



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

Name of work: **SUPPLY, INSTALLATION AND COMMISSIONING OF SOLAR
PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM
OF CAPACITY 100 KW_p IN THE CAMPUS OF THE INSTITUTE**

18 February 2020

NATIONAL INSTITUTE OF BIOMEDICAL GENOMICS

P.O.: N.S.S., KALYANI 741 251

TENDER NOTICE

NIT No. NIBMG/Solar/2019-20/47

Date: 18/02/2020

Sealed tenders in duplicate under two cover system are invited from experienced and resourceful contractors who fulfill the eligibility criteria for participation in the tender process 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.

SL. No.	Name of the work	Estimated Cost (₹) (including GST)	Completion time in Months / days	Earnest Money (₹)
1.	SUPPLY, INSTALLATION AND COMMISSIONING OF SOLAR PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM OF CAPACITY 100 KWp IN THE CAMPUS OF THE INSTITUTE	40 Lakhs	28 days	80,000/-

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 which will be adjusted with the Security Deposit at the time of payment of 1st. R. A. bill of successful bidders. EMD of the unsuccessful bidder will be released after issuing the work order against their written request.

Intending Bidders may kindly visit the Institute website www.nibmg.ac.in for downloading the tender documents and for other details.

Scope of Work:

A) Design And Detailed Engineering, Documentation For Solar Photovoltaic On-Grid Power Generating System Of Capacity 100 Kwp, Customised For Nibmg Campus. Preparation Of As Built Drawing And Submission.

B) Supply Of Solar Photovoltaic On-Grid Power Generating System Of Capacity 100 Kwp

C) Transportation, Storing Installation & Commissioning Of 100 Kwp On Grid Solar Photovoltaic Power Generating System.

D) Five (5) Years' Comprehensive Maintenance On Turnkey Basis of The Installed System in the Institute.

Eligibility Criteria

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

1. Minimum 5 (five) years' experience of having successfully completed works of similar nature with CPWD, State PWD, MES, Railways, Autonomous Bodies, any Reputed Organization and for either of the following value of work during last 5 (Five) years ending last day of month previous to the one in which tenders are invited.
 - a) Two similar completed works costing not less than ₹24 lakhs each, or
 - b) One similar completed work costing not less than ₹32 lakhs.
2. 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 Cover-I of the bid including EMD. The cover I 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.

The bidders should also submit the photocopies of following documents in Cover- I of the bid:

 - i) Valid GST Registration Certificate
 - ii) Professional Tax Registration Certificate
 - iii) PAN Card
 - iv) Valid Trade License Certificate
3. The contractor must have its registered office in Kolkata at least for last 3 years.

Terms and Conditions:

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 on turnkey basis inclusive of all supplies, installation & commissioning, testing at site & site handover. All quoted prices should be valid till 45 days after the date of tender opening. Quantities in BOQ are tentative. Payments will be made on basis of actual measurements
- ii) New imposition of taxes and variations, if any, will be borne by the Contractor, except GST, which will be paid as per actual.
- iii) **Security Deposit** – Security Deposit will be deducted @ 5% (Five per cent) of the Bill value from the bill and the same will be released after satisfactory completion Defect liability period (DLP) of one year.
- iv) **Performance Bank Guarantee:** Performance bank Guarantee amounting to 5% (Five per cent) of the Contract value is to be submitted within 15 (Fifteen) days in terms of Bank Guarantee from the date of issue of the valid and acceptable work order. It will remain valid up to 5 (five) years and 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.
- v) **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.

vi) 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.

4. 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.

5. Payment Terms:

i) No mobilization Advance will be paid.

ii) Payment will be made only after successful installation and commissioning of the system i.e. HOTO. No part payment will be allowed.

Other Terms and Conditions

i) **Site visit** – NIBMG will arrange access to the site for 'site visit' of contractor's engineer before commencement of work.

ii) **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.

- iii) **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 commence after expiry of Defect Liability Period (DLP) and 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.
- iv) 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.
- v) **Delivery, Installation and Commissioning** – within 28 days from the date of order (with accepted commercial terms), Delivery, Installation and Commissioning should be completed in all respect.
- vi) The contractor shall take necessary action to fulfill all applicable statutory obligations as required to execute the work.
- vii) The work order can be terminated if any of the contract terms are violated, by giving 7 (Seven) days’ notice from the competent authority of NIBMG at any stage of work.
- viii) 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.
- ix) Tender in duplicate will have to be submitted in two parts – Cover-I Technical Bid & Cover-II Financial Bid separately sealed and superscripted with the name of work.

Cover-I: Cover-I (Technical Bid) shall contain Earnest Money, all documents supporting fulfillment of eligibility criteria & commercial & general stipulations mentioned in the Tender Documents.

Cover-II: Cover-II (Financial Bid) shall contain the complete tender documents duly filled. No condition stipulated in Cover-II other than general rebates shall be accepted. The Financial Offer of the prospective tenderer/bidder will be considered only if the Technical Bid of the tenderer 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.

6. **Pre-bid meeting including site visit with the intending bidders will be held on 25th Feb 2020 at 2:30 PM in the institute.**
7. **Tenders (Cover-I & Cover-II put in a separate sealed cover) will be received up to 12:00 Noon on 10th March 2020 and will be opened on the same day at 3-00 PM** in the office of the Manager (Finance), National Institute of Biomedical Genomics, P.O. N.S.S, Kalyani 741 251, West Bengal in presence of the contractors or their authorized representatives who may like to be present. **Cover-II (Financial Bid)** of the bidders who qualify in Technical Bid evaluation will be opened on the same day in presence of bidders, as finalized by NIBMG and displayed in website. The Institute reserves the right to reject any or all of the tenders received without assigning any reason thereof.

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

Cover-I: Technical Bid

National Institute of Biomedical Genomics, Kalyani

DESIGN, SUPPLY, INSTALLATION AND COMMISSIONING OF SOLAR PHOTOVOLTAIC ON- GRID POWER GENERATING SYSTEM OF CAPACITY 100 KWp

(Tender No. NIBMG/Solar/2019-20/47

Date:18/02/2020)

BIDDER'S INFORMATION:

1	Name of firm		
2	Address of Organization in Kolkata		
3	Established on		
4	Statutory Registration Nos.		
	a) GST Registration No.		
	b) Professional Tax Registration certificate		
	c) Income Tax PAN Card No.		
	d) Valid Trade License Certificate		
	Any other No., Please specify		
5	Name of the authorized signatory		
6	Specimen Signature of the Authorized signatory.		
7	Telephone Number of the authorized signatory and other Telephone Number of the firm.		
8	Details of the works executed during the last five years. Copies of work orders may be enclosed.	Year	Rs.
9	Whether proof/copies of work order on items at Sl. No. 8 enclose (Yes/No)		
10	List of copies of documents enclosed.		

DECLARATION BY VENDOR/SERVICE PROVIDER
(To accompany the Technical Bid)

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)

Place:

(Seal of Service Provider)

Date:

Technical Specification

Name of Work	<p>A) DESIGN, DETAILED ENGINEERING AND DOCUMENTATION FOR SOLAR PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM OF CAPACITY 100 KW_p, 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 100 KW_p</p> <p>C) TRANSPORTATION, STORING INSTALLATION & 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 SYESTEM AT NIBMG AS DEFINED IN (B)</p>
NIT No.	<p>NIBMG/Solar/2019-20/</p> <p style="text-align: right;">Date:</p>

Note: Bidders should indicate state of compliance of their product/service in the format titled ‘*Compliance Statement*’ attached here. 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.

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

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 – Mono Crystalline 375 Wp (as per clause 4.0 & 5.0 of Technical specifications) and module mounting structure as per clause 6.0	Lot.	1
3.	PV Array Junction Box with SPD with poly carbonate, IP 65 enclosure.	Nos.	2
4.	Solar Inverter suitable for 100 kWp (2x 50 kWp) of PV Modules (as per clause 8.0 of Technical specifications)	Nos.	2
5	Grid interfacing LT Panel /AJB, IP 65 Enclosure complete with AC Surge Suppressor & MCB for individual Inverter. (as per clause 10.0 of Technical specifications)	lot	2
6.	MCCB with appropriate rating with enclosure and extension box and spreader link	Nos.	1
7.	Balance of Systems consisting of Module Structure, Module Mounting stainless steel screws, cables, earthing, lightning arrestor etc. All structures will be with 80-micron galvanization suitable for Solar System of relevant capacity. (as per clause 6.0, of Technical specifications)	Job	1
8.	Foundation of RCC for PV Array Panels	lot	1
9.	Cables (as per clause 13.0 of Technical Specification)		
i)	IIP to GIP existing LT Panel (3.5C x 185 Sq. mm.) Aluminium Cable	Mtrs.	100
ii)	AC Cabling from Inverter to AC DB (1C x 35 Sq. mm) Copper Cable		30
iii)	DC double insulated cable (1C x 4 sq. mm.) Copper Cable	Mtrs.	1500
10.	Earth Pit and Earthing System and Civil job as per clause no 12.0	Lot	1
11.	Installation and commissioning	Job	1
12.	Web based Remote Monitoring System	System	1
13.	Lightning Arrestor	Job	1

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 and other drawing 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) Design and details 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 max. 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 (rooftop) 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 heavy wind speeds. 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

5.1. 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.

5.2. 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 IS 14286 ii) IEC 61730
1.1	Test certificate issuing authority.	NABL/ IEC Accredited Testing Laboratories or MNRE accredited test centers.
2.0	PV Cell	
2.1	Type	Monocrystalline
3.0	PV Module	
3.1	Minimum capacity	375Wp
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 _{sys})	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:

- i) The Module Mounting structure must be made of Mild Steel members. The Mild Steel member must be of IS Make manufacturer.
- ii) The PV Module Mounting Structure shall be so designed satisfying that rain water is not clogged due to installation of the same.
- iii) 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.**

- iv) The PV Array should be capable of withstanding a wind load 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 **80 micron**
- 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 mechanical loads to the existing strength structure.
- 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 800 mm
- xv) PV Modules should be fixed with SS nut bolts and Neoprene washer.
- xvi) Mandatory enclosures: Brochure of the Module IEC 61215, IEC 61730
- xvii) Aluminum Structure: Contractor may also use Aluminum structure conforming 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 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 PV Array Junction Box and accessories will include but not limited to the following:

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 1.25 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

9.0 Power Conditioning Unit (PCU)

9.1 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.

9.2 Rating – The System should be capable of handling upto 60 kWp of PV modules. The Output AC shall not be less than 50000 W. 2 Inverters should be used for the 100 kWp plant

9.3 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 4 Wire

9.4 The Output frequency should be minimum 46-54 Hz in sync with the grid frequency

9.5 The PCU should be transformer less and in minimum IP 65 enclosure for outdoor use if required

9.6 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

9.7 The MPPT Tracking range should be 200V – 800 V

9.8 Please mention the following parameters about the Inverter

- i. 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

9.9 The Inverter should have a peak efficiency not less than 97.5%

9.10 The Inverter should have IEC 61683 and IEC 60068-2 (1,2,14,30), IEC 61727, IEC 62116, IEC 62109. Please enclose the certificates.

9.11 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.

Inverter Interfacing LT Panel (IIP)

The Inverter Interfacing LT Panel should have the following

- 10. i** It should be made of Fire Proof, UV protected Poly Carbonate and should be IP 65 enclosure
- 10. ii** It should have suitably rated MCCB's for each Inverter Input of 16 kA minimum fault current
- 10. iii** It should have Grid side MCCB of suitable rating of 25 kA fault current
- 10. iv** It should have Type II SPD, 25 kA Fault Current Three Phase type. Please enclose the catalogue of the SPD being used.
- 10.v** The Inverter Interfacing LT Panel should have a Class 1 accuracy import/ export energy meter.

10.vi Digital Voltage Meter and Ammeter, kWh meters, Metering instrument and protection relays, Provision for net-metering scheme to be kept.

10.vii Instrumentation and metering complying with the requirement of State Nodal Agency 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.
- Wind Speed – Anemometer.
- 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

11.0 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.

12.0 Earthing System

A minimum of 6 Nos of Earthing Pits of Chemical gel type will have to be erected at the site. 2 Nos Interconnected earth pits will be used for system earthing and 2 Nos interconnected earth pits will be used for the lightning arrestors. All the chemical gel earth pits will have copper bonded electrodes. The system has to be designed using Copper Cables / Copper strips for interconnection and termination. Suitable Tinned copper earth busbars are to be placed for termination. 2 nos. of earthing pits to be provided for Solar panels and Structures.

13.0 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.

14.0 Cables :

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

Sl No	Item	Description
A	DC Cable	
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	AC Cable	
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
C	PVC Conduit tees, bends etc (Hard & flexible)	
3.0	Standard	ASTM D 1785 u PVC
3.1	Type	UV stabilized , temperatures, Shock proof chemical resistant
D	GI Pipe	
4.0	Make	ISI marked

14.2 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 3%.

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.

- viii) 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.
- ix) The UPVC conduit of suitable size must rest on the pedestal on the foundation or perforated GI cable Tray.
- x) All fasteners will be made of Stainless steel or Aluminum or UV Protected PVC.
- xi) Minimum one number loop must be provided at the start and end each span of cable laying and before termination.
- xii) Type of cable to be used:

SI 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 Al Cable 4 or 3.5 core as per design

15.0 Equipment, Array structure Earthing:

15.1 Equipment Earthing will connect all non-current carrying metal receptacles, electrical boxes, appliance frames, chassis and PV panel mounting structures in one long run. The earthing wire should not be switched, fused or interrupted. **The earth strips shall be drawn from the earthing distribution strip to the earth pits along shortest possible distance.**

15.2 Earthing Pit with Pipe Electrode and Earth strip:

- i) Earth Pit:**
- ii) Chemical Gel Cu bonded earthing can be used
- iii) **Number of earth pit: Six (06) Numbers**

15.3 Earth Busbar: Earth Busbar 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 Busbar must have **Two (02) Incoming 25 mm X 3 mm** galvanized (Hot Dip) MS flat.

15.4 Earth Wire:

- i) Earth wire shall be connected to Inverter , Inverter LT Panel from the Earth Bus near Inverter and Inverter LT Panel : **Size of Earth wire : 3 core 6 Sq. mm armored Copper Cable for equipment earth pit.**
- ii) **Separate Earth Pits to be provided for 2 nos. lighting arrestor.**
- iii) Earth wire shall be connected to Grid interfacing Panel from the Earth Bus at Ground Floor. Size of Earth wire: **6sqmm**

15.5 Suitable Lightning arrestors are to be provided.

- i) Danger plates, name boards etc.
- ii) Mandatory spares as given in Annexure-2.
- iii) Metering Instruments
- iv) Any other equipment/material required to complete the Solar Power Plant on turnkey Basis.
- v) Special tools & tackles and test/measuring equipment.

16.0 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.

17.0 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

18.0 Fire Extinguishers:

CO₂ type portable fire extinguishers of minimum capacity 5 kg shall be provided. Standard of Fire Extinguisher BIS 2171 (with latest amendments)

19.0 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.

20.0 PV Array Cleaning Arrangement

- a) 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.

21.0 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.

PREFERRED MAKES

Sl. No.	Item Description	Preferred Makes	UOM	Quantity
1	Monocrystalline Solar PV Module of capacity 375 Wp or more.	Sova Power / Novasys or equivalent	Wp	100 kWp
2	Module Mounting Structure - hot dipped galvanised upto 80 microns suitable for the supplied PV modules and capable of withstanding 150 km/hr 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 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	Make 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 - cable for inter-connecting AJB, ACDB and Inverter	RR Kabel / Lapp / Polycab or equivalent	mtrs	As per Site Requirement
10	Earthing Cable - 6 sqmm 3 Core Copper XLPE Earth Pit to Earth Bus Bar	Polycab / Havells or equivalent	mtrs	As per Site Requirement
11	Earthing Cable - 10 sq mm 1 Core Copper PVC insulated for Earthing Connection	Lapp / RR Kabel / Polycab or equivalent	mtrs	As per Site Requirement
12	Chemical Gel Earth Pit - Cu bonded (As per Design)	Standard Makes	No.	6
13	Lightning arrestors	Standard make	No	1
14	Fire Extinguisher and Danger sign board	Standard make	lot	1

Cover-II: PRICE BID

NIT No. NIBMG/Solar/2019-20/47

Date: 18/02/2020

PRICE BID FOR DESIGN, SUPPLY, INSTALLATION AND COMMISSIONING OF SOLAR PHOTOVOLTAIC ON-GRID POWER GENERATING SYSTEM OF CAPACITY 100 KWp.

Sl. No	Description of Items	Unit	Qty.	Rate (Rs.)	GST (Rate)	GST (amount)	Total Amount including (Rs.)
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 – Mono Crystalline 375 Wp (as per clause 4.0 & 5.0 of Technical specifications) and module mounting structure as per clause 6.0	Lot.	1				
3.	PV Array Junction Box with SPD with poly carbonate, IP 65 enclosure.	Nos.	2				
4.	Solar Inverter suitable for 100 kWp (2x 50 kWp) of PV Modules (as per clause 8.0 of Technical specifications)	Nos.	2				
5	Grid interfacing LT Panel /AJB, IP 65 Enclosure complete with AC Surge Suppressor & MCB for individual Inverter. (as per clause 10.0 of Technical specifications)	lot	2				
6.	MCCB with appropriate rating with enclosure and extension box and spreader link	Nos.	1				
7.	Balance of Systems consisting of Module Structure, Module Mounting stainless steel screws, cables, earthing, lightning arrestor etc. All structures will be with 80-micron galvanization suitable for Solar System of relevant capacity. (as per clause 6.0, of Technical specifications)	Job	1				
8.	Foundation of RCC for PV Array Panels	lot	1				
9.	Cables (as per clause 13.0 of Technical Specification)						
i)	IIP to GIP existing LT Panel (3.5C x 185 Sq. mm.) Aluminium Cable	Mtrs.	100				
ii)	AC Cabling from Inverter to AC DB (1C x 35 Sq. mm) Copper Cable		30				
iii)	DC double insulated cable (1C x 4 sq. mm.) Copper Cable	Mtrs.	1500				
10.	Earth Pit and Earthing System and Civil job as per clause no 12.0	Lot	1				
11.	Installation and commissioning	Job	1				
12.	Web based Remote Monitoring System	System	1				

13.	Lightning Arrestor	Job	1				
				Total			

**(Rupees.....
Only)**

- Note: 1. Unit rate and total amount should be quoted including of GST and all other charges.
 2. Quantities will be billed as per actual measurement at site.
 3. While quoting for the job the bidder should include all completion jobs like making up for damages caused during installation of Brick work, plastering, painting etc.
 4. Prices also should include painting of equipment for outdoor as well as indoor installation.

.....
 (Signature of Proprietor/Partner/Chief Executive)
 Name
 (In Capital Letters)
 (Seal of the company)

Place :
 Date :

**PROFORMA FOR AGREEMENT BETWEEN THE NIBMG AND
CONTRACTOR**

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

ARTICLES OF AGREEMENT made this day ofTwo
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 hereinbefore 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
Netaji Subhas Sanatorium, 2nd floor
Kalyani 741 251

Sub: Bank Guarantee of Rs..... towards Performance Guarantee 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.

(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 upto (.....).

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 of 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 otherwise.
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.
b) 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 suretyship.
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 ISI 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 uptounless 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