



**NATIONAL INSTITUTE OF BIOMEDICAL GENOMICS**

(An autonomous Institute of Dept. of Biotechnology, Ministry of Science & Technology, Govt. of India)

**P. O.: N. S. S. Kalyani – 741251, Nadia, West Bengal**

**TENDER DOCUMENT**

SUPPLY, INSTALLATION AND COMMISSIONING OF GROUND MOUNTED SOLAR PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM OF CAPACITY 100 KWp IN THE CAMPUS OF THE INSTITUTE

**February, 2021**

**NIT No. NIBMG/Solar/2020-21/015**

**Date: 26.02.2021**



# **NATIONAL INSTITUTE OF BIOMEDICAL GENOMICS**

(An autonomous Institute of Dept. of Biotechnology, Ministry of Science & Technology, Govt. of India)

## **CRITICAL DATE SHEET**

<b>Published Date</b>	<b>26.02.2021 (06.00 PM)</b>
<b>Bid Document Download / Sale Start Date</b>	<b>27.02.2021 (09:00 AM)</b>
<b>Clarification Start Date</b>	<b>27.02.2021 (09.00 AM)</b>
<b>Prebid Meeting Date</b>	<b>10.03.2021 (03.00 PM)</b>
<b>Clarification End Date</b>	<b>10.03.2021 (02.00 PM)</b>
<b>Bid Submission Start Date</b>	<b>27.02.2021 (09.00 AM)</b>
<b>Bid Submission End Date</b>	<b>18.03.2021 (02.00 PM)</b>
<b>Bid Opening Date</b>	<b>19.03.2021 (02.30 PM)</b>

**NATIONAL INSTITUTE OF BIOMEDICAL GENOMICS P.O.: N.S.S.,  
KALYANI 741 251**

**A: INSTRUCTION TO BIDDERS**

**TENDER NOTICE**

**NIT No. NIBMG/Solar/2020-21/015**

**Date: 25.02.2021**

Online (e-procurement mode) bids in percentage rate are invited under two part system from experienced and resourceful contractors who fulfill the eligibility criteria for participation in the tender process for the following work

<b>SL. No.</b>	<b>Name of the work</b>	<b>Estimated Cost (Rs.) (excluding the GST)</b>	<b>Completion time in Months / days</b>	<b>Earnest Money (Rs.)</b>
1.	SUPPLY, INSTALLATION AND COMMISSIONING OF GROUND MOUNTED SOLAR PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM OF CAPACITY 100 KWp IN THE CAMPUS OF THE NATIONAL INSTITUTE OF BIOMEDICAL GENOMICS, KALYANI	51.03 Lakh	45 days	1.00 lakh

Earnest Money will be accepted in the form of Bank Draft drawn in favour of the 'NATIONAL INSTITUTE OF BIOMEDICAL GENOMICS', payable at Kolkata from any Nationalized Bank. EMD of the successful bidder will be adjusted with the Security Deposit. EMD of the unsuccessful bidders will be released after finalization of the tender.

Earnest Money Deposit (EMD) must reach in original at National Institute of Biomedical Genomics within the stipulated time, i.e., the deadline time and date for submission of the bid online.

Bid for the work shall remain valid for a **period of 90 days** after the deadline date specified for submission.

Intending Bidders may visit the Institute website [www.nibmg.ac.in](http://www.nibmg.ac.in) as well as e-procurement portal for downloading the tender document, other details and any revisions or corrigendum.

Key dates: - As mentioned in the NIBMG Website and e-procurement portal.

Incomplete bids are liable to be rejected. National Institute of Biomedical Genomics (NIBMG) reserves the right to reject the tender without assigning any reason.

**1. Scope of Work:**

- a) Design and Detailed Engineering, Documentation For Solar Photovoltaic On-Grid Power Generating System of Capacity 100KWp, Customised For NIBMG Campus. Preparation Of As Built Drawing and Submission.
- b) Supply of Solar Photovoltaic On-Grid Power Generating System Of Capacity 100Kwp
- c) Transportation, Storing Installation & Commissioning Of 100 KWp on Grid Solar Photovoltaic Power Generating System.
- d) Five (5) Years' Comprehensive Maintenance of the Installed System in the Institute.

## **2. Eligibility Criteria**

Intending bidders should fulfill the eligibility criteria laid down hereunder and they should satisfy themselves about their eligibility before submitting the bid. The bidders should submit the documents/credentials **in Part-I** of the bid against all the criteria to substantiate their eligibility to participate in the tender.

a) Minimum 5 (five) years of experience having successfully completed works of similar nature of grid interactive solar power system installation works with CPWD, State PWD, MES, Railways, Autonomous Bodies, any Reputed Organization.

b) To qualify for award of the contract,

i) Each bidder in its name should have achieved in at least three financial years, during the last five years, i.e., 2015-16 to 2019-20, a minimum annual financial turnover of Rs 120.00 lakh.

ii) Satisfactorily completed during last 5 (five) years, ending last day of month previous to the one in which tenders are invited, at least,

One similar work of value not less than Rs 40.00 lakh (excluding the GST);

Or,

Two similar works of value not less than 30.00 lakh (excluding the GST);

c) Following Particulars of the Bidder are also required to be furnished in a separate sheet (format enclosed in Technical bid part) & submitted along with the relevant documentary evidence in Part-1 of the bid including EMD. The Part-1 should also contain a point wise compliance declaration by the bidder against all the technical specifications. Without compliance to the technical specifications, bidder's quotation may be rejected.

- i) Name of the Organisation
- ii) Address
- iii) Year of Establishment
- iv) Status of the firm – whether Company/Firm/Proprietary
- v) Whether registered with the Registrar of Company/Registrar of Firms. If so, mention number and date
- vi) Details of similar work and its value of work done with completion certificate during last 5 years

d) The bidders should also submit the photocopies of following documents in Part- 1 of the bid:

- i) Valid GST Registration Certificate
- ii) Professional Tax Registration Certificate
- iii) PAN Card
- iv) Valid Trade License Certificate
- v) Valid Electrical Contractor's Licence or Valid agreement with electrical licensed contractor for execution of work
- vi) Valid ISO certificate
- vii) MNRE certification of Bidder
- vi) Power of Attorney for the authorised signatory

e) The contractor must have its registered office in Kolkata at least for last 3years.

### **3. Bid Price**

The bidders are advised to visit the site of works at their own expense and obtain all information that may be necessary for preparing the bid.

- a) The contract shall be for the whole works as described in the Schedule of Works, drawings and technical specifications.
- b) For Item Rate Tender the bidder must ensure to quote rate of each item. No cell for price can be left blank. However, if a bidder quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section/sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest bidder.
- c) All duties, taxes, other levies payable by the contractor under the contract shall be included in the total price, except the GST. GST will be paid extra at the rate prevailing at the time of invoicing. New imposition of taxes and variations, (after award of contract) if any, will be borne by the Contractor, except for the GST, which will be paid as per actual.
- d) The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subjected to adjustment on any account.
- e) The rates should be quoted in Indian Rupees only.

### **4. Method of Submission of Bid:**

A) Bidders shall require to submit the bids online in the CPP portal in two Parts, which shall comprise the following:.

- a) **Part - 1 (The Technical Bid)** of the bid shall contain (In JPG format or PDF format)
  - i. Scanned Copies of the original Earnest Money Deposit and receipt for deposition of the same
  - ii. All documents, supporting fulfillment of eligibility criteria & commercial & general stipulations mentioned in the Tender Documents.
  - iii. A set of bidding document duly signed and stamped by the bidder as token of acceptance of the entire bidding document.
  - iv. Any other materials required to be completed and submitted by bidders in accordance with these instructions.

Technical Bid must be submitted in the Format B at the following pages

**Note:** *Part-1 (Technical bid) must not contain any price*

- b) **Part - 2 (The Financial Bid)** of the bid shall contain
  - i. Priced Schedule of Works

**Note:** *The Financial Offer of the prospective tenderer/bidder will be considered only if the Technical Bid of the bidder is found qualified by the "Tender Evaluation Committee" of NIBMG. The decision of the 'Tender Evaluation Committee' will be final and absolute in this respect.*

### **B. FORMATS FOR TECHNICAL BID (1.1.1 to 1.4.1)**

The information to be filled in by the Bidder in the following pages will be used for purposes of prequalification. This information will not be incorporated in the Contract.

The bidders shall fill in the information in the following format carefully, attach copies of the corresponding supporting documents (preferably marked as Annexure-1,2....etc. for convenience of identification), duly sign and stamp the pages and then upload the pages in JPG or PDF format in the online bid.

The information and documents will be used for the purpose of technical evaluation of the bidders; hence the bidders are required to be very particular and careful.

S.L. No.	Description	Information to be filled in by the Bidder	Uploaded copies of the corresponding supporting documents	
			Name of the document (to be filled in by the Bidder)	Marked as
<b>1.1.1</b>	<b>Particulars of the Bidder (Mandatory)</b>			
	Name of the Firm:			
	Address of the Firm:			
	Established on			
	Contact Telephone Number of the firm:			
	Email id:			
	Statutory Registration No.			
	Place of registration:			
	Registration for GST.			
	Professional Tax Registration Certificate			
	Income tax Permanent Account Number (PAN)			
	Valid Trade Licence			
	Valid Electrical Contractor's Licence or Valid agreement with electrical licensed contractor for execution of work			
	Valid ISO certificate			
	MNRE Certification of bidder.			
	Registration under PF scheme, if any			
	Registration under ESI scheme, if any			
	Name of the authorized signatory (Attach copy of power of attorney or valid document)			
<b>1.1.2</b>	<b>Earnest Money Deposit of Rs. 1,00,000/- (Mandatory)</b>			

1.2.1	Information regarding qualifying criteria as per clause 2 (b) (ii) (Mandatory)								
To be filled in by the bidder: List of similar works satisfactorily completed									
Sl. No.	Project Name	Name of the Employer*	Description of work*	Contract No.*	Value of contract (Rs. Lakh)*	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remarks explaining reasons for delay
1									
2									
3									
4									
Sl. No.	To be filled in by the Bidder: List of the uploaded copies of the corresponding supporting document/s * with respect to the list of works stated above.							Uploaded copies of documents * marked as	
1									
2									
3									
4									

\* Copies of certificate(s) from the Engineer(s)-in-Charge.

1.3.1	Information regarding qualifying criteria as per clause 2 (b) (i) (Mandatory)			
To be filled in by the Bidder, for the last five years.				
	Financial year	Financial turnover Rs. Lakh	Uploaded copies of the corresponding supporting documents *	
			Description of the document	Marked as
	2015-2016			
	2016-2017			
	2017-2018			
	2018-2019			
	2019-2020			
	(*) Attach certificate from Chartered Accountant/ Auditor/Any other valid Certificate, viz., balance sheets, profit and loss statements, auditors' reports (in case of companies/corporation)			



#### 1.4.1 DECLARATION BY VENDOR/SERVICE PROVIDER

I confirm that:-

- 1) I \_\_\_\_\_ Son / Daughter / Wife of  
Shri \_\_\_\_\_ Proprietor/Director/Partner/Manager Resident of  
\_\_\_\_\_, authorized signatory of the  
Agency/Firm, \_\_\_\_\_, am competent to sign this Declaration and execute this  
application document.
- 2) No employee or direct relation of any employee of NIBMG is in way connected as Partner  
/Shareholder/Director/Advisor/Consultant/Employee etc. with the Company.
- 3) The information furnished is correct to the best of my knowledge and belief.
- 4) I have read and understood the general instructions to vendors and undertake to abide by the same.

.....  
(Signature of Proprietor/Partner/Chief Executive)

Name .....

(In Capital Letters)

(Seal of Service Provider)

Place: .....

## **5. Pre-bid Meeting:**

Pre-bid meeting with the intending bidders will be held on 10.03.2021 at 3:00 PM in the institute.

## **6. Submission of Bid:**

- 6.1 Bids shall be submitted online to E-procurement cell, NIBMG, Kalyani (<http://eprocure.gov.in/eprocure/app>)
- 6.2 Deadline date for submission of bid: Bids must be submitted online no later than 12:00 Noon on (DD+21).MM.2021
- 6.3 NIBMG may extend the deadline for submission of bids by issuing an amendment, in which case all rights and obligations of the NIBMG and the bidders previously subject to the original deadline will then be subject to the new deadline.

## **7. Bid Opening and Evaluation:**

### **7.1 Opening of the Technical Bid:**

All the **Technical Bids** received, will be opened online on 19.03.2021 at 3:00 PM. In the event of the specified date of Bid opening being declared a holiday NIBMG, the Bids will be opened at the appointed time on the next working day.

### **7.2. Examination of Bids and Determination of Responsiveness**

- 7.2.1 Prior to the detailed evaluation of Bids, NIBMG will determine whether each Bid (a) meets the eligibility criteria; (b) has been properly signed; (c) is accompanied by the required EMD; (d) is substantially responsive to the requirements of the Bidding documents.

A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding documents, without material deviation or reservation.

- 7.2.2 If a Bid is not substantially responsive, it will be rejected by NIBMG and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

### **7.3 Evaluation and Comparison of Technical Bids**

- 7.3.1 NIBMG will evaluate and compare only the Bids determined to be substantially responsive.
- 7.3.2 NIBMG will finalize the list of qualified Bidders whose Bids have been determined to be substantially responsive to the Bidding documents, provided that such Bidder has been determined to be eligible and qualified in accordance with the provisions of Clause: 2 of ITB
- 7.3.3 NIBMG will upload the Evaluation Report of the Technical Bids and notify the list of Qualified Bidders in the CPP Portal.

### **7.4 Right to accept any Bid and to reject any or all Bids**

NIBMG reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the 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 action.

## **8. Opening of the Financial Bid**

- 8.1 NIBMG shall notify the time and date of online opening of the **Financial Bid**. Financial Bids of the qualified bidders will only be opened.
- 8.2 The Financial Bids will be opened online.
- 8.3 The detail report on the Financial Bids, that is, the Bidders' names, the Bid Price, the total amount of each Bid will be uploaded in the CPP portal for information of the Bidders.

## **(C) Terms and Conditions of the Contract**

### **1. Terminology:**

- a) **‘Owner’** means National Institute of Biomedical Genomics or its authorised representatives.
- b) **‘Work’** means Supply, Installation and Commissioning of Ground Mounted Solar Photovoltaic On-Grid Power Generating System of Capacity 100 Kwp in the Campus of the National Institute Of Biomedical Genomics, Kalyani
- c) **‘Contractor’** means the Agency/Firm on whom the owner would place the order for execution of the work.

### **2. Price**

- i) Rate should be inclusive of all other taxes, duties as on date, levies, insurance, transport cost etc. except GST. GST will be paid extra as actuals at the rate prevailing at the time of invoicing. Prices quoted should be inclusive of all supplies, installation & commissioning, testing at site & site handover and five years of maintenance. All quoted prices should be valid till 90 days after the date of tender opening. Quantities in BOQ are tentative. Payments will be made on basis of actual executed quantities
- ii) New imposition of taxes and variations, if any, will be borne by the Contractor, except GST, which will be paid as per actual.

3. **Security Deposit** will be deducted @ 5% (Five percent) of the Bill value from the bill and the same will be released after satisfactory completion of Defect Liability Period (DLP). **Defect Liability Period** is for **12 (twelve) calendar months** and will be reckoned from the date of successful completion and handing over / taking over of the assigned work.

4. **Performance Bank Guarantee** amounting to 3% (Three percent) of the Contract value is to be submitted within 10 (Ten) days in terms of Bank Guarantee from the issue of the Work order. It will remain valid up to 6 (six) years and (2) two months from the date of submission of Bank Guarantee and will be released after successful completion of Maintenance period as defined in succeeding paragraph.

5. **Commencement of work:** Within 7 (seven) days from the date of issue of the Notice to proceed with the work /Work Order.

### **6. Completion time**

The works should be completed in 60 (Forty-five) days from the date of commencement of work. In exceptional circumstances, the time stated in this clause may be extended in writing by mutual consent between NIBMG (hereinafter referred to as The Owner) and the Contractor.

In the event of any delay not attributable to the Contractor, consequent extension of completion time shall be granted by the Owner at the sole discretion of the Owner against application by the Contractor.

Any wilful delay on the part of the ‘Contractor’ in completing the construction within the stipulated period will render him liable to pay liquidated damages \* \_\_\_\_\_ per day which will be deducted from payments due to him. The ‘owner’ may cancel the contract and take recourse to such other action as deemed appropriate once the total amount of liquidated damages exceeds 2% of the contract amount.

*\* (Note: The amount of liquidated damages per day should be determined at 0.20% of the contract value of the works and indicate here.)*

## **7. Duties and responsibilities of the ‘Owner’**

- a) The ‘Owner’ shall be responsible for providing regular and frequent supervision and guidance to the ‘Contractor’ for carrying out the works as per specifications. This will include written guidelines and regular site visit of the authorized personnel of the ‘Owner’, for checking quality of material and construction to ensure that it is as per the norms.
- b) The “Owner” shall supply execution drawings, specifications and / or guidelines to the Contractor for the proposed work.
- c) The “Owner” shall hold meeting where the ‘Contractor’ or his representative at site will submit the latest information including progress report and difficulties if any, in the execution of the work. The whole team may jointly inspect the site on a particular day to take stock of activities.
- d) The “Owner” shall record his observations/instructions at the time of his site visit in a site register maintained by the second party. The ‘Contractor’ will carry out the instructions and promptly rectify any deviations pointed out by the engineer. If the deviations are not rectified, within the time specified in the Engineer’s notice, the ‘Owner’ as well as the engineer nominated by it, may instruct stoppage or suspension of the construction. It shall thereupon be open to the ‘Owner’ or the engineer to have the deviations rectified at the cost of the Contractor.

## **8. Duties and responsibilities of the Contractor**

The ‘Contractor’ shall:

- a) take up the works and arrange for its completion within the time period stipulated in clause 6.
- b) employ suitable skilled persons to carry out the works.
- c) regularly supervise and monitor the progress of work.
- d) abide by the technical suggestions / direction of supervisory personnel including engineers etc. regarding construction.
- e) be responsible for bringing any discrepancy to the notice of the representative of the ‘Owner’ and seek necessary clarification.
- f) ensure that the work is carried out in accordance with specifications, drawings and within the total of the contract amount without any cost escalation.
- g) keep the ‘Owner’ informed about the progress of work.
- h) be responsible for all security and watch and ward arrangements at site till handing over of the work to the ‘Owner’.
- i) maintain necessary insurance against loss of materials/cash, etc. or workman disability compensation claims of the personnel deployed on the works as well as third party claims.
- j) pay all duties, taxes and other levies payable by construction agencies as per law under the contract (‘Owner’ will effect deduction from running bills in respect of such taxes as may be imposed under the law).
- k) clear the site on completion of work.

## **9. Variations / Extra Items /Deviation**

The works shall be carried out by the ‘Contractor’ in accordance to the approved drawings and specifications. However, if, on account of site conditions or any other factors, variations are considered necessary, the following procedure shall be followed: -

- a) The ‘Contractor’ shall provide the “Owner” with a quotation for carrying out the Variation when requested to do so by the “Owner”. The “Owner” shall assess the quotation, which shall be given within seven days of the request before the Variation is ordered.
- b) If the quotation given by the ‘Contractor’ is unreasonable, the “Owner” may order the Variation and make a change to the Contract Price which shall be based on “Owner’s ” own forecast of the effects of the Variation on the Contractor’s costs.
- c) The ‘Contractor’ shall not be entitled to additional payment for costs, which could have been avoided by giving early warning.

- d) The “Owner” shall have the power (i) to make alteration in, omissions from, additions to, or substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work, and (ii) to omit a part of the works in case of non-availability of a portion of the site or for any other reasons and the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the authorized Engineer of the Owner and such alterations, omissions, additions or substitutions shall form part of the contract as if originally provided therein and any altered, additional or substituted item which the contractor may be directed to do, shall be carried out by the contractor on the same conditions in all respects which he agreed to do the main work.

Clause 9a and 9b shall apply for extra items, substitute items.

#### **10. Certificate of Completion:**

- a) On successful completion of the job as per technical specifications, the contractor should issue a “Completion Certificate” to NIBMG and NIBMG Engineer will provide a written acceptance after due inspection of the job vis-à-vis the work order.
- b) The contractor before submitting the completion certificate will make sure that the site is clear of all debris/scrap, excess materials, scaffolding etc. He should make good of any damage caused to any NIBMG asset during his execution of the work order failing which NIBMG may get it done at the cost and risk of the contractor.

#### **11. Testing and Handing over / Taking over (HOTO):**

- a. The Contractor shall carry out test functioning of equipment supplied by them after obtaining clearance of statutory authorities’ for powering up of installations, in the presence of representatives of NIBMG to establish satisfactory functioning of equipment.
- b. The equipment shall be handed over to the representatives of NIBMG after satisfactory commissioning, duly permitted by the statutory authorities, along with 4 (four) sets of completion documents each consisting of:
- i) Detailed equipment data and catalogues with all Test Reports.
  - ii) Manufacturer’s maintenance manual including trouble shooting & preventive maintenance chart.
  - iii) Set of “INSTALLED EQUIPEMENT DRAWINGS” (As built drawings) showing layouts & equipment details of Solar Panels, solar panel mounting frames, electrical power and control wiring diagrams etc. as per BOQ.
  - iv) Satisfactory Test Certificates for SPV Panels, Electricals Panels, inverters etc.
  - v) List of recommended spares.
  - vi) Certificate from the Engineer that the Contractor has cleared the site of all debris and litter caused by them during the construction.
- c. Submission of the above documents shall form a precondition for the final acceptance of the system. Final acceptance will be recorded in the HOTO document and signed by authorized representative of NIBMG and the vendor. Final payment will be released only after signing of the HOTO document.

#### **12. Defect Liability Period(DLP):**

Defect Liability Period (DLP) will be one year from the date of issuing of HOTO. The contractor shall maintain (including routine and preventive maintenance) the whole of the works completed by him for a period of one year from the date of HOTO. During this DLP the contractor will replace/repair any defect / failure which may arise during operation of the equipment, free of cost

to the satisfaction of the NIBMG engineer. NIBMG will be free to get this done at the cost and risk of the contractor during the pendency of the DLP.

### **13. Payment Terms:**

- i) No mobilization Advance will be paid.
- ii) Payment will be made against R.A. Bills.
- iii) Billing schedule: 60% on supply of materials, 30% on completion of installation, commissioning and achievement of 100% of rated capacity, 10% on Handing Over/Taking Over (HOTO) of the completed system.

### **14. Other Terms and Conditions**

- iii) **Site visit** – NIBMG will arrange access to the site for ‘site visit’ of contractor’s engineer before commencement of work.
- iv) **Storing of materials** –NIBMG will provide covered space only for storing of all materials awaiting installation. Safety (from moisture and other physical damage) and security from theft etc. will be sole responsibility of the contractor.
- v) **Warranty and Maintenance**– Complete system’s warranty and periodic maintenance (including preventive maintenance) is for 60 months from the date of Handing over (HOTO) against any manufacturing and installation defect, during which contractor will repair/replace any defect / failure which may arise during operation of the equipment, free of cost. Warranty period will be covered by PBG, which will only be released on successful completion of Maintenance Period. The warranty of solar panel must be 25 years from the date of issuance of HOTO. Warranty certificate of Solar panel from Manufacturer must be submitted to the Institute.
- vi) Before supply and installation of the work the contractor must submit detailed engineering design and drawing of the work for approval and satisfaction of NIBMG.
- vii) **Delivery, Installation and Commissioning** – within 45 days from the date of order (with accepted commercial terms), Delivery, Installation and Commissioning should be completed in all respect.
- viii) **Statutory obligations:** The contractor shall take necessary action to fulfill all applicable statutory obligations as required to execute the work. Valid insurance papers covering accident related expenditures/claims should be submitted at the time of deployment at site.

### **ix) Termination**

The “Owner” may terminate the Contract if the other party causes a fundamental breach of any the Contract terms. Fundamental breaches of Contract include, but shall not be limited to the following:

- (a) the contractor stops work for 07 days and the stoppage has not been authorized by the “Owner”.
- (b) the Contractor has become bankrupt or goes into liquidation other than for a reconstruction or amalgamation.
- (c) the “Owner” gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the “Owner”.
- (d) the Contractor does not maintain a security which is required.

Notwithstanding the above, the Owner may terminate the Contract for convenience. If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

**x) Payment upon Termination**

If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law.

If the Contract is terminated at the “Owner’s” convenience, the “Owner” shall issue a certificate for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor’s personnel employed solely on the Works and the Contractor’s costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law.

**xi) Dispute settlement**

If over the works, any dispute arises between the two parties, relating to any aspects of this Agreement, the parties shall first attempt to settle the dispute through mutual and amicable consultation. In the event of agreement not being reached, the matter will be referred for arbitration by a Sole Arbitrator to be appointed by the Owner. The Arbitration will be conducted in accordance with the Arbitration and Conciliation Act, 1996. The decision of the Arbitrator shall be final and binding on both the parties.

**xii) Legal issues:**

All disputes arising out of or in any way connected with this work order shall be deemed to have been arisen in Kolkata and only the Court in Kolkata shall have jurisdiction to determine the same.

**Manager (Administration)  
On behalf of Director, NIBMG**

#### **D. Technical Specification**

<b>Name of Work</b>	:	<p>A) DESIGN, DETAILED ENGINEERING AND DOCUMENTATION FOR GROUND MOUNTED SOLAR PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM OF CAPACITY 100 KW<sub>p</sub>, CUSTOMISED FOR NIBMG CAMPUS. PREPARATION OF AS BUILT DRAWING AND SUBMISSION.</p> <p>B) SUPPLY OF SOLAR PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM OF CAPACITY 100KW<sub>p</sub></p> <p>C) TRANSPORTATION, STORING INSTALLATION &amp; COMMISSIONING OF 100 KWP ON GRID SOLAR PHOTOVOLTAIC POWER GENERATING SYSTEM.</p> <p>D) FIVE (5) YEARS' COMPREHENSIVE MAINTENANCE ON TURNKEY BASIS OF THE INSTALLED SYSTEM AT NIBMG AS DEFINED IN (B)</p>
---------------------	---	--

**Note: Bidders should indicate state of compliance of their product/service against every item of the Technical Bid. Compliance may be given in the cryptic form e.g. 'Complied', 'Agreed', 'Noted', 'Not Applicable', 'Better', 'Not Complied' etc. Any deviation / non-compliance may be indicated clearly, otherwise the quotation is liable to be rejected.**



**BILL OF QUANTITY (BOQ) FOR DESIGN, SUPPLY, INSTALLATION AND COMMISSIONING OF GROUND MOUNTED SOLAR PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM OF CAPACITY 100KWp.**

Sl. No	Description of Items	Unit	Quantity
1.	Design, Detailed Engineering, Documentation for Solar Photovoltaic on-grid power generating system of capacity 100 KWp, customized for NIBMG campus.	system	1
2.	Solar PV Module PERC Mono-Crystalline 375 Wp or above (as per clause 5.0& 6.0 of Technical specifications)	lot.	1
3.	PV Array Junction Box with SPD with poly carbonate, IP 65 enclosure / inbuilt with inverter. (as per clause 8.0 of Technical specifications)	each	2
4.	50 KW (peak solar) Inverter (as per clause 9.0 of Technical specifications)	each	2
5	Grid interfacing LT Panel, IP 55 Enclosure complete with AC Surge Suppressor & MCB for individual Inverter. (as per clause 11.0 of Technical specifications)	lot	2
6.	MCCB with appropriate rating with enclosure and extension box and spreader link(as per clause 12.0 of Technical specifications)	each	1
7.	Module mounting structure, foundation bolts, stainless steel screws / nuts and bolts as per approved design. All structures will be with 80-micron galvanization suitable for Solar System of relevant capacity and nuts and bolts will be made of stainless steel (as per clause 7.0, of Technical specifications)	MT	7.3
8.	RCC Foundation of module mounting structures.		
8 (i)	Earth work in excavation including back filling in foundation trenches with proper compaction, disposal, dressing and leveling of surplus earth within a lead of 75 m. as per direction, all complete.	cum.	388
8(ii)	Cement concrete (mix 1:3:6) with graded stone ballast (40 mm size, Pakur variety), complete with all materials and labour, etc.	Cum	13.5
8(iii)	Ordinary cement concrete (mix 1:1.5:3) with graded stone chips (20 mm nominal size, Pakur variety) as per relevant IS codes, complete with all materials and labour, etc.	cum.	51
8(iv)	Reinforcement work for reinforced concrete. SAIL/ TATA/RINL including carrying, handling placing and binding with biding wire nails complete with all materials and labour etc.	quintal	51.3
8(v)	9 to 12 mm thick approved quality ply board shuttering in any concrete work, complete with all materials and labour, etc.	sqm	528.00
9.	Cables (as per clause 15 & 16 of Technical Specification)		
i)	IIP to GIP existing LT Panel 4C x 70 sqmm. copper armoured cable	mtr.	20
ii)	AC Cabling from Inverter to AC DB (1C x 35 Sq. mm) Copper Cable		100
iii)	DC double insulated cable (1C x 4 sq. mm.) Copper Cable	mtr.	1500
10.	Earth Pit and earthing System and Civil job (as per clause no 13 of technical specification)	lot	1
11.	Installation and commissioning	job	1
12.	Web based Remote Monitoring System (as per clause no 10 of technical specification)	system	1
13.	Lightning Arrestor (as per clause no 14 of technical specification)	Job	1
14.	Fire extinguishers (as per clause no 19 of technical specification)	each	1

15.	Project signage and safety signage(as per clause no 17 & 18 of technical specification)	lot	1
-----	---	-----	---

*Note: Quantities in the BOQ are tentative. Actual quantities may vary as per final approved design and drawing. Payment will be made on the actual executed quantities only.*

## **D: Technical Specification of Ground Mounted Grid Connected Solar PV Power Plant**

The scope of work shall cover all civil, electrical & mechanical works, providing of labour, tools, plants, materials and performance of work necessary for the planning, design, engineering, manufacture, quality assurance, shop assembly/ testing, insurance, supply, packing & forwarding, transportation, unloading at site, site storage & preservation, installation, commissioning, performance testing, acceptance testing, training of the Owner's personnel, handing over plant to the Owner and guarantee of all equipment covered under the scope as per the technical specifications. The work shall be executed in conformity with the relevant applicable latest standards, codes, rules/ordinances & regulations. The overall design & engineering of the plant shall be based on latest available technology and optimal usage of space to minimize losses and maximize efficiency. The detailed scope of work shall include but not limited to following,

**1.0** Grid connected solar PV power plants to be installed under this project shall be guided by following technical specification

### **2.0 Outline of the scheme of the project:**

- 2.1** The PV array of the PV Power Plant shall be installed at the available space earmarked at project site.
- 2.2** The power from PV array shall be fed into grid through grid connected string inverter (s). PV array shall be connected to the Grid Connected inverter through Array Junction Box(s)(AJB)
- 2.3** The output of the Inverter shall be connected with supply mains through a Grid Interfacing Panel.
- 2.4** The SPV power should be Robust, Economic, Efficient and Time tested.

### **3.0 Design and Engineering**

- 3.1** The contractor shall develop the general layout drawing of Array Yard, Inverter, AJB, Grid Interfacing panel, Single line diagram, design/ drawings of mounting structures and concrete foundations and other drawings as may be required. All designs & drawings are to be developed based on specification given in the tender, relevant BIS unless otherwise specified.
- 3.2** The Power Plants shall have to be designed considering optimal usage of space without compromising the effect of shadow, cooling, ventilation, accessibility, losses, protection, security and safety etc.

### **3.3 Document to be submitted during approval of the Design and Drawing:**

During approval of drawing and design of the PV Power Plant the documents have to be submitted by the contractor which shall be included but not limited to as follows:

- i) PV Array and other component layout drawing of the PV Power Plant
- ii) Drawing of different equipment of PV power Plant
- iii) Design and drawing of PV Module mounting structure along with the fixing arrangement of PV array on the ground as per technical specification with the name of the manufacturer of the MS Structure Member to be used for PV module Mounting Structure.
- iv) List of Equipment and Component and its capacity and manufacturer's name to be used in the PV Power Plants.
- v) IEC certificates of Inverters, PV Module.
- vi) ISO 9001:2008 or ISO 14001 Certification, certificate of PV Module manufacturer,
- vii) IS/IEC Certificate of Cables , Components of Array JB, Grid Inter facing Panel, MS Members make of the PV module mounting structure etc.
- viii) Technical catalogue of the Equipment and Component.
- ix) Detail design and drawings of RCC foundation.

#### 4.0 **Civil Works**

Due consideration is to be given for the weight of the concrete blocks (foundation block for the module mounting structure) which must be capable of bearing the design wind speed of 150 km/hr and even then keep the entire Solar PV system intact in place. It is to be further noted that the entire Solar mounting structure at each location (on ground) shall be interconnected with Structural members so as to make the entire mounting structure as one entity and thereby help in providing sufficient stability against design wind pressure (conforming to IS 875 (Part 3): 2015). Further, seismic factors of the site and overall height of the location is to be given due consideration. All structural / civil works are in the scope of Contractor.

#### 5.0 **Solar PV Modules**

**Proposed PV Module must be manufactured in India.** Each PV module used in this solar power project must use an RF identification tag. The information as per MNRE Guideline must be mentioned in the RFID used on each module (This can be inside or outside the laminate, but must be able to withstand harsh environmental condition)

#### **Guarantee**

**51. A. Material Guarantee:** The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than five (5) years from the date of commissioning of the PV Power Plant.

- i. Defects and/or failures due to manufacturing
- ii. Defects and/or failures due to quality of materials
- iii. Non conformity to specifications due to faulty manufacturing and/or inspection processes.

If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owner's sole discretion.

**52. B. Performance Guarantee:** The contractor should warrant the electrical output of Solar Module(s) for at least 90% of its rated power after initial 10 years & 80% of its rated power after 25 years from the date of handing over of the Power Plant.

Manufacturer of proposed PV modules must have the ISO 9001:2008 or ISO 14001 Certification for their manufacturing unit for the said manufacturing item.

**Note: Only indigenously manufactured PV modules should be used in Grid Connected Solar PV Power Plants under this scheme.**

**Desired specification of the PV Module shall include but not limited to the following:**

Sl. No.	Item	Description
1.0	Certification	i) IEC 61215 or IS14286 ii) IEC61730
1.2	Test certificate issuing authority.	NABL/ IEC Accredited Testing Laboratories or MNRE accredited test centers.
2.0	PV Cell	
2.1	Type	Monocrystalline (PERC)
3.0	PV Module	
3.1	Minimum capacity	375Wp or above
3.2	Rating	72 cell (without any negative tolerance) with glass
3.3	Efficiency	Minimum 19.3%
3.4	Fill factor	Minimum 7.5%
3.5	Glass	
3.5.1	Thickness	3.2 mm (minimum) for 72 Cell PV Module
3.5.2	Type	High transmission, low iron, tempered & textured glass with anti-reflective coating.
3.6	PV Module Junction Box	
3.6.1	Protection level	IP 67 or above
3.7	Bypass Diode	
3.7.1	System Voltage (V <sub>sys</sub> )	1000 V dc
3.7.2	Number	3 numbers
3.8	Module Frame	
3.8.1	Type	Anodized aluminum frame (minimum thickness ?

## **6.0 PV Array**

**Desired specification of the PV Array shall include but not limited to the following:**

Sl. No.	Item	Description
1.0	PV Module interconnection connector	MC-4 / Tyco
2.0	PV Module interconnection cable and array cable	PV 1-F standard /NEC standard “USE-2 or RHW-2” type ( double insulated)
3.0	PV array String Voltage	Compatible with the MPPT Channel of the inverter
4.0	Maximum Ground Space Utilization	12 sqm / per KWp for true South

## **7.0 PV Module Mounting Structure**

**During Structural design following points must be included but not limited to the following:**

- The Module Mounting structure must be made of Mild Steel members. The Mild Steel member must be of IS make manufacturer.
- The PV Module Mounting Structure shall be so designed satisfying that rain water is not clogged due to installation of the same.
- The contractor shall have to submit the drawing of PV module mounting structure after placement of PO for necessary approval. Angle-channel structure shall only be considered. **Hollow pipe structure shall not be considered.**
- The PV Array should be capable of withstanding the design wind speed of **150 km/hr** after installation.

- v) Design Factor of Safety :**1.5**
- vi) All structures including any metallic part thereof must be protected against any corrosion. The structures must also be compatible with the materials used in the module frame, fasteners, fixtures, nuts, bolts or any similar nature of metallic components whichever are required to complete the job.
- vii) The PV array structure will be made of hot dip galvanized MS structure of minimum galvanizing thickness **80micron**
- viii) Structures will be supplied complete with all members to be compatible for allowing easy installation.
- ix) The module mounting structure will have to be designed and fabricated with tilt angle for obtaining optimum generation from the PV power Plant as per site condition.
- x) The structures will be designed for simple mechanical and electrical installation. There will be no requirement of welding or complex machinery at the installation site.
- xi) The PV Array structure will support SPV modules at the mentioned orientation and absorb, transfer the loads to the ground through properly designed reinforced concrete foundation.
- xii) **Nuts and Bolts of Array structure:** Stainless steel
- xiii) All fasteners, fixtures for supporting conduits shall be made with stainless steel or aluminum or UV Protected PVC
- xiv) The minimum ground clearance should be 1000 mm
- xv) PV Modules should be fixed with SS nut bolts and Neoprene washer.
- xvi) Mandatory enclosures: Brochure of the Module IEC 61215, IEC61730
- xvii) Aluminum Structure: Contractor may also use Aluminum structure conforming to the specified design criteria mention as above.

## 8.0 **PV Array Junction Box(AJB)**

**PV Array Junction Box (AJB) will have to be used for termination of string prior to connecting array with inverter.** Minimum one (01) number of PV Array Junction Box will be provided with each Power Plant. The desired specification of the PVArrayJunctionBoxandaccessorieswillincludebutnotlimitedtothefollowing:

Sl. No.	Item Description	Desired Data
1.0	Enclosure	
1.1	Degree of Protection	IP65 with UV Protected
1.2	Material	Polycarbonate.
1.3	Withstanding voltage	1000V DC
1.4	Withstanding Temperature	100 °C
1.5	Accessories mounting arrangement	DIN Rail or as suitable
1.6	Front cover	Transparent
1.7	Number of Strings entry	As may be required
2.0	Cable Entry and Exit	
2.1	Position	Bottom at cable entry and exit
2.2	Cable Entry and Exit connector type	MC 4 / Tyco Connector ( PV Array String cable)
2.3	Cable gland	Earthing cable entry
3.0	Surge Protecting Device (SPD)	

3.1	Type	DC
3.2	Protection class	Type 2
3.3	Rating	25 kA
3.4	Voltage	1000 V
3.5	Standard	PV Standard
4.0	Fuse with fuse holder	
4.1	Position	Positive and negative terminal for each series string (if required)
4.2	Type	Glass fuse, for PV Use only
4.3	Rating	Current: Minimum <b>1.25</b> times the rated short circuit current of the series string
4.4	Standard	PV Standard
5.0	Earthing Provision	Terminal blocks will have to be provided for Earthing
6.0	Terminals, lugs and bus bar	Tinned copper

*Note: Array junction box in-built with inverter is also acceptable.*

## 9. 0 Power Conditioning Unit (PCU)

- 91** The Power Conditioning Unit will be a grid connected string inverter. This will convert the DC Power generated from the PV Array Yard to Pure Sine wave AC Output and feed into the grid.
- 92** Rating – The System should be capable of handling up to 60 KWp of PV modules. The Output AC shall not be less than 50000 W. 2 nos. of Inverters should be used for the 100 KWp plant. One additional inverter will be used as stand by.
- 93** The Output Voltage of the Inverter should be 400 VAC and should be capable of syncing to the grid within a range of +/- 20%. The Output will be 3 Phase 4Wire
- 94** The Output frequency should be minimum 46-54 Hz in sync with the grid frequency
- 95** The PCU should be transformer less and in minimum IP 65 enclosure for outdoor use if required
- 96** The Inverter Selected should have at least 4 Channels of MPPT. Each Channel of MPPT should be able to support at least 20A of DC Current. The MPPTs should be capable of symmetric as well as asymmetric loading
- 97** The MPPT Tracking range should be 200V – 800V
  - i. Please mention the following parameters about the Inverter Make of the Inverter
  - ii. Model Number of the Inverter
  - iii. Please mention maximum Input voltage from PV modules allowed on the inverter
  - iv. Please mention Input MPP Range of the Inverter
  - v. Please mention night Consumption of the Inverter
- 98** The Inverter should have a peak efficiency not less than 97.5%
- 99** The Inverter should have IEC 61683 and IEC 60068-2 (1,2,14,30), IEC 61727, IEC 62116, IEC 62109. Please enclose the certificates.
- 910** The Inverter should have RS 485 over Modbus for remote monitoring. It should have Bluetooth / Wifi for Upgrading firmware and for downloading the inverter service log data and generation data.

## **MANDATORY ENCLOSURES**

1. Brochure of the Offered Inverter
2. IEC 61683 of the offered Inverter
3. IEC 62116 of the Offered Inverter
4. IEC 61727 of the Offered Inverter
5. IEC 62109 of the Offered Inverter
6. IEC 60068-2 (1,2,14,30) of the offered inverter

### **10.0 Remote and Weather Monitoring System**

The Remote monitoring system will consist of a Data Logger and environmental sensors. The data logger will connect to the Inverters over MODBUS through RS 485 and collect the generation details of the Inverter and store locally. The data logger will also connect to the following two sensors – irradiation sensor (for measuring solar insolation), module temperature sensor collect the data from them and store locally. The data after being stored locally will be transferred to the remote portal in the internet cloud which will keep a backup of the data. Anyone can logon to the remote portal and access the generation data using a predefined username and password. It should be possible to control the output power of the Inverter through the Inbuilt Webserver of the data logger. Necessary SIM card for customer connectivity will be provided by NIBMG.

### **11. Inverter Interfacing LT Panel (IIP)**

The Inverter Interfacing LT Panel should have the following

- 11.1 Interfacing LT Panel should be made of Fire Proof, UV protected Poly Carbonate and should be IP 65 enclosure
- 11.2 It should have suitably rated MCCB's for each Inverter Input of 16 kA minimum fault current
- 11.3 It should have Grid side MCCB of suitable rating of 25 kA fault current
- 11.4 It should have Type II SPD, 25 kA Fault Current Three Phase type. Please enclose the catalogue of the SPD being used.
- 11.5 The Inverter Interfacing LT Panel should have a Class 1 accuracy import/ export energy meter.
- 11.6 Digital Voltage Meter and Ammeter, kWh meters, Metering instrument and protection relays, Provision for net-metering scheme to be kept.
- 11.7 Instrumentation and metering complying with the requirement and specifications for operation and control of the plant. Appropriate instruments will be installed at suitable locations to measure the following details:
  - Solar Radiation/ Insolation Data – Irradiance Sensor.
  - Surface Temperature measurement –Pyrometer.
  - Ambient Temperature –Thermometer.
  - Generation of Solar DC power measured at Inverter input as well as AC power fed from Solar PV System to the captive load bus
  - Exported power/energy.
  - Frequency
  - Power Factor

### **12.0 MCCB**

A Suitably rated MCCB will have to be provided at the existing main panel where power evacuation will take place. The MCCB will be Four Pole Type with metal enclosure and suitable handle. SFU make will be Siemens / ABB / Schneider.



## 13.0 Earthing System

### a. Earth Pit:

#### i) Earth Electrode:

Earthing with 50 mm dia. MS pipe 3.5 mm thick x 3 m long duly galvanized to be filled with bitumen partly under the ground level and partly above ground level driven to an average depth of 3.65 Mts. below the ground level & restoring surface duly rammed.

#### ii) Masonry enclosure

Masonry enclosure of the earth pit of size not less than 600mm X 600mm X 500mm (depth) complete with cemented brickwork (1:6) of minimum 150 mm width duly plastered with cement mortar (inside) shall be provided. Hinged inspection covers of size not less than 300mm X 300 mm with locking arrangement shall be provided. Suitable handle shall be provided on the cover by means of welding around on top of the cover for future maintenance

- b. **25 mm x 5** GI flat shall be drawn from each earth electrode. The Earth Strip drawn from the Earth Electrodes shall be connected to the Earth Busbar of GI flat **25 mm x 5 mm** nearer to the Earth Pit at the ground floor of the building. From the Earth Bus-bar two (02) nos. **25 mm X 5 mm** GI flat shall be drawn upto the other Earth Bus-bars at the different location of the Power Plant.
- c. Necessary provision will be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
- d. Test point will be provided for earth pits.
- e. Earthing system must be interconnected through GI Strip to arrive equal potential bonding.
- f. **Number of earth pit** : Minimum four (04) Numbers

### PV Array Structure Earthing

- (i) Two Earth strip shall be connected at two end of each Row of PV Array Structure.
- (ii) The earth Strip must be connected with the PV Array structure by GI Nuts or Bolts. If the strip will be connected with the structure by welding Epoxy painting must be done at the place of Welding Joint
- (iii) Earth Strip size : **25mmX 5 mm**

### Earth Bus-bar

Earth Bus-bar of galvanized (Hot Dip) MS flat **25 mm x 5 mm** on wall having clearance of 6 mm from wall including providing drilled holes on the busbar complete with GI bolts, nuts, washers, spacing insulators etc. as required. Each Earth Bus-bar must have to (02) Incoming **25 mm X 5 mm GI flat**.

### Earth Strip

**The earth strip must be minimum 25mmX 5 mm** GI flat From the Earth Bus-bar two (02) nos. **25 mm X 5 mm** GI flat shall be drawn upto the other Earth Bus-bars at the different location of the Power Plant.

### Earth Wire

- a) Earth wire shall be connected to Inverter , Inverter LT Panel or Inverter Combiner LT Panel from the Earth Bus near Inverter and Inverter LT Panel : **Size of Earth wire : Copper Wire 6 sqmm**

### Position of the Earth Busbar

**Position of the minimum number of Earth Busbar shall include but not limited to the following:**

- i. At the Ground floor near the earth pits : 02 no.

- ii. Near the Grid Interfacing LT Panel : 01 no.
- iii. Near the Inverters, Inverter LT / Combiner LT Panel : 01 no.  
(as per location of the equipment)
- iv. Array field : 01no.

#### 14.0 Lightning Arrestors

The lightning system should be so designed as to cover the whole array yard. A suitable number of Franklin rods are to be placed for protection against lightning and subsequent over voltages.

#### 15. Cables:

**The Specification of wiring material of PV Power plant shall include but not limited to the following:**

Sl. No.	Item	Description
<b>A</b>	<b>DC Cable</b>	
1.1	Conductor	Tinned annealed stranded copper according to IEC 60228 class 5
1.2	Standard	PV-1F / 2 PfG 1169/08.2007 / VDE Standard E PV 01:2008-02 /Equivalent
<b>B</b>	<b>AC Cable</b>	
2.1	Rated Voltage	1.1kV
2.2	Construction	
2.2.1	Type	Armored or unarmored as per requirement
2.2.2	Insulation	XLPE
2.2.3	Standard	IS 7098-Part-I
<b>C</b>	<b>PVC Conduit tees, bends etc (Hard &amp; flexible )</b>	
3.0	Standard	ASTM D 1785 UPVC
3.1	Type	UV stabilized , temperatures, Shock proof chemical resistant
<b>D</b>	<b>GI Pipe</b>	
4.0	Make	ISI marked

#### 16.0 Sizing and procedure and guideline of Cable laying

- i) Buried AC underground cables must be armored.
- ii) Conductor size of cables and wires shall be selected based on efficient design criteria. The wiring size of cable shall be designed such that minimum voltage drop at full power–

From the PV Array to Inverter(s) should be less than 2%.

From Inverter to AC Grid interfacing panel should be less than 2%.

iii) Cable terminations shall be made with suitable cable lugs & sockets etc, crimped properly and cables shall be provided with dry type compression glands wherever they enter junction boxes/ panels/ enclosures at the entry & exit point of the cubicles. The panels' bottoms should be properly sealed to prevent entry of snakes/lizard etc. inside the panel. All cables shall be adequately supported. Outside of the terminals / panels / enclosures, cables shall be protected by conduits. Cables and wire connections shall be soldered, crimp-on type or thimble or bottle type.

- iv) Only terminal cable joints shall be accepted. Cable joint of two cable ends shall not be accepted.

- v) The cable must be laid through UPVC conduit on ground and indoor.
- vi) All the unarmored cable and control cable if need to be drawn through underground, adequate size UPVC conduit is to be used for drawing of such cable all along. However, the conduits also need to be laid inside class – B, GI pipes of requisite diameter under road crossings, drains, sewerage lines, entry or exit points of the buildings or where there are chances of mechanical damage.
- vii) All cable/wires/control cable shall be marked with good quality letter and number ferrules of proper sizes so that the cables can be identified easily. All cable shall be suitable marked or coded for easy identification. Cables and wires shall conform to the relevant standards suppliers to specify the specification.
- viii) The UPVC conduit of suitable size must rest on the pedestal on the foundation or perforated GI cable Tray.
- ix) All fasteners will be made of Stainless steel or Aluminum or UV Protected PVC.
- x) Minimum one number loop must be provided at the start and end each span of cable laying and before termination.
- xi) Type of cable to be used:

Sl. No	Location	Type of AC Cable
01.	From PV Array to PV Array Junction Box	Unarmoured DC copper Cable
02.	From PV Array Junction Box to String Inverter	Unarmoured DC copper Cable
03.	From Inverter to Grid Interfacing Panel to Point of Common Coupling	Armoured XLPE Insulated AC copper Cable 4 or 3.5 core as per design

## 17.0 **Project Signage:**

### **Project information Signage:**

The Signage will be made up of metallic base of minimum size 3'x 2'. The Signage provide with detail of the project as approved by NIBMG. The font size on the signage has to be big enough so that everyone can read it easily. The Signage will be fixed **up at two (02)** prominent places of the project area.

## 18.0 **Safety Signage:**

Safety Signage must be provided indicating the level and type of voltage and symbols as per IE Rule at different position as may be required. In the safety signage Voltage level and type of voltage must be mentioned

## 19.0 **Fire Extinguishers:**

ABC type portable fire extinguishers of minimum capacity 8 kg shall be provided. Standard of Fire Extinguisher BIS 2171 (with latest amendments)

## 20.0 **Training of Owner's Personnel:**

Providing a detailed training plan on energy assessment, design, technologies, plant design, and erection & commissioning, operation & maintenance procedures of the Solar PV System, which shall, after approval by owner, form the basis of the training program. Contractor shall impart classroom as well as field training on site to owner personnel on the installed Solar PV system and associated equipments. Cost towards

training shall be borne by the contractor.

### **21.0 PV Array Cleaning Arrangement**

Periodic (monthly) cleaning of modules will be in the scope of work during warranty period of 5 years. Water pipeline and other arrangement for cleaning of the modules will be done by the contractor. Source of water at nearby point will be provided by NIBMG.

### **22.0 Other Conditions**

The work includes necessary excavation, concreting, flooring, platform, necessary finishing, painting, back filling, shoring & shuttering, cable laying, location of installation of different component of PV Power Plant etc. if any, required for completion of the project in all respect shall be as per direction of Engineer-in-Charge. Only leveled ground of required area will be made available by NIBMG.

### **23.0 Other items to be provided (within cost of the system)**

- i) Danger plates, name boards, etc.
- ii) Mandatory spares: 1% of total module
- iii) Metering Instruments in terms of clause 11.7
- iv) Any other equipment/material required to complete the Solar Power Plant.
- v) Special tools & tackles and test/measuring equipment:  
(Digital multi-meter, Make: Fluke / Motwane, Spanner, Plier & Screw-driver set, Make: Taparia),

**PREFERRED MAKES**

<b>Sl. No.</b>	<b>Item Description</b>	<b>Preferred Makes</b>	<b>UOM</b>	<b>Quantity</b>
1	PERC Monocrystalline Solar PV Module of capacity 375 Wp or more.	Sova Power/ Vikram Solar/ Websole or equivalent	Wp	100 KWp
2	Module Mounting Structure - hot dipped galvanized upto 80 microns suitable for the supplied PV modules and capable of withstanding 150 km/hr design wind speed	Locally Fabricated as per approved design	Lot	As per design
3	RCC foundation for PV Modules mounting completed with foundation bolts.	NA	Lot	As per design
4	Inverters suitable for 100 KWp (2 nos. 50 KW. )	Thea energy / Sungrow or equivalent.	Lot	2 Nos.
5	Inverter Interfacing AC panel with Type II SPD, suitable glands in IP 65 enclosure (ACDB)	Enclosure make Ensto / Spelsberg / Hensel or equivalent SPD make Citel / OBO / Dehn or equivalent Switchgear make ABB / Siemens/Schneider or equivalent	Lot	As per design
6	Array Junction Box with Type II SPD in IP 65 Enclosure along with 1000 VDC DC 12/15 Amps Fuses on the + ve and - ve side (if required as per design)	Enclosure make Ensto / Spelsberg / Hensel or equivalent SPD make Citel/ OBO / Dehn or equivalent MC4 make Lumberg/ SAMO / Elmex or equivalent	Lot	As per site requirement
7	DC Cables 4 sq mm Weather Proof Double Insulated cables, UV resistant PV1F	Lapp / Polycab or equivalent	mtrs	As per approved BOQ
8	AC cables Al Armoured XLPE, 3.5 core 35 sq mm from IIP (ACDB) to AC Termination point	Polycab / Havells or equivalent	mtrs	As per approved BOQ
9	AC Cables for inter-connecting AJB, ACDB and Inverter	RR Kabel/ Lapp / Polycab or equivalent	mtrs	As per Site Requirement
10	Lightning arrestors	Standard make	No	1
11	Fire Extinguisher and Danger signboard	Standard make	lot	1

### **E. SCHEDULE OF WORKS**

#### **Design, Supply, Installation and Commissioning of Ground Mounted Solar photovoltaic On-Grid Power Generating System of Capacity 100 KWp.**

Sl. No	Description of Items	Unit	Qty.	Unit Rate	Amount			
1.	Design, Detailed Engineering, Documentation for Solar Photovoltaic on-grid power generating system of capacity 100 KWp, customized for NIBMG campus.	system	1	30,000/-	30,000/-			
2.	Solar PV Module PERC Mono-Crystalline 375 Wp or above (as per clause 5.0 & 6.0 of Technical specifications)	lot.	1	23,50,000/-	23,50,000/-			
3.	PV Array Junction Box with SPD with poly carbonate, IP 65 enclosure/inbuilt with inverter (as per clause 8.0 of Technical specifications)	each	2	15,000/-	30,000/-			
4.	50 KW (peak solar) Inverter(as per clause 9.0 of Technical specifications)	each	2	2,00,000/-	4,00,000/-			
5	Grid interfacing LT Panel, IP 55 Enclosure complete with AC Surge Suppressor & MCB for individual Inverter. (as per clause 11.0 of Technical specifications)	lot	2	25,000/-	50,000/-			
6.	MCCB with appropriate rating with enclosure and extension box and spreader link (as per clause 12.0 of Technical specifications)	each	1	35,000/-	35,000/-			
7.	Module mounting structure, foundation bolts, stainless steel screws / nuts and bolts as per approved design. All structures will be with 80-micron galvanization suitable for Solar System of relevant capacity and nuts and bolts will be made of stainless steel (as per clause 7.0, of Technical specifications)	MT	7.3	85,000/-	6,20,500/-			
8.	RCC Foundation of module mounting structures.							
8 (i)	Earth work in excavation including back filling in foundation trenches with proper compaction, disposal, dressing and leveling of surplus earth within a lead of 75 m. as per direction, all complete.	cum.	388	175/-	67,900/-			
8 (ii)	Cement concrete (mix 1:3:6) with graded stone ballast (40 mm size, Pakur variety), complete with materials and labours, etc.	cum	13.50	5,400/-	72,900/-			
8 (iii)	Ordinary cement concrete (mix 1:1.5:3) with graded stone chips (20 mm nominal size, Pakur variety) as per relevant IS codes, complete with materials and labours, etc.	cum.	51	6,000/-	3,06,000/-			
8 (iv)	Reinforcement work for reinforced concrete. SAIL/ TATA/ RINL including carrying, handling placing and binding with biding wire nails, complete with all materials and labour,	quintal	51.30	5,850/-	3,00,105/-			

Sl. No	Description of Items	Unit	Qty.	Unit Rate	Amount			
	etc.							
8 (v)	9 to 12 mm thick approved quality ply board shuttering in any concrete work, complete with all materials and labour, etc.	Sqm.	528.00	370/-	1,95,360/-			
9.	Cables (as per clause 15 & 16 of Technical Specification)							
(i)	IIP to GIP existing LT Panel 4C x 70 sqmm copper armoured cable	mtr	20	2,654/-	53,080/-			
(ii)	AC Cabling from Inverter to AC DB (1C x 35 Sq. mm) Copper Cable	mtr	100	348/-	34,800/-			
(iii)	DC double insulated cable (1C x 4 sq. mm.) Copper Cable	mtr	1500	80/-	1,20,000/-			
10.	Earth Pit and earthing System and Civil job (as per clause no 13 of technical specification)	lot	1	50,000/-	50,000/-			
11.	Installation and commissioning	job	1	2,75,000/-	2,75,000/-			
12.	Web based Remote Monitoring System (as per clause no 10 of technical specification)	system	1	80,000/-	80,000/-			
13.	Lightning Arrestor (as per clause no 14 of technical specification)	job	1	25,000/-	25,000/-			
14.	Fire extinguishers (as per clause no 19 of technical specification)	each	1	5,000/-	5,000/-			
15.	Project signage and safety signage(as per clause no 17 & 18 of technical specification)	lot	1	3,000/-	3,000/-			
	Estimated value				51,03,645/-			
Rupees fifty-one lakh three thousand six hundred forty-five only								
Note: Quantities in the BOQ are tentative. Actual quantities may vary as per final approved design and drawing. Payment will be made on the actual executed quantities only.								

Note: 1. Unit rate and total amount should be quoted including of GST and all other charges.
2. Payment will be made as per actual executed quantity.
3. Unit rate shall include all finishing and cleaning work, making good of damages, etc.
4. Prices should also include painting of equipment for outdoor as well as indoor installation.

## FORM OF AGREEMENT

(On Non-Judicial Stamp Paper of Rs.100.00)

ARTICLES OF AGREEMENT made this .....day of .....Two Thousand Eighteen between the National Institute of Biomedical Genomics, an Autonomous Institution of Govt. of India at Gayeshpur, Kalyani, West Bengal (hereinafter referred to as “the OWNER”) which expression shall include its successor or successors and assigns) of the ONE PART through the authorized officer.

AND

M/S. .... having its registered office at ..... (there in after referred to as the ‘CONTRACTOR’) of the OTHER PART.

WHEREAS the Owner is desirous of .....(here in after called the ‘Works’).

AND WHEREAS the Owner has cause the plans, drawings and specification, priced schedule of quantities of work to be executed at the New campus of National Institute of Biomedical Genomics at Kalyani, West Bengal as per conditions of the contract and special conditions prepared subject to which the offer of the Contractor shall be accepted.

AND WHEREAS the tender of the Contractor for the said..... has been accepted.

WHEREAS the contractor has deposited with the Owner Rupees ..... (Rupees ..... ) as Performance Guarantee for the due performance of agreement.

AND WHEREAS the Owner has issued work order there for to the contractor.

AND WHEREAS said drawings .....( here in after collectively referred to as the said condition) have been signed by the parties here to and the contractor has agreed to execute the works upon and subject to the said conditions.

### NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of payments to be made to the contractor as hereinafter provided the contractor shall upon and subject to the said conditions execute and complete the works shown upon the said drawings etc. and such further detailed drawings as may be furnished to the contractor by the said owner as described in the said specifications and the said priced schedule of quantities.
2. The Owner will pay to the Contractor the sum of Rs..... (Rupees.....) (hereinafter called the contract sum) or such other sum as shall become payable hereunder at the times and in the manner specified in the said conditions. However, the actual sum will be paid on the actual value of work done, irrespective of the contract sum.
3. The plans, agreement and documents above mentioned shall from the basis of this contract and dispute, if any to be decided in the manner prescribed in the conditions attached hereto.
4. The said contract comprises the .....in the upcoming campus of National Institute of Biomedical Genomics at Kalyani works as above mentioned, and all subsidiary works connected therewith within the same site as may be ordered to be done from time to time by the said Owner even though said works may not be shown on the drawings or described in the said specifications or the priced schedule of quantities.
5. Notwithstanding what are stated in the special condition, conditions of contract and herein before stated the owner reserves to himself the right to alter the drawings and nature of the work and of



adding to or omitting any items of works from or of having portions of the same carried out departmentally or otherwise and such alternations or variations shall be carried out without prejudice to this contract.

6. The said conditions in the Agreement tender documents, work order and other related documents shall be read and be treated as forming part of this agreement and the parties hereto will respectively be bound thereby and to abide by and submit themselves to the conditions and stipulations and perform the same on their to be respectively observed and preferred.
7. Any dispute arising under this agreement shall be referred to the arbitration of a sole arbitrator appointed with consent of the Owner and the contractor as indicated in the Article of the general conditions. The award of the arbitrator shall be final and binding on both parties.

IN WITNESS WHEREOF, the parties hereto have executed these presents the day and year first hereinabove written.

**WITNESS**

- 1.
2.  
CONTRACTOR

**EXECUTANTS**

1. OWNER
- 2.

\* Common Seal

\*In case of the company, the common seal be affixed pursuant to resolution of Board of Directors in accordance with Articles of Association of the Company the directors etc. as the case may be affixing common seal may be initial in token thereof and also by putting their names.

Place :.....

Date.....

(On Non-judicial stamp paper of Rs.100.00)

**PROFORMA OF BANK GUARANTEE TOWARDS PERFORMANCE GUARANTEE**

B.G. No:

Value: Rs.....

National Institute of Biomedical  
Genomics Post: N.S.S,  
Kalyani: 741 251

**Sub: Bank Guarantee of Rs... ..... towards Performance Guarantee for Supply,  
Installation and Commissioning of Ground Mounted Solar Photovoltaic On-Grid Power  
Generating System of capacity 100kWp in National Institute of Biomedical Genomics, Kalyani,  
West Bengal. ....**

(Name of Branch/Office)

Dear Sir,

WHEREAS (Name and address of contractor/vendor) (hereinafter called the Contractor) have entered into contract for Supply, Installation and Commissioning of Solar Photovoltaic On-Grid Power Generating System of capacity 100 KWp in National Institute of Biomedical Genomics, Kalyani, West Bengal.as mentioned in the letter of intent and the correspondence and tender relating thereto which is hereinafter referred to as “the said contract” and that the Contractor has agreed to produce a Performance Guarantee amounting to 10% of the contract to NIBMG for performing their part of the contract obligations their liability ceases.

AND WHEREAS in terms of the said Contract, the contractor is required to furnish to NIBMG a Guarantee of a Nationalised Bank for a value of Rs..... to be valid up to( .....).

AND WHEREAS (Name of Bank and its branch) having their office at (address) the Guarantor, at the request of the contractor hereby furnishes a guarantee in favour of NIBMG and Guarantees in the manner hereinafter appearing.

In consideration of the premises, we (name of bank and its branch) having our office at (address) hereafter called the “Guarantor” (which expression shall include its successors and assigns) hereby expressly, irrevocably and unreservedly undertake and guarantee that if the Contractor fails to execute the work according to his obligations under the said contract, then notwithstanding any dispute between NIBMG and the contractor the Guarantor shall, without demur and without reference to the contractor pay to NIBMG immediately any sum claimed by NIBMG under the said contract upto a maximum amount f Rs..... (Rupees..... only).

In case the amount demanded by NIBMG is not paid within 48 hours of receipt of demand, the Guarantor agrees to pay the aforesaid amount of Rs..... (Rupees.....only).

1. Such payment shall be notwithstanding any right the contractor may have directly against NIBMG or any disputes raised by the Contractor with NIBMG or any suits or proceedings pending in any competent court or before any arbitrator. NIBMG’s written demand shall be conclusive evidence to the Guarantor that such payment is payable under the terms of the Contract and shall be binding in all respect on the guarantor.
2. The Guarantor shall not be discharged or released from this undertaking and Guarantee, by any arrangement, variations made between NIBMG and the Contractor and or indulgence shown to the contractor by NIBMG, with or without the consent and knowledge of the guarantor or by alterations in the

obligations of the contractor by any forbearance, whether as to payment, time performance or other wise.

3. This guarantee shall remain valid until.....or as may be caused to be extended by the contractor or until discharged by NIBMG in writing whichever is earlier.
4. a) This guarantee shall be a continuing guarantee and shall not be revocable during its currency except with the previous written consent of NIBMG.  
a) This guarantee shall not be affected by any change in the constitution of the contractor, by absorption with any other body or corporation or dissolution or otherwise and this guarantee will be available to or enforceable against such body or corporation.
5. In order to give effect to this guarantee NIBMG will be entitled to act as if the Guarantor were the Principal debtor and the Guarantor hereby waives all and any of its rights or surety ship.
6. This guarantee shall continue to be in force notwithstanding the discharge of the contractor by operation of law and shall cease only on payment of the full amount by the Guarantor to NIBMG of the amount hereby secured.
7. This guarantee shall be in addition to and not in substitution for any other guarantee or security for the contractor given or to be given to NIBMG in respect of the said contract.
8. Any notice by way of request and demand or otherwise here under may be sent by post or any other mode or communication to the guarantor addressed as aforesaid and if sent by post it shall be deemed to have been given at the time when it would be delivered in due course of post and in providing such notice when given by post it shall be sufficient to prove the envelope containing the notice was posted and a certificate signed by an officer of NIBMG that the envelope was so posted shall be conclusive.
9. These presents shall be governed by and constructed in accordance with Indian Law.

Notwithstanding anything contained hereinbefore the liability of the guarantor under this guarantee is restricted to a sum of Rs.....

This guarantee will remain valid upto .....unless a demand or claim under this guarantee is made in writing on or before ..... the guarantor shall be discharged from all liability under the guarantee thereafter.

Dated the.

For (Name of Bank)

(Signature/s with designation/s of signatory/ies)

(Name and Stamp of Bank)

Place :.....

Date.....