supply boxes / PCB boxes fans fault | | | |
| | Synchronization circuit fault | | | |
| | DC current sensor fault | | | |
| | DC bus voltage sensor fault | | | |
| | AC current sensor fault | | | |
| | Inverter current sensor fault | | | |
| | Main contactor fault | | | |
| | Controller power supply failure | | | |
| | Phase mismatching | | | |
| | Controller boards connectors fault signal | | | |
| | DC earth fault | | | |
| **10** | **Grid protective functions to stop inverter** | | | |
| | Grid over voltage | | | |
| | Grid under voltage | | | |





**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | TYPE1 | TYPE2 | TYPE3 |
|---|---|---|---|---|
| | Grid over frequency | | | |
| | Grid under frequency | | | |
| | | | | |
| **11** | **Panel - operation selection / setting Function** | | | |
| | Inverter ON / OFF Switch | | | |
| | Selection for Manual / Auto / Parallel Mode | | | |

| | | | | |
|---|---|---|---|---|
| | Selection for MPPT control / Constant voltage control | | | |
| | Selection for Output voltage control | | | |
| | Selection for communication function | | | |
| | Error Reset Button | | | |
| | Setting of Startup / optimum voltage with LCD display | | | |
| | | | | |
| **12** | **Panel display Function** | | | |
| | **LED display** | | | |
| | For Stop / Run /Stand by / Error /Grid tied | | | |
| | **LCD display** | | | |
| | Stand by state and its cause | | | |
| | Error state and its cause | | | |
| | Dc under power | | | |
| | Output over voltage control | | | |
| | Input over current control | | | |
| | Pv array voltage , current and power | | | |
| | DC bus voltage | | | |





**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi** **System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | TYPE1 | TYPE2 | TYPE3 |
|---|---|---|---|---|
| | Converter unit current | | | |
| | Output : voltage, current, power , Power factor, | | | |

| | | | | |
|---|---|---|---|---|
| | frequency | | | |
| | Accumulated power | | | |
| | History : Error / standby / Grid tied protective relay | | | |
| | Set values of all protective functions | | | |
| | Communication function | | | |
| | Remote monitoring and control functions | | | |
| | Output of contact signal | | | |
| **13** | **Panel** | | | |
| | Dimensions ( W x H x D ) mm | | | |
| | Frame /Sheet/ Door /Gland plate Material & thick mm | | | |
| | Degree of protection | | | |
| | Finish / Paint colour as per Standard code | | | |
| | Panel weight | | | |
| | Cooling Fan & Louvers | | | |
| | Earth bus /Bolt size | | | |
| | Lifting hooks | | | |
| | Panel light with door interlock switch | | | |
| **14** | **Panel Wiring : Type, Conductor size, colour code** | | | |
| | For main circuit 9 low voltage ) | | | |
| | For Auxiliary circuit | | | |
| | For Control Circuit | | | |
| | For Earthing | | | |

| Department for welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>INVERTER TECHNICAL DATA | DATA SHEET NO:<br>BSE – PV-INV - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi** **System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | TYPE1 | TYPE2 | TYPE3 |
|---|---|---|---|---|
| **15** | **Cable Terminations** | | | |
| | DC main circuit - Input Terminal detail | | | |
| | AC main power circuit – output terminal detail | | | |
| | Input signal terminals detial | | | |
| | Output signal terminal detail | | | |
| | Communication data signal terminals | | | |
| **16** | **Testing and certificates** | | | |
| | All Type test Certificates | | | |
| | Complete system physical inspection | | | |
| | Insulation resistance measurement | | | |
| | Insulation voltage test | | | |
| | Earth continuity checks | | | |
| | Start/ stop function test | | | |
| | Harmonic distortion | | | |
| | Output power factor measurement | | | |
| | Efficiency measurement | | | |
| | Protection interlock simulation test | | | |
| | Integrated operation test | | | |
| | Breaker interlock test while running | | | |
| **17** | **Document** | | | |
| | System equipment Technical data sheet | | | |
| | Panel General arrangement Dimensional Drg. | | | |

| | | | | |
|---|---|---|---|---|
| | Panel foundation drawing with cable entry detail | | | |
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | | **Sheet No : 7 / 8** |

| **Department for welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>INVERTER TECHNICAL DATA** | | **DATA SHEET NO:<br>BSE – PV-INV - 01** | |
|---|---|---|---|---|
| **PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi<br>Capacity : 120 KWp** | | | **System** | |
| **Son.** | **SPEC. DETAILS** | **TYPE1** | **TYPE2** | **TYPE3** |
| | Panel gland plate drawing | | | |
| | Panel Internal component arrangement drg. | | | |
| | Panel earthling drawing | | | |
| | Panel Main / Control Circuit drawing | | | |
| | System single line diagram | | | |
| | Interconnection cable diagram | | | |
| | Cable schedule | | | |
| | System bill of material | | | |
| | O & M manual for system & Components | | | |
| | | | | |
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| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | | **Sheet No : 8 /8** |

| Department for Welfare of SC/ST/OBC/Minorities | SECTION : 4<br>PV POLYCRYSTALLINE MODULES<br>TECHNICAL DATA | DATA SHEET NO:<br>BSE – PV- MOD - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi** **System**
**Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | TYPE1 | TYPE2 | TYPE3 |
|---|---|---|---|---|
| 1 | **Module Type** : | | | |
| | Make / model No. | | | |
| 2 | **Standards** | | | |
| | Confirm to standard codes | | | |
| | Safety | | | |
| | Quality | | | |
| | | | | |
| 3 | **Climatic condition** | | | |
| | Altitude | | | |
| | Ambient temperature deg C | | | |
| | Relative humidity % | | | |
| 4 | **Mechanical** | | | |
| | **Solar Cells** : | | | |
| | No of cells / cell dimension | | | |
| | Cell matrix / Connection type | | | |
| | **Construction** | | | |
| | Front cover with dimension mm | | | |
| | Back cover with dimension mm | | | |
| | Encapsulate detail | | | |
| | Frame material with dimension mm | | | |
| | **Junction box** | | | |
| | Body Material | | | |
| | Enclosure protection class | | | |

| Department for Welfare of SC/ST/OBC/Minorities | SECTION : 4<br>PV POLYCRYSTALLINE MODULES<br>TECHNICAL DATA | DATA SHEET NO:<br>BSE – PV- MOD - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | SPEC. DETAILS | TYPE1 | TYPE2 | TYPE3 |
|---|---|---|---|---|
| | No of terminals | | | |
| | Cable conduit sixe | | | |
| | Cable glands size & Quantity | | | |
| | **Output cables** | | | |
| | Type | | | |
| | Voltage grading | | | |
| | Conductor material & size | | | |
| | Cable Length | | | |
| | **Bypass diodes** Rating / Quantity | | | |
| | **Connectors** Type / Rating / Quantity | | | |
| | **Panel** Dimensions | | | |
| | Weight | | | |
| **5** | **Electrical** | | | |
| | **STC* (Standard Test Conditions): Irradiance 1000W/m², Module Temperature 25°C, Air Mass 1.5** | | | |
| | Nominal Output (Pmax) [W] | | | |
| | Warranted Minimum Power [W] | | | |
| | Flash Test Power Classification | | | |
| | Voltage at Pmax (Vmp) [V] | | | |
| | Current at Pmax (Imp) [A] | | | |
| | Open Circuit Voltage (Voc) [V] | | | |

| | | | | |
|---|---|---|---|---|
| | Short Circuit Current (Isc) [A] | | | |
| | Maximum System Voltage IEC: 1000 V / UL: 600 V | | | |
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | **Sheet No ; 2 / 4** | |

| **Department for Welfare of SC/ST/OBC/Minorities** | **SECTION : 4 PV POLYCRYSTALLINE MODULES TECHNICAL DATA** | | **DATA SHEET NO: BSE – PV- MOD - 01** | |
|---|---|---|---|---|
| **PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi Capacity : 120 KWp** | | | **System** | |
| **SNo.** | **SPEC. DETAILS** | **TYPE1** | **TYPE2** | **TYPE3** |
| | Maximum Series Fuse Rating | | | |
| | Cell Efficiency [%] | | | |
| | Module Efficiency [%] | | | |
| | | | | |
| **6** | **NOCT: Irradiance 800 W/m², Module Temperature 45± 2 °C, Air 20°C; Wind speed 1m/s** | | | |
| | Nominal Output (Pmax) [W] | | | |
| | Voltage at Pmax (Vmp) [V] | | | |
| | Current at Pmax (Imp) [A] | | | |
| | Open Circuit Voltage (Voc) [V] | | | |
| | Short Circuit Current (Isc) [A] | | | |
| | Operating Temperature -40°C to +85°C | | | |
| | Temperature Coefficient of Pmax % / °C | | | |
| | Temperature Coefficient of Voc % / °C | | | |
| | Temperature Coefficient of Isc % / °C | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 6 | **Packing Configuration** | | | |
| | Packing Configuration pcs. / box | | | |
| | Packing Configuration pcs. / box | | | |
| | Quantity / Pallet pcs. / pallet | | | |
| | Loading Capacity pcs. / ft (H) | | | |
| | | | | |
| | | | | |

| PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp | | | | |
|---|---|---|---|---|
| **SNo.** | **SPEC. DETAILS** | **TYPE1** | **TYPE2** | **TYPE3** |
| **16** | **Testing and certificates** | | | |
| | All Type test Certificates | | | |
| | Module physical inspection | | | |
| | Insulation resistance measurement | | | |
| | Insulation voltage test | | | |
| | Earth continuity checks | | | |
| | Efficiency | | | |
| | | | | |
| | **Document** | | | |
| | Module Technical data sheet | | | |
| | Module Dimensional Drawing | | | |
| | Structural supports drawing | | | |
| | Module cable interconnection drawing | | | |
| | Module Identification tags | | | |
| | O & M manual | | | |
| | | | | |
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| Department for Welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>PROJECT DATA | DATA SHEET NO:<br><br>BSE – PV- PRO - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | DESCRIPTION | UNIT | DATA |
|---|---|---|---|
| 1 | **Plant Capacity** | KW | |
| 2 | **Technology** | | Solar PV |
| 3 | **Client** Name | | Department for Welfare of SC/ST/OBC/Minorities |
| | Address | | 2nd Floor B Block |
| | | | Vikas Bhawan, New Delhi-2 |
| 4 | **Bidder** Name | | |
| | Address | | |
| | | | |
| 5 | **Site Data** | | |
| | Ambient temperature | Deg C | |
| | Humidity | % | |
| | Maximum Wind speed | m/sec | |
| | Seismic location | | |
| | Coordinate : Latitude | Deg N | |
| | Longitude | Deg E | |
| | Altitude ( above mean sea level ) | Mtr | |
| | Location : District / City | | |
| | Near by Electrical substation | KM | |
| | | | |
| | | | |

| Department for Welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>PROJECT DATA | DATA SHEET NO:<br><br>BSE – PV- PRO - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | DESCRIPTION | UNIT | DATA |
|---|---|---|---|
| **6** | **Solar Field Summary** | | |
| | Solar system / plant | No | |
| | Modules / plant | No | |
| | Module / string | No | |
| | Strings / plant | No | |
| | Strings / Inverter | No | |
| | Inverter / plant | No | |
| | Peak power / plant | KWp | |
| | STC Data | | |
| | NOCT data | | |
| | | | |
| **7** | **Modules** | | |
| | Type | | |
| | Make / Model | | |
| | Maximum power (Pmp) / Module | Wp | |
| | Rated power tolerance | % | |
| | Module efficiency | % | |
| | Module Dimension & Area | mm/mm² | |
| | Fill factor | | |
| | Irradiance at Maximum operating power | W/ m² | |
| | | | |
| | | | |

| | | | |
|---|---|---|---|
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | **Sheet No : 2 / 8** |

| **Department for Welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>PROJECT DATA** | **DATA SHEET NO:<br>BSE – PV- PRO - 01** |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | DESCRIPTION | UNIT | DATA |
|---|---|---|---|
| **8** | **Electrical** | | |
| | Maximum power voltage (Vmp) @ STC | V | |
| | Maximum Power Current (Imp) @STC | A | |
| | Open Circuit Voltage (Voc) @ STC | V | |
| | Short Circuit Current (Isc) @ STC | A | |
| | Maximum power voltage (Vmp) @ NOCT | V | |
| | Maximum Power Current (Imp) @NOCT | A | |
| | Open Circuit Voltage (Voc) @ STC NOCT | V | |
| | Short Circuit Current (Isc) @ STC NOCT | A | |
| | Temperature Coefficient of Isc | %/$^{o}$C | |
| | Temperature Coefficient of Voc | %/$^{o}$C | |
| | Temperature Coefficient of Pmax | %/$^{o}$C | |
| | Normal Operating Cell | $^{o}$C | |

| | | | |
|---|---|---|---|
| | Temperature | | |
| | NOCT | $^{o}C$ | |
| | Nominal Power Ratio | | |
| | No. of Modules | No | |
| | Module weight | Kg | |
| **9** | **Module Mounting structure** | | |
| | Make / Model | | |
| | Tilt | Deg | |
| | Azimuth | Deg | |
| | Pitch | m | |
| | Mounting type | | |



| **Department for Welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>PROJECT DATA** | **DATA SHEET NO:<br>BSE – PV- PRO - 01** |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi** **System Capacity : 120 KWp**

| SNo. | DESCRIPTION | UNIT | DATA |
|---|---|---|---|
| | Mounting frame dimension without module (WxDxH) | | |
| | Mounting frame dimension with module (WxDxH) | | |
| | Area per module with mounting frame | $mm^2$ | |
| | No of modules assembly per row | | |
| | Assembly Dimension per row (WxDxH) | mm | |
| | Total No of module assembly rows | | |

| | | | |
|---|---|---|---|
| | Module coverage dimension ( W x D ) / Area | mm/ mm² | |
| | Total ground dimension ( WxD ) / Area | Mm/ mm² | |
| | Ground coverage Area | % | |
| | No of foundation supports per module | | |
| | Total mounting supports per row | | |
| | Total mounting structure per plant | | |
| | Module supporting frame / structure weight | | |
| | Total supporting frame / structure weight | | |
| | | | |
| **10** | **String Details** | | |
| | Number of Modules in a String | Nos | |
| | String per Combiner Box | | |
| | Number of Strings per inverter | | |
| | Number of parallel Strings per inverter | | |
| | String Maximum Power Capacity | W | |
| | String Combiner Box (SCB) Power Capacity | kW | |
| | Total number of strings/ plant | Nos | |

| Department for Welfare of SC/ST/OBC/Minorities | SECTION : 4<br>SOLAR PV SYSTEM<br>PROJECT DATA | DATA SHEET NO:<br><br>BSE – PV- PRO - 01 |
|---|---|---|

**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | DESCRIPTION | UNIT | DATA |
|---|---|---|---|
| | Total number of combinatory box | Nos | |
| | Open Circuit Voltage of String (Voc) at SCB | V | |
| | Short Circuit Current of String (Isc) at SCB | A | |
| | Maximum mpp voltage (Vmpp) at 70ºC | V | |
| | Maximum mpp voltage (Vmpp) at 5ºC V | V | |
| | Maximum open circuit voltage (Voc) at 5ºC | V | |
| | Maximum open circuit voltage (Voc) at 0ºC | V | |
| | Maximum operating power | kW | |
| | Temperature at Maximum operating power | ºC | |
| | Maximum power voltage (Vmpp) at STC | V | |
| | Inverter Maximum Power (Pmax) at STC | kW | |
| | Maximum power current (Impp) at STC | A | |
| | Short circuit current (Isc) at Maximum power | A | |
| | | | |

| | | | |
|---|---|---|---|
| 11 | **Inverter** | | |
| | **Type** | | |
| | Make / model | | |
| | **Input** | | |
| | Max Power Point track Voltage Range | Vdc | |
| | Nominal DC Power | kWdc | |
| | Maximum DC Power | kWdc | |
| | Maximum DC Voltage | Vdc | |
| | Maximum DC Current | Adc | |





**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | DESCRIPTION | UNIT | DATA |
|---|---|---|---|
| | Number of DC inputs | Nos. | |
| | Threshold voltage | Vdc | |
| | **Output** | | |
| | Continuous AC power at 50°C | kWac | |
| | AC Voltage with tolerance | Vac | |
| | Frequency with tolerance | Vac | |
| | **Efficiency** | | |
| | Maximum Efficiency | % | |
| | European Efficiency | % | |
| | CEC Weighted Efficiency | % | |
| | Installation (Outdoor / Indoor) | | |

| | | | |
|---|---|---|---|
| | Total number of inverter / plant | % | |
| | **Inverter Panel Data** | | |
| | Panel Dimension ( W x Dx H) | | |
| | DC input breakers | | |
| | AC output breaker | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| **Sanskar Ashram Complex, Dilshad Garden, Delhi** | | | **Sheet No : 6 / 8** |

| **Department for Welfare of SC/ST/OBC/Minorities** | **SECTION : 4<br>SOLAR PV SYSTEM<br>PROJECT DATA** | | **DATA SHEET NO:<br>BSE – PV- PRO - 01** |
|---|---|---|---|
| **PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System<br>Capacity : 120 KWp** | | | |
| **SNo.** | **DESCRIPTION** | **UNIT** | **DATA** |
| **12** | **System Loss Factors** | | |
| | Low irradiance | | |
| | Module temperature | % | |
| | Soiling | % | |
| | Module quality | % | |
| | Module mismatch | % | |
| | Inverter performance | % | |
| | MPP Tracking | % | |
| | DC ohmic | % | |

| | | | |
|---|---|---|---|
| | Downtime | % | |
| | AC ohmic | % | |
| | *AC Losses* | % | |
| | Transformer (LV/MV) | % | |
| | Transformer (MV/HV) | % | |
| | First Year Degradation | % | |
| | Total Annual Loss Factor | % | |
| | Annual degradation | % | |
| | | | |
| | | | |
| 13 | **Grid** | | |
| | Grid connect | KV | |
| | | | |
| | | | |





**PROJECT : Sanskar Ashram Complex, Dilshad Garden, Delhi System Capacity : 120 KWp**

| SNo. | DESCRIPTION | UNIT | DATA |
|---|---|---|---|
| **14** | **Energy Yield** | | |
| | First Year Energy Yield | GWh | |
| | First Year AC Specific Yield | kWh/kW | |
| | Standard degradation per year | | |
| | Performance Ratio for Year 1 of Operation (monthwise ) | | |

| | | | |
|---|---|---|---|
| | Performance Ratio for Year 2 of Operation (Quarterly ) | | |
| | Performance Ratio for Year 3 of Operation (Quarterly ) | | |
| | Performance Ratio for Year 4 of Operation (Quarterly ) | | |
| | Performance Ratio for Year 5 of Operation (Quarterly ) | | |
| | Power warranty for 5 years | | |
| | Power warranty Extendable to 10 years | | |
| | | | |
| | | | |
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**SECTION :4**
**Department for welfare of SC/ST/OBC/Minorities**

## 25.5 PART – B

## 25.6 SCHEDULE OF PRICE FOR

# 26 ROOF TOP SOLAR PHOTO VOLTAIC SYSTEM

Scope of work shall include Detailed Engineering Design, Planning, Manufacturing, supply, Construction/Erection, Testing, Commissioning and Initial Operation for 5 years and Annual maintenance for additional 5 years for Roof Top solar PV plant at **Department for the welfare of SC/ST/OBC/Minorities, Sanskar Ashram complex, Dilshad Garden, Delhi** indicated below according TENDER TECHNICAL SPECIFICATION.

| ROOF TOP SOLAR PV SYSTEM | | |
|---|---|---|
| **Sl No.** | **Location** | **Capacity(KWp)** |
| **1** | **Boys Home** | **120 KWp** |
| **2** | **Girls Home** | |
| **3** | **Nehru Boys Hostel** | |
| **4** | **Kamla Nehru Girls Hostel** | |
| **5** | **NSIC Training centre** | |

**Price offer** shall be submitted in a separate envelope under Part B. as per data sheet No : BSE-PV-PSH -01 .

Tender document duly filled in and signed along with official seal, must be put in the proper envelope, duly sealed and should be submitted to this office as per the date stipulated

| Department for the welfare of SC/ST/OBC/Minorities | **SECTION :4<br>SCHEDULE OF PRICE<br>PART - B** | **DATA SHEET NO:<br><br>BSE – PV-PSH – 01** |
|---|---|---|

**PROJECT :**
**CAPACITY :**

| **Sl.No** | **Sys. Particulars** | **Price data** | **Amount** |
|---|---|---|---|
| 1 (A) | **<u>Supply, Erection ,Testing & Commissioning contract</u>**<br><br>Cost of 120 KWp complete design and supply of solar power plant equipment such as solar panels, structures, cables, string monitoring cum junction boxes ,Inverters, panels, Circuit breakers ,other required instruments, safety systems etc. and internal cabling & lines and associated switchgear. Equipments required for interfacing with grid sub station, material storage and other auxiliaries, complete system erection testing and commissioning , and all other works enabling Solar power project work complete in all respects . This also includes the cost of power evacuation system and metering system (s) as required up to the point of inter connection with the grid. **Comprehensive operation & Maintenance of solar PV plant upto five years from the date of commissioning shall also be included in the** | **Equipment cost**<br><br>**Operation & Maintenance cost**<br><br>**Duty / Levies charges**<br><br>**ST / CST**<br><br>**VAT**<br><br>**Freight / Transportation charges**<br><br>**Insurance**<br><br>**Service Tax**<br><br>**Any other Tax (Please Specify)**<br><br>**Total value (A)** | |

| | | | |
|---|---|---|---|
| | **same.** | | |
| 1 (B) | **<u>Comprehensive Annual Maintenance charge</u>**<br><br>Cost of comprehensive Annual operation & maintenance for additional 05 years after Completion of 5 years from date of commissioning of project | **Operation & Maintenance cost**<br><br>**Service Tax**<br><br>**Any other Tax /charges (Please Specify)**<br><br>**Total value (B)** | |
| | | **Grand Total (A +B)** | |

**Note :**

Any item of work not mentioned in the above particulars, but written elsewhere in the scope of work or in Technical Specification or essentially required for completion of works, proper operation and maintenance of Solar power plant, safety of equipment and operating personnel shall be deemed to have been included in the above particulars.

The prices may be written in figures and words and shall include all taxes, duties, levies including VAT/CST.

The prices mentioned at this page shall be taken into consideration for evaluation of bids.

At the point of inter connection with Discom system, the work has to be carried out as per instructions and approval of Discom and its cost is included in the above price.

The work has to be carried out as per the I.E/ IEC Rules & Code of practice and prudent utility practices along with the approvals of statutory authorities.

Signature and seal of firm