

**West Bengal Renewable Energy Development Agency
Bikalpa Shakti Bhavan, J1/10, EP&GP Block,
Sector – V, Salt Lake Electronics Complex,
Kolkata – 700 091**

Ref. No. WBREDA/34(2017)/1288

Dated 08-03-2019

Notification

Name of the Work: Setting up of grid connected roof top solar PV (GRTSPV) systems of cumulative capacity 2 MWp at the customers' premises under residential /Institutional/ Social sector in West Bengal

Reference NIeT No: WBREDA/NIeT-08 /18-19 dated: 27-11-2018

1. Introduction: West Bengal Renewable Energy Development Agency has empanelled vendors through open tender for setting up of Grid Connected Roof Top Solar PV (GCRTSPV) Systems at the customers' premises under Residential/Institutional/ Social sector in West Bengal.

Any intending customer, who is eligible for availing Central Financial Assistance, may go for procurement of GRTSPV System and may submit proposal through the empanelled vendors.

West Bengal Renewable Energy Development Agency shall not award any work to any vendor but provide allotment to execute work against order directly receivable from the eligible and intending customers. The eligible customers have to get the work done through the empanelled vendors only.

2. Minimum capacity of the GRTSPV System: Minimum capacity of power plant shall be guided by the regulation of West Bengal Electricity Regulatory Authority. However as per the West Bengal Electricity Regulatory Commission (Cogeneration and Generation of Electricity from Renewable Sources of Energy) Regulations, 2013, the minimum capacity of GCRTSPV systems shall be 5 kWp.

3. Eligible Customer: An entity under Residential/Institutional/ Social sector defined by MNRE, Government of India and the eligible consumers defined by West Bengal Electricity Regulatory Commission shall be eligible for CFA.

4. Category of customer and extent of CFA: The Category of customer for this project shall be under residential, institutional and social sector, as per eligibility in accordance to the Guidelines of MNRE, Government of India and Regulations in the State.

Category	Coverage of Buildings	Level of CFA
Residential	All types of residential buildings	30% of the project cost on the basis of the discovered rate or actual project cost whichever is less.
Social	Community centers, welfare homes, old age homes, orphanages, common service centers, common workshops for artisans or craftsmen, facilities for use of community, Trusts / NGOs / Voluntary organizations / Training institutions, any other establishments for common public use etc. (applicable to not-for-profit registered organizations only)	
Institutional	Schools, health institutions including medical colleges & hospitals, universities, educational institutions etc. (applicable to not-for-profit registered organizations only)	

5. Project category and allocation: The project category has been defined by the capacity of PV system and allocation of project capacity thereof is as follows:

Project Category	GRTSPV System Size Range	Allocation of project capacity
A	5 – 10 kW	350kW
B	>10 – 100 kW	1650kW
	Total Capacity	2000 kW

However the projects of the Intending Customers shall be approved for CFA subject to the availability of capacity of WBREDA as allotted by MNRE GoI

6. Discovered rate: The discovered rate against each category of project is as follows:

Sl. No.	Project Category	Rate (Rs./kWp)
1.	A	Rs. 48,998.00
2.	B	Rs. 40,820.00

7. Procedure of Implementation of Project:

- Step-1. The Intending Customer / Applicant shall enter into an agreement with the enlisted vendor for installation of GCRTSPV system with a copy to WBREDA.
- Step-2. The customer shall apply to WBREDA as per prescribed format along with the copy of the Agreement between vendor and customer, Project proposal, copy of the electricity bill and other desired documents with the assistance of the vendor (Shall be available in WBREDA Website Shortly)
- Step-3. WBREDA shall provide the necessary approval of the project based on the document submitted by the intending customer / applicant.
- Step-4. After obtaining approval, the work shall be completed within the stipulated time period.
- Step-5. After completion of the project (GCRTSPV system at customer's Premises) in all respect, the Customer shall submit the project completion report along with the desired documents and the claim along with copy of tax invoice, bill of material and the Statement of Expenditure (SOE) on the letter head of a Chartered Accountant with the assistance of the vendor for release of CFA.
- Step-6. WBREDA or their authorised representative shall carry out the inspection at site.
- Step-7. WBREDA shall upload the information of the project (GCRTSPV system at customer's Premises) through the SPIN Portal of MNRE GoI after inspection if it is found satisfactory.
- Step-8. Once the Central Financial Assistance (CFA) is released by MNRE, WBREDA shall transfer the same to the Customer's Bank Account on reimbursement basis through **RTGS/ NEFT**.

The intending customers shall have to be eligible for having CFA and net-metering connectivity in accordance to the Guideline of MNRE GoI and West Bengal Electricity Regulatory Commission (Cogeneration and Generation of Electricity from Renewable Sources of Energy) Regulations, 2013 including its subsequent amendment, if any.

However, any departure from the guidelines, specifications, terms & conditions shall result summarily rejection of the project and also the project shall not be entitled for CFA.

8. Inspection by WBREDA at Installation Site: After completion of the project, the customer shall submit all the necessary documents of installation along with the service charge of WBREDA in the form of Demand Draft/Banker's cheque with a request for inspection to WBREDA which is included but not limited as follows:

- i) Copy of the Agreement between Vendor and Eligible Customer for the installation of GCRTSPV system
- ii) Copy of the agreement of installation of Net meter between DISCOM and customer
- iii) Project Summary Report
- iv) Handing over document
- v) Photograph of roof before and after installation of PV array with date.
- vi) Photograph of other components of the Power Plant.
- vii) Any other documents as demanded related to the project.

All copies and photographs must be self attested by the vendors and customers. A soft copy of the above documents must be submitted along with the documents.

9. Service Charges of WBREDA: The customer shall submit the service charges in form of Demand Draft/Banker's cheque in favour of "WBREDA", payable at Kolkata with the inspection call of the GCRTSPV system. Service charges of WBREDA shall be computed @Rs.3000.00/kW or 5% of the project cost of the installed GCRTSPV system whichever will be higher. The Service Charges are exclusive of Service Taxes which shall be paid extra as per applicable norms of the Government.

10. Validity: The project completion time shall be within 25-06-2019. However, the validity may be extended if MNRE, GoI extend the time period.

11. Empanelled Vendors:

SI No	Name of the Vendor	Cumulative Allotment Capacity
1	<p>SunCraft Energy Private Limited Address : 369, 3rd Floor, Shanti Pally, Kolkata – 700107 Contact Person Name : Subhra Sankha Saha, Director email Address: info@suncraftenergy.net, subhra@suncraftenergy.net Mobile No: 9007067399 Land Phone : 033-40624430</p>	<p>Project Category-A: 50 kW Project Category -B: 489 kW</p>

SI No	Name of the Vendor	Cumulative Allotment Capacity
2	<p>Switching Avo Electro Power Ltd Address : 97, Raja Rammohan Roy Road, Kolkata – 700041 Contact Person Name : Suman Shil, Project Manager/ Kisholya Mondal, Site Supervisor email Address : suman.shil@avoups.com, kish.25avoups@gmail.com Mobile No: 8670176422/9875342490</p>	<p>Project Category-A: 100 kW Project Category –B: 387 kW</p>
3	<p>Chloride Power Systems & Solutions Ltd Address : Plot No. -Y 21, Block: EP, Sec - V, Salt Lake Electronics Complex, Bidhan Nagar, Kolkata-700091 Contact Person Name : Satyabrata Pattanayak, Head Solar Sales email Address : satyabratap@chloridepower.co.in Mobile No: 9830440008 Land Phone no: 033-25005458 / 5225 / 5660 Fax No: 033-25005545</p>	<p>Project Category-A: 50 kW Project Category –B: 387 kW</p>
4	<p>Agni Power and Electronics Pvt Ltd Address : 114 Rajdanga Gold Park, Kolkata – 700107 Contact Person Name : Sudhanwa Sahoo, Sr. Manager Marketing email Address : s.sahoo@agnipower.com Mobile No: 8420119791 Land Phone no: 033-40051193 Fax No: 033-40610038</p>	<p>Project Category-A: 50 kW Project Category –B: 387 kW</p>
5	<p>Salt Lake Institute of Engineering and Management Address: GN-34/2, Ashram Building, Sector-V, Kolkata- 7000091. Contact Person Name : Debashis Majumdar, Director/ Nabin Kumar Yadav, Executive Engineer email Address : debashism@gmail.com, info@sliemskills.com Mobile No: 9830747008/7596863992</p>	<p>Project Category-A: 50 kW</p>

SI No	Name of the Vendor	Cumulative Allotment Capacity
6	Durga Solar Enterprise Address : Barabagan Bypass, Post: Barabagan, Suri, Dist: Birbhum Contact Person Name : Amit Kumar Das, Proprietor email Address : durgasolar@yahoo.in , durgasolar.org@gmail.com Mobile No: 8972419508/ 9434399151	Project Category-A: 50 kW

All concerns may follow the WBREDA's website for any modification.

Sd/-
(P.K.Basu)
Chief Engineer

Ref. No. WBREDA/ 34(2017)/1288

Dated 08-03-2019

Copy to:

1. The Additional Director & CEO, WBREDA
2. The DDO, WBREDA
3. Sri Hire Chandra Borah , Scientist C, MNRE Government of India ,Block-14, CGO Complex, Lodi Road, New Delhi 110 003
4. The PS to Additional Chief Secretary, Department of Power and NES Government of West Bengal.
5. The Sr. P.S to Director-in-Charge, WBREDA and CMD WBPDCCL
6. The P.S to Chairman WBSEDCL,
7. The P.S to Managing Director (Distribution) CESC Ltd

Sd/-
Chief Engineer

TECHNICAL SPECIFICATIONS

(Reference Tender No: WBREDA /Niet-08 /18-19 DTD: 27-11-2018)

1. Guideline of installation of GCRTSPV systems

The grid-connected roof top solar PV (GCRTSPV) Systems to be installed under this project shall be guided by as follows:

- i. The GCRTSPV systems shall have to be designed considering optimal usage of space without compromising the effect of shadow from **10.00 AM to 3:00 PM** cooling, ventilation, accessibility, losses, protection, security and safety etc.
- ii. The PV array of the GCRTSPV systems shall be installed at the available shadow free space on the rooftops of technically fit buildings.
- iii. Inter row spacing of the PV array should be designed considering no inter row shadow effect from 10.00 AM to 3:00 PM
- iv. The configuration of PV array shall be designed matching with the DC voltage operating window of the Inverter and DC Power overloading capacity of the Inverter.
- v. PV array shall be connected to the Grid Tied String Inverter (s) through Array Junction Box(es) (AJBs).
- vi. The capacity of Grid Tied String Inverter shall be based on PV Array to be connected to the particular Inverter.
- vii. Outputs of the Grid Tied String Inverter (s) shall be terminated to Inverter LT Panel/ Inverter LT combiner panel to be located close to the Grid Tied String Inverter (s). Inverter LT combiner panel shall be used where more than one inverter shall be installed at a particular location of a site
- viii. The output of the Inverter LT panel/ Inverter Combiner LT Panel shall be connected with supply mains at a Point of Common Coupling through a Grid Interfacing LT Panel (GILTP).
- ix. A unidirectional/ bi-directional energy meter (not panel meter) shall be installed at the output of the Grid Interfacing LT Panel (GILTP). The energy meter shall not be the panel meter.
- x. Proper earthing and protection system must be provided to the systems.
- xi. The GCRTSPV systems to be installed should be Robust, Economic, Efficient and Time tested.

2. Capacity of GCRTSPV System

The PV Array of the GCRTSPV Systems should be installed at the Roof top of the Buildings

If multiple GCRTSPV Systems is installed at different buildings in a compound, in such case, the cumulative capacity of GCRTSPV system shall be considered.

The capacity of the GCRTS System shall be fixed based on the round-down cumulative capacity of PV Array or the Grid Connected Inverter which will be less.

3. 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). The logo/ monogram of the manufacturer must be inside in front of the PV module.

a) Guarantee/Warranty

Product Warranty

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 (05) years from the date of commissioning of the PV Power Plant.

- a) Defects and/or failures due to manufacturing
- b) Defects and/or failures due to quality of materials
- c) 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 option.

Performance Warranty

The vendor 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 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 their said manufacturing item.

Warranty Certificate

The vendor shall provide the warrantee certificates issued by Original Equipment Manufacturing (OEM) to the Customer.

b) Specification of the PV Module

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

Sl No	Item	Description
1	Type	Crystalline Silicon
2	Minimum wattage of individual solar photovoltaic module	300 Wp (No negative tolerance to be considered),
3	No of PV Cell	72 Cell for 300 Wp
4	The rated output variation of individual module	<ul style="list-style-type: none">• No negative tolerance shall be considered• Each module shall display rating and individual

Sl No	Item	Description
		power curve shall be available for inspection
5	System Voltage (V _{sys})	1000 V dc/1500 V dc
6	Efficiency	Minimum 15.5%
7	Fill factor	Minimum 73%
8	Potential Induced Degradation (PID)	PID free PV modules shall be used
9	Certificate from IEC approved test centers or MNRE approved test centers or NISE	<ul style="list-style-type: none"> • IEC 61215 or IS 14286 • IEC 61730 Part I to II for safety qualification testing • IEC 61701-Salt Mist Corrosion Testing of PV Modules • IEC 62804 - Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation
10	PV Module Frame	<ul style="list-style-type: none"> • Aluminum
11	PV Module cover surfaces	<ul style="list-style-type: none"> • Low iron tempered or toughened, high transmission glass at front (Minimum Thickness 3.2mm) • Multi-layered polymer sheet • Suitable encapsulates and sealants to prevent module from environmental effects like moisture and dust
12	PV Module Junction Box	Minimum IP67
13	No of Bypass Diode	3 nos (Minimum)
14	System Voltage (V _{sys})	1000 V dc/1500 V dc
15	Range of Temperature and Humidity for satisfactory performance	<ul style="list-style-type: none"> • Relative humidity up to 85% • Temperatures between -10°C and +85°C • withstand wind gust up to 180 km/h from back side of the panel
16	RF identification tag	Tag must with stand harsh environmental conditions for 25 years
17	Markings on RFID	<p>It should carry at least the following information in clear readable markings</p> <ul style="list-style-type: none"> • Name, monogram or symbol of manufacturer; • Name of manufacturer of solar cell • Information such as wattage, I_m, V_m, Fill factor • Type or model number; • Unique serial number; • Date and year of obtaining IEC PV module qualification certificate • Maximum suitable system voltage for the module • Date & place of manufacture (separately for cell and module)

4. PV Array

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

SI No	Item	Description
1.0	PV Module interconnection connector	MC-4 / Tyco/ Equivalent
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 Roof Space Utilization	12 Sqm / per kWp for zero degree Azimuth Angle with true south of the proposed roof

5. PV Module Mounting Structure

Sl. No.	Specifications for proposed module mounting structure on the roofs of the building
1	The PV array structure shall be so designed that it will occupy minimum space without scarifying the output from SPV panels.
2	The fixing arrangement of Module Mounting Structures should be designed considering the condition of roof and may either be with pedestal using anchor fastener for grouting of structure on the roof or with dead load supported or self supported as the case is most appropriate. Use of anchor fastener for grouting structures on roof shall only be permitted with use of leakage proof sealant to ensure no water seepage is occurred from the points of anchoring.
3	The structure shall be designed to allow easy replacement of modules while at the same time be in line with Site requirements.
4	The structure shall be fixed type. Option of periodic change in the tilt angle may be provided
5	The array structure shall be made of hot dipped galvanized MS angles channel and flat of suitable size (Minimum thickness of MS members must be 5 mm thick and minimum 85 micron thickness of galvanization). Alternatively, aluminum structure specially designed and manufactured by an experienced company for solar module mounting can be used. <i>The mounting structure steel should be as per latest IS 2062: 1992 and galvanization of the mounting structure should be in compliance with latest IS 4759</i>
6	The support structure design & foundation shall be designed to withstand wind speed up to 180 km/hr as per IS:875- Part-3
7	All fasteners shall be of stainless steel of grade SS 304.
8	All nuts and Bolts for fixing of PV modules and structures shall be of galvanize/Stainless Steel
9	The array structure shall be grounded properly using earthing kit suitable for mounting over building terrace
10	The mounting of solar modules shall be done in such a way that the lower position of solar module shall be of min 300 mm above the terrace level.
11	Alignment and tilt angle of PV modules shall be calculated to provide the maximum annual energy output. This shall be decided based on the location of array installation
12	The structures shall be designed for simple mechanical and electrical installation. There shall be no requirement of welding or complex machinery at the installation site.

13	Structure should be designed in such a way that there is no shadow between the minimum period 10.00 AM to 3.00 PM from nearby obstacle / structures like boundary wall, water tank, trees etc.
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6. PV Array Junction Box (AJB)

Array Junction Box (AJB) shall have to be used for termination of series strings connecting array with each inverter. The array Junction Box may be inbuilt with the Inverter or it may be a separate unit. There shall be two Arrays Junction Boxes if, the inverter is located away from PV Array. The desired specification of the PV Array Junction Box and accessories shall 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 (If AJB is a separate Unit and not Inbuilt in Inverter).
1.3	Withstanding voltage	1000V dc (minimum)
1.4	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
3.3	Protection class	Type-II
3.4	Number of set	As may be required as per string design (minimum 1 set against each MPPT Chanel)
3.5	Voltage	1000 V (Y connection shall also be considered)
3.6	Standard	PV Standard
4.0	Fuse with fuse holder	
4.1	Position	At negative and positive terminal for each series string
4.2	Type	Glass fuse, for PV Use only
4.3	Rating	Current: Minimum 1.25 times the rated short circuit current of the string Voltage: Minimum 1000V DC or matched with the system voltage which will be higher
4.4	Standard	PV Standard
5.0	Earthing Provision	Terminal blocks will have to be provided for Earthing
6.0	Terminals and lugs	Tinned copper

7. Grid Connected Solar String Inverter

The proposed grid connected solar string inverter shall be connected with grid. As such, the inverters shall be compatible to operate with existing utility supply. The power from PV array shall be feed into the grid through the grid connected string inverter.

Desired specification of each grid connected string inverter shall include but not limited to the following:

Sl. No.	Operating Parameter	Desired specification
1.0	Type	Grid connected String Inverter
2.0	Usage	Specially used for PV system
3.0	Standards	
3.1	Efficiency Measurement	IEC 61683/ Equivalent BIS Std.
3.2	Environmental testing	IEC 60068-2 (1,2,14,30) / Equivalent BIS Std.
3.3	Interfacing with utility grid	IEC 61727
3.4	Islanding Prevention Measurement	IEC 62116 equivalent IS standard
3.5	Certification	Type test certificate issuing authorities should be any NABL/IEC Accredited Testing Laboratories or MNRE approved test centers.
4.0	Input (DC)	
4.1	PV array connectivity capacity	minimum 10% more than the rated AC kVA
4.2	MPPT Voltage range	Compatible with the array voltage
4.3	Number of MPPT Channel	Minimum one number
5.0	Output (AC)	
5.1	AC Power output	The rated power/name plate capacity of the inverters shall be the AC output of the inverter at ambient temperature 45°C
5.2	Number of Grid Ph	3Ø 400 V + N 50Hz ,
5.3	Adjustable AC voltage range	As per Grid Code
5.4	Frequency range	As per Grid Code
5.5	AC wave form	Pure Sine wave
5.6	THD	As per prevailing Grid code.
6.0	General Electrical data	
6.1	Efficiency	96% (Minimum)
6.2	No load loss	0.1% of rated power
6.4	Sleep mode consumption	Less than 10 W
6.5	VAR Control	Set point pre-selection for VAR control within the range of 0.8 lagging to 0.8 leading
7.0	Protection	
7.1	DC Side	<ol style="list-style-type: none"> 1. Reverse-polarity protection 2. Reverse current to PV array protection, over voltage, Under voltage protection 3. Over current

Sl. No.	Operating Parameter	Desired specification
7.2	AC side	<ol style="list-style-type: none"> 1. DC inject protection to grid 2. Over voltage and Under voltage 3. Over and under grid frequency protection, 4. Over current/ Short circuit current protection 5. Anti Islanding protection 6. Set point pre-selection for VAR control
7.3	Other	<ol style="list-style-type: none"> 1. Surge arrestors to protect against Surge voltage induced at output due to external source 2. Direct earth fault protection and body earthing
7.4	Isolation Switch	PV array Isolation switch (DC) (In built or add on)
7.5	Ground fault detection device (RCD) which can detect changes in ground current. Rating shall be as suitable for inverter	To be provided for transformer less inverter.
8.0	Display	
8.1	Display type	LCD Display
8.2	Display parameter	
8.2.1	DC	Voltage Power
8.2.2	On grid connected mode	Line status Grid voltage Export Power Cumulative Export Energy
9.0	Interface (Communication protocol)	Suitable port must be provided in the inverter for <ol style="list-style-type: none"> i) Port for Onsite upgrade of Software, ii) Port for monitoring system
10.0	Web based monitoring	The Inverters shall be suitable for interfacing with Web based monitoring
11.0	Mechanical Data	
11.1	Protection Class	IP 65 or higher..
11.2	Operating ambient temperature	0 ⁰ C to 55 ⁰ C
11.3	Cooling	Natural/forced
11.4	Type of Fixing	Wall/ angle / channel Mounted suitable for outdoor application

8. Maintenance setup of the Inverter Manufacturer

The proposed Inverter Manufacturer or there authorized service provider must have maintenance setup anywhere in West Bengal.

9. Data Logger

- a) Data logger shall be an integral part of the inverter or a separate unit.
- b) The data logger shall record generation and other electrical parameters at different stages.
- c) The data logger shall have reliable data storage capacity (for a minimum period of one years) to store the cumulative generation
- d) The data, which are essential for performance evaluation, shall be recorded in the Data logger and shall be sent to the Web based monitoring system continuously with an interval of maximum 20minutes.
- e) The Data logger shall be web enabled for the inverters of capacity **5 kW** or above and shall continuously send data to the Web server.

10. Web Based Remote Monitoring System

- a) The Web based Remote Monitoring system shall be provided with the minimum capacity of **GCRTSPV system 5 kW**
- b) Web based Remote Monitoring system must be compatible with data logger (s).
- c) The system(s) shall be provided with suitable modem and required SIM card for wireless communication or connection from internet service provider (Wired system) to maintain the Web Monitoring system for a period of five (05) years within the contract price.
- d) The vendor shall provide and maintain the IP address, Server charge (storage, access charge and other charges if any) for data communication through remote monitoring system for a period of five (05) years within the contract price.
- e) The vendor shall share the website address and password with the Customer for asses the data from the remote server.
- f) The other required accessories, hardware and compatible software shall have to be provided as an integrated part of the system to monitor the data (maximum 20 minutes delay) through web server.
- g) The system can be monitored from anywhere through internet without installing any special application software. The server shall be arranged by the vendor.
- h) The Web based monitoring system should have the provision of graphical representation of the data.
- i) All data shall be recorded chronologically. The data file should be MS Excel/XML/or any readable form compatible and should have the facility of easy downloads from the website.

11. Inverter LT Panel/ Inverter Combiner LT Panel

In case, the Power Plant consists of a single Sting Inverter only, its output shall be terminated in an **Inverter LT Panel to be located close** to the inverter through a 4 Poles MCB/MCCB. A set of AC surge protecting device (SPD) shall also have to be provided at the outgoing side of the Panel. The inverter LT Panel may, however, be an integral part of the Inverter or a separate unit. In case, the desired components are partially inbuilt in the inverter, in such case remaining item(s) shall be put into in the Inverter LT panel.

Desired specification of each **Inverter LT Panel** will include but not limited to the following:

Sl No	Parameter	Desired Specification
1.0	MCB/MCCB	
1.1	Use of MCB/MCCB	Up to 63A MCB Rated Short Circuit Breaking Capacity 10 kA (Minimum) Above 63 A MCCB Rated Short Circuit Breaking Capacity 16 kA (Minimum)
1.2	Number	01(one) number
1.3	Type	4 pole
1.4	Rating	1.2 times of the rated current capacity of the inverter.
2.0	Surge protection device (SPD)	
2.1	Usage as declare by Manufacturer	For AC use only
2.2	Protection class	Type II
2.3	Number of set	01 Set
3.0	Indicator	R,Y,B
4.0	Earthing Provision	Terminal Blocks will have to be provided for Earthing
5.0	Enclosure	
5.1	Degree of Protection	IP 4X
5.2	Material	Poly Carbonate/ Polystyrene
5.3	Housing	Wall Mounted/ structure mounted
5.4	Number of cable entry	As may be required
5.5	Number of cable exit	As may be required
5.6	Glands Position	At cable entry and exit

Inverter Combiner LT Panel

If the numbers of inverters are more than one, and installed at the same location Inverter Combiner LT Panel has to be provided instead of Inverter LT Panel. In such case, all the desired components of Inverter LT Panels shall be provided in the Inverter Combiner LT Panel. In addition Inverter Combiner LT Panel shall have an outgoing

switch – MCB/MCCB. If the Inverter LT Panel be an integral part of Inverters or the desired components may partially inbuilt in the inverter in such case remaining components shall be put into the Inverter Combiner LT Panel. The Inverter Combiner LT Panel shall be installed close to the inverters. A suitable MCB/MCCB has to be connected at the output of the inverter combiner LT Panel.

Sl No	Parameter	Desired Specification
1.0	Incoming MCB/MCCB	
1.1	Use of MCB/MCCB	Up to 63A –MCB fault Current 10 kA Above 63 A- MCCB Fault Current 16 kA
1.2	Number	01(one) number for each Inverter
1.3	Type	4 pole
1.4	Rating	1.2 times of the rated current capacity of the Inverter.
2.0	Surge protection device (SPD)	
2.1	Usage as declare by Manufacturer	For AC use only
2.2	Protection class	Type II
2.3	Number of set	01 Set
3.0	Indicator	R,Y,B with Fuse
4.0	Earthing Provision	Terminal Blocks will have to be provided for Earthing
5.0	Outgoing MCB/MCCB	
5.1	Use of MCB/MCCB	Up to 63A –MCB fault Current 10 kA Above 63 A- MCCB Fault Current 16 kA
5.3	Number	01(one)
5.4	Type	4 pole
5.5	Rating	1.2 times of the cumulative rated current capacity of the Inverters.
6.0	Enclosure	
6.1	Degree of Protection	IP 4X
6.2	Type	Poly Carbonate/ Polystyrene
6.3	Housing	Wall Mounted/ structure Mounted
6.4	Number of cable entry	As may be required
6.5	Number of cable exit	As may be required
6.6	Glands Position	At cable entry and exit

12. Grid interfacing LT Panel

Output of the Inverter LT Panel / Inverter LT Combiner Panel shall be terminated at GILTP. The Grid Interfacing LT Panel shall be indoor type having double door metal enclosure dust and vermin proof (nearer to the Point of Common Coupling).

Desired specification of each **Grid interfacing LT Panel** shall include but not limited to the following

- (a) If output of one Inverter LT Panel /Inverter LT Combiner Panel shall be terminated at **Grid interfacing LT Panel**

Sl No	Parameter	Desired Specification
1.0	MCCB/MCB	
1.1	Use of MCB/MCCB	Up to 63A –MCB fault Current 10 kA Above 63 A- MCCB Fault Current 16 kA
1.2	Type	4 Pole TPN
1.3	Rating	1.2 times of the rated current capacity.
1.4	Accessibility of MCB/ MCCB	Flap/handle from 2 nd Door
2.0	Indicator	R,Y,B with Fuse
3.0	Earthing Provision	Terminal Blocks will have to be provided for Earthing
4.0	Mechanical	
4.1	Type	IP 42/43. Metallic, double door, indoor Type , 16SWG MS sheet
4.2	Housing	Wall Mounted/ Floor Mounted / structure mounted
4.3	Number of cable entry	As may be required
4.4	Number of cable exit	As may be required
4.5	Cable Entry	Bottom /Top/Side
4.6	Glands Position	At cable entry and exit

- (b) If output of more than one Inverter LT Panel / Inverter LT Combiner Panel shall be terminated to **Grid interfacing LT Panel**:

All the components mentioned in (a) shall be provide against each input and an outgoing MCB/MCCB as per specification mentioned in (a) along with indicator (R,Y,B) shall be provided.

Grid interfacing LT Panel should be provided with 3 Phase copper bus bar of suitable capacity for ‘**Project Category B**’

The panel shall have the arrangement for measuring Voltage and Current for ‘Project Category B’.

13. Energy Meter

- a) An Energy Meter shall be provided for recording of solar generation against each Grid Interfacing LT Panel (GILTP).
- b) The Solar Generation meter shall not be a panel meter. The meter to be supplied must be tested.

- c) The rating of the meter shall be matched with the current and voltage rating of the GILTPs.
- d) The meter must be put in an enclosure made with Polycarbonate sheet.
- e) The location of the meter shall be nearer GILTP.
- f) The Solar energy meter shall conform to the requirements laid down by the CEA's (Installation and Operation of Meters) Regulation, 2013 and any amendments thereof.
- g) The following are technical specifications of the solar generation meter and bi-direction energy meter / net meter that shall be used:
- h) Standards / Specifications for Solar Generation Meter

S. No.	Technical Parameters	Whole Current Meters	CT Operated
1	Number of phases and wires	Three Phase, 4 Wire	Three Phase, 4 Wire
2	Measurand (s)	kWh	kWh, kVAh, kVA, PF
3	Standard Voltage and frequency	3X240 V (PN), 415 V (P-P), 50Hz	3X240 V (PN), 415 V (PP) 50Hz
4	Accuracy class	1.0s	0.5s
5	Indian Standard or IEC to which conforming	IS 13779:1999	IS 14697, IS 13779
6	Import-export feature	Forward Import	Forward Import
7	Communication Port/ Protocol	Optical, RS232/ DLMS	Optical, RS232/ DLMS

14. Cables and Wires

A) 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 shall be designed such that maximum 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, 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 to join two cable ends shall not be accepted.
- v) The cable must be laid through uPVC conduit on roof and indoor. On the roof the conduit shall run over the PCC block. The PCC block shall be painted with suitable paint.
- vi) All the unarmored cable and control cable if need to be drawn through underground, adequate size uPVC conduit is to be used for drawl of such cable all along. However, the conduits also need to be laid inside 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 confirm to the relevant standards suppliers to specify the specification.
- ix) All fasteners will be made of Stainless steel or Aluminum
- x) Minimum two number loop must be provided at the start and end each span of cable laying and before termination.

B) Type of cable to be used

Sl no	Location	Type of Cable
01.	PV Array to PV Array Junction Box	PV graded copper cable upto 6 sqmm and above 6 sqmm XLPE insulated copper cable
02.	PV Array JB to String Inverter	PV graded copper cable upto 6 sqmm and above 6 sqmm XLPE insulated copper cable
03.	String Inverter to Inverter LT panel/ Inverter Combiner LT Panel	PVC insulated copper Cable
04.	Inverter LT panel to Grid Interfacing Panel	Armoured PVC insulated Aluminium cable 4 or 3 & ½ core as per design
05.	Grid Interfacing Panel to Point of Common Coupling	PVC Insulated Aluminium cable 4 or 3 & ½ core as per design

The higher graded cables shall be accepted in respect of type of cables.

15. Equipment, Array structure Earthing

The Equipment and Array structure earthing shall be done as per **IS 3043**, 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 ground floor to the roof of building

The following specification and quantification shall be for each location of PV power plant in a single site

A) Earthing Pit with Pipe Electrode and Earth Strip

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.

Or

Chemical gel maintenance free earth pit shall also be accepted. However in such cases the length of earth electrode must be minimum 3 mtr.

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 3** 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 3** 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

B) 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 3 mm**

C) 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 3 mm GI flat**.

D) Earth Strip

The earth strip must be minimum 25mmX 3 mm GI flat From the Earth Bus-bar two (02) nos. **25 mm X 3 mm** GI flat shall be drawn upto the other Earth Bus-bars at the different location of the Power Plant.

E) 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
- b) Earth wire shall be connected to Grid interfacing LT Panel from the Earth Bus at Ground Floor. Size of Earth wire: **10 SWG (GI)**

F) 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.

16. Fire Buckets and Holding stands

- a) Each set of Fire Buckets and Fire Bucket Holding Stand shall have four (04) Fire Bucket sand one (01) Double Tier / single tire Fire Bucket Holding Stand with an arrangement of holding of minimum four (04) Fire Buckets. The Fire Bucket Stand shall be installed nearer the each Array field.

The minimum technical specification is a follows:

Fire Bucket Capacity	10 liters
Fire Bucket Body Material	Mild Steel Sheet
Standard	As per BIS

b) Number of Fire Buckets and Holding stands:

Capacity upto 10 kWp at each location in a particular site	01(one) set
Capacity greater than 10kWp upto 100 kWp at each location in a particular site	01 Set for each 25 kW

17. Fire Extinguishers

a) ABC type dry power portable fire extinguishers of minimum capacity 5/6 kg shall be provided. Fire Extinguisher must be of BIS Standard

b) Number of Fire Extinguishers:

Capacity upto 10 kWp at each location in a particular site	01(one) set
Capacity greater than 10kWp upto 100 kWp at each location in a particular site	01 Set for each 25 kW

18. Project Signage

The Project Signage will be made up of metallic/ACP base of minimum size 3'x 2'. The Signage provide with detail of the project as approved by WBREDA. 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 a prominent place** of the project area.

19. Schematic Diagram Signage

Schematic diagram of the installation must be provided on a display board of minimum size 3' x 2' made up of metallic/ACP base. The schematic diagram must be fixed up at any prominent place of installation.

20. Safety Signage

Safety Signage of size 300mmX 200 mm 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. DC safety Signage color shall be **Yellow** with black lettering. AC safety signage colour is **Red**

Each set of Safety Signage contain minimum 06 (six) nos. safety signage:

Location	Quantity
PV Array Field (on metallic base)	Minimum 2 nos up to 10 kWp Capacity of PV array in each location in a site more than 10 kWp -Minimum 4 Nos for each 25 kWp PV array.
On PV Array JB	01 No. (Sticker)
Near Inverters (on metallic base)	01 No
On Inverter LT Panel/ Inverter Combiner LT Panel	01 no. (Sticker)
On Grid interfacing LT Panel	01 No (Sticker)

21. 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 customer.

22. Comprehensive Maintenance during defect liability period

All the equipments to be installed for commissioning of each of the grid connected solar PV power plant and the power plant in whole shall be under Comprehensive Maintenance Contract within the scope of the tender for 5(five) years from the date of commissioning. The equipments or components, or any part thereof, so found defective during Comprehensive Maintenance Contract period will be forthwith repaired or replaced within the scope of warrantee obligation to the satisfaction of the customer.

The maintenance of GCRTSPV system shall include routine & periodic maintenance, overhauling, breakdown maintenance, and repairing or replacement of defective PV modules, invertors, and other components.

The Down-Time of PV system should not be more than thee (03) working days.

23. Routine maintenance

In order to carry out routine maintenance of the GCRTSPV system, the vendor will provide all labour, material etc. within the scope of maintenance service. Recommended tasks under the scope of routine maintenance will include but not limited to the followings:

SI No.	Type of Routine Maintenance
01	Checking and tightening of all electrical connections
02	Checking and tightening of mechanical fittings
03	Checking and restoring of earthing system
04	Dusting and cleaning of Inverter and other electrical equipments
05	Routine maintenance as recommended by the Original Equipment Manufacturer (OEM)

24. Breakdown maintenance

Breakdown maintenance will include but not limited to the followings:

Breakdown maintenance will mean the maintenance activity including repairs and replacement of any component or equipment of the power plant, which is required to be carried out as a result of any sudden failure/breakdown of that particular component or equipment while the plant is running.

The vendor will be responsible to carry out breakdown maintenance of the power plant and will provide the required manpower, materials, components or equipment etc. for breakdown maintenance.

The vendor will undertake necessary maintenance/ troubleshooting work of the GCRTSPV system. Down time will not be more than 03 (three) working days from time of occurrence. However, if the breakdown is not repairable within 3 (three working) days due to some specific reason, the vendor must seek extension of time by giving sufficient acceptable reasons. In such cases the restoration shall be done by the vendor with in maximum 15 days. If the restoration of the power plant shall not be done within 15 days the CMC of that Power plant shall be deducted prorate basis.

25. Schedule of Work

The schedule of work mentioned here in under is for a GCRTSPV system to be installed at the roof of single storied building.

If the GCRTSPV system shall be installed at the rooftop of a building more than single storied additional cost of the system for the scheduled **sl no: 12 and 14** shall be considered separately beyond the system cost as fixed through this tender. For this additional cost the CFA shall not be considered.

The schedule of work for each PV Power Plants as per Technical specification which includes but not limited as mentioned here in under.

SI No.	Item Description	Qty	Unit
1.	Technical feasibility survey, Preparation of project proposal and other formalities and assistance to the customer before and after installation of the power plant for commissioning the same.	1	Job
2.	Supply delivery installation testing and commissioning of PV Array	1	Job
3.	Supply delivery installation testing and commissioning of PV Module Mounting Structure suitable for installation of PV power Plant	1	Job
4.	Supply delivery installation testing and commissioning of PV Array Junction Boxes (AJB)	1	Job
5.	Supply delivery installation testing and commissioning of Grid Connected String Inverter	1	Job
6.	Supply delivery installation testing and commissioning of Data Logger required for collection of data from Solar PV Power plant	1	Job
7.	Supply delivery installation testing and commissioning of Web enable on line Remote Monitoring system for the PV power plant of capacity 5kW and above	1	Job
8.	Supply delivery installation testing and commissioning of Inverter LT panel / Inverter LT Combiner LT Panel	1	Job
9.	Supply delivery installation testing and commissioning of Grid interfacing LT panel	1	Job
10.	Supply delivery installation testing and commissioning of Energy Meter to record Solar Power Generation	1	Job
11.	Supply delivery installation testing and commissioning of DC Cables and conduits and cabling materials	1	Job
12.	Supply delivery installation testing and commissioning of AC Cables and conduits and cabling material	1	Job
13.	Supply delivery installation testing and commissioning of Earthing Pit	1	Job
14.	Supply delivery installation testing and commissioning of Equipment, and Array structure Earthing strips and earth Bus and other accessories for installation of the same.	1	Job
15.	Supply delivery installation testing and commissioning of Fire extinguisher	1	Job
16.	Supply delivery installation testing and commissioning of Fire Buckets and Holding stand	1	Job
17.	Supply delivery and installation of Project Signage	1	Job
18.	Supply delivery and installation of Schematic Diagram Signage	1	Job
19.	Supply delivery and installation Safety Signage	1	Job
20.	Training to the Customer	1	Job
21.	Documentation of the project	1	Job
22.	Any other work which is not mentioned above to be required completed the project	1	Job
23.	Comprehensive maintenance of the GCRTSPV system for five (05) years.	1	Job

Solar PV Modules and Grid -Tie Inverter to be used by the Vendor for installation of GRTSPV Systems

Sl No	Name of the Vendor	Solar PV Module Make	Grid Tie Inverter Make
1	M/s SunCraft Energy Private Limited	1. Vikram Solar Ltd 2. Waaree Energies Ltd. 3. Sova Solar Ltd	1. INVT Solar Technology (Shenzhen) Co. Ltd.
2	M/s Switching Avo Electro Power Ltd	1. Vikram Solar Ltd 2. Sova Solar Ltd	1. ABB 2. KACO 3. Power One Micro System Pvt. Ltd. 4. THEA
3	M/s Chloride Power Systems & Solutions Ltd	1. Websol Energy System Ltd. 2. Waaree Energies Ltd.	1. Delta Power 2. Power One Micro System Pvt. Ltd.
4	M/s Agni Power and Electronics Pvt Ltd	1. Sova Solar Ltd. 2. Vikram Solar Ltd. 3. Websol Energy System Ltd.	1. ABB 2. Delta Power 3. Sungrow 4. KACO
5	M/s Salt Lake Institute of Engineering and Management	1. Sova Solar Ltd. 2. Modern Solar Pvt. Ltd.	1. Delta Power
6	M/s Durga Solar Enterprise	1. Websol Energy System Ltd. (300 Wp)	1. INVT Solar Technology (Shenzhen) Co. Ltd.

Terms and Conditions

(Tender Reference: WBREDA /NIeT-08 /18-19 DTD: 27-11-2018)

1. Assigning officers

1.1 Controlling officer

The Chief Engineer, WBREDA will be Controlling Officer of the program.

1.2 Supervising officer

Divisional Engineer will be the Supervising officer of the work

1.3 Paying Authority

Drawing and Disbursing Officer of WBREDA is the Paying Authority of the work.

1.4 Purchaser and Owner of the Projects

- a) The respective customer for the individual project shall be the purchaser and owner of the project
- b) WBREDA shall disburse the subsidy (CFA) to the customer on reimbursement basis.

2. Dispute

The parties shall take necessary steps to settle any dispute through mutual discussion with issuing prior notice in writing to other side at least 07(seven) days in advance. If the issue is remained unresolved to the satisfaction of the parties, then the matter may be referred to Arbitration.

The parties may refer them after for Arbitration on expiry of 45(forty five) days from the date of intimation of disapproval/dissatisfaction from either party to other party.

The provisions of Arbitration and Conciliation Act 1996 will apply with respect to Arbitration proceedings between the parties.

Dispute(s), if any, shall be settled by mutual agreement through Amicable Settlement and in case of failure the dispute(s) shall be settled through Arbitration.

3. Arbitration

The provisions of Arbitration and Conciliation Act 1996 will apply with respect to Arbitration proceedings between the parties.

Each party shall appoint one Arbitrator and third Arbitrator shall be nominated by the said two Arbitrators who shall act as presiding Arbitrator.

The venue of the Arbitration proceedings shall be in the state of West Bengal. The decision of the majority of the Arbitrators shall be final and binding upon both the parties.

The cost of the Arbitration shall be borne equally by the parties.

Any dispute submitted by a party to arbitration shall be heard by an arbitration panel composed of three arbitrators, in accordance with the provisions set forth below.

The Owner and the Contractor shall each appoint one arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the two arbitrators do not succeed in appointing a third arbitrator within 28 (twenty eight) days after the latter of the two arbitrators has been appointed, the third arbitrator shall, at the request of either party, be appointed by the Appointing Authority for arbitrator.

If for any reason an arbitrator is unable to perform its function, the mandate of the Arbitrator shall terminate in accordance with the provisions of applicable laws and a substitute shall be appointed in the same manner as the original arbitrator.

The decision of a majority of the arbitrators (or of the third arbitrator chairing the arbitration, if there is no such majority) shall be final and binding and shall be enforceable in any court of competent jurisdiction as decree of the court. The parties there by waive any objections to or claims of immunity from such enforcement.

The arbitrator(s) shall give reasoned award to withstanding any reference to the arbitration herein

i) The parties shall continue to perform the irrespective obligations under the Contract unless they otherwise agree.

ii) The Owner shall pay the Contractor any monies due to the Contractor except for the woks referred to the Arbitrator.

4. Jurisdictional Matter

Either party may approach Court of law if any of them is aggrieved by the award of the Arbitration proceedings.

All litigation matters between the parties if any shall be held in any Court in Kolkata under the superintendence of High Court of Calcutta.

5. Capacity of GCRTSPV system:

The PV Array of the GCRTSPV Systems should be installed at the Roof top of the Buildings

If multiple GCRTSPV Systems is installed at different buildings in a compound, in such case, the cumulative capacity of GCRTSPV system shall be considered.

The capacity of the GCRTS System shall be fixed based on the round-down cumulative capacity of PV Array or the Grid Connected Inverter which will be less.

6. Codes and Standards

All equipment and materials to be furnished under this specification shall be designed, manufactured and tested in accordance with the latest editions of the relevant IS/IEC/MNRE guide lines or as applicable. The electrical installation shall meet the

requirement of Indian Electricity Act, and Indian Electricity Rules as amended up-to-date and also the applicable section of the latest revision of the relevant IS Code of Practice.

The work shall be done in compliance with the IS Specifications, International Electrotechnical Commission (IEC) Codes, Indian Electricity Act 2003 and all applicable laws in India.

7. Equipment and Material

Equipment and material shall comply with description, rating, type and size as detailed in the technical specification. Equipment and materials furnished shall be complete and operative in all respect.

All parts shall be made accurately to standard gauges so as to facilitate replacement and repair.

All corresponding parts of similar equipment shall be interchangeable.

Vendor shall carefully check the available space and the environmental conditions for installation of all equipments available at site and shall design the system accordingly.

8. Materials and Workmanship

Qualified, experienced people should be deployed by the vendor(s) to install the PV Power Plant. All materials shall be of the best quality and capable of satisfactory operation under the operating and prevailing climatic conditions. Unless otherwise specified, they shall conform in all respect to the latest edition of the relevant code and standards. The work shall be performed confirming safety precaution of all level of workers executing the project.

The inspection and testing at the factory may be waived by the customer at his own discretion

9. Training

The vendor shall arrange training program at site for the Customer personnel. The vendor shall provide training manual.

10. Inspection by WBREDA at Installation Site

After completion of the project, the customer shall submit all the necessary documents of installation along with the service charge of WBREDA in form of Demand Draft/Banker's cheque with a request for inspection to WBREDA which is included but not limited as follows:

- i) Copy of the Agreement between Vendor and Eligible Customer for the installation of GCRTSPV system
- ii) Copy of the agreement of installation of Net meter between DISCOM and customer
- iii) Project Summary Report
- iv) Handing over document
- v) Photograph of roof before and after installation of PV array with date.

- vi) Photograph of other components of the Power Plant.
- vii) Any other documents as demanded related to the project.

All copies and photographs must be self attested by the vendors and customers. A soft copy of the above documents must be submitted along with the documents.

11. Service Charges of WBREDA

The customer shall submit the service charges in form of Demand Draft/Banker's cheque in favour of "WBREDA", payable at Kolkata with the inspection call of the GCRTSPV system.

Service charges of WBREDA shall be computed @Rs.3000.00/kW or 5% of the project cost of the installed GCRTSPV system whichever will be higher.

The Service Charges are exclusive of Service Taxes which shall be paid extra as per applicable norms of the Government.

12. Force Majeure

Force Majeure Events shall include the following events to the extent they satisfy the foregoing requirements:

- i) acts of God, including but not limited to lightning, earthquake, volcanic eruption, landslide, flood, cyclone, typhoon, tornado;
- ii) any act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, terrorist or military action;
- iii) any requirement, action or omission to act pursuant to any judgment or order of any court or judicial authority or Statutory Entity in India of any Law or any of their respective obligations under this Agreement;
- iv) expropriation and/or compulsory acquisition of the Project in whole or in part by any Government or Statutory Entity;
- v) radioactive contamination or ionizing radiation originating from a source in India or resulting from another Force Majeure Event excluding circumstances where the source or cause of contamination or radiation is brought or has been brought into or near the Site by the Affected Party or those employed or engaged by the Affected Party;
- vi) industry wide strikes and labor disturbances having a nationwide impact in India;
- vii) Change in prices of steel having nationwide impact in India

Force Majeure Event shall not include the following conditions, except to the extent that they are consequences of a Force Majeure Event:

- a) unavailability, late delivery or change in cost of steel, equipment, materials, spares parts or consumables in local market;
- b) delay in performance of any vendor or sub-vendor or their agents;
- c) strike or labor disturbances at the facilities of the vendors;
- d) insufficiency of finances or funds or the agreement becoming onerous to perform;

- e) non-performance caused by, or concerned with, the Selected bidder negligent and intentional acts, errors or omissions;
- f) failure to comply with Law; or
- g) breach of, or default under this Agreement

13. Warranty

The equipments used in installing the plant are new and unused.

The vendors shall provide warranty, in the name of the eligible customers, of the complete GCRTSPV systems towards any defect in design of the plant, equipment used including spare parts for a period of five (5) years from the date of Commissioning of the plant.

Any defect noticed in the GCRTSPV systems during the period of five (5) years from the date of Commissioning of the plant shall be rectified/replaced by the vendor on its own motion at free of charges.

The replacement of the defective component shall be made with similar and/or equivalent make. The replaced component shall not, in any situation, reduce the performance of the plant.

The Vendors shall commence the replacement/rectification of the defect within three (3) days from the date of identification of such defect and shall rectify the defect within mutually agreed time; failure in doing so shall enable the customer to rectify the defect at the expense of vendors.

The vendors shall provide warranty certificate along with the Commissioning report to the Customer .

14. Proposed Inverters and PV Module

The bidder must declare the proposed PV Module and Grid connected Inverter to be used by them for this project.

15. Document to be Submitted by the Vendor to the Customer

The work shall be taken over by the respective Customer upon successful completion of work at site(s) and observing performance of the power plant **for at least 30 days** in accordance with provision of this work. During handing over of the complete project work, the vendors will submit the followings in **Six (06) sets** for considering final payment.

- a) All As-Built Drawings & Design of the power plant
- b) Detailed Engineering Document with detailed specification, schematic drawing, Design and test results, manuals for all deliverable major items, Operation, Maintenance & Safety Instruction Manual and other information about the project
- c) Bill of materials
- d) Performance Guarantee Certificate of PV modules and inverter from the original manufacturer
- e) Inventory of spares at projects sites if any
- f) 30 days Generation Data.
- g) Other documents in line with serial no 3.11 as per applicability.

APPLICATION FORM

[TO BE SUBMITTED ON THE LETTERHEAD OF THE CUSTOMER]

Ref No:

Date:

To
The Chief Engineer
West Bengal Renewable Energy Development Agency
Bikalpa Shakti Bhavan, J1/10, EP&GP Block,
Sector – V, Salt Lake Electronics Complex,
Kolkata – 700 091

Subject: Application for setting up of Grid Connected Roof Top Solar PV (GRTSPV) systems of capacitykW at (name and address of the locations of proposed installation site of the GRTSPV system)

Reference: Your Notification No: **WBREDA/34(2017)/1288 Dated: 08-03-2019**

Sir,

With reference to above, I, Sri _____ (Name and Designation) on behalf of _____ (Name of the Customer) am submitting the application for necessary approval of the project for installation of GRTSPV system of capacity _____ kW at _____ (name and address of the locations of proposed installation site of the GRTSPV system) against your notification vide no: **WBREDA/34(2017)/1288 Dated: 08-03-2019**. The details are as follows:

Part A- General Details

1. Full Name of the Organization/Institution/Association:
2. About the organization [write in 50 words] :
3. Address of the Organization/Institution/Association:
4. Address of Premises at which Roof Top Solar PV System is to be installed
5. Type of Organization/ Institution/Association:
(Societies Registration Act 1860/Indian Trust Act 1882)
6. Registration No:
7. Latest copy of the Audit Report/ Renewal Certificate/ IT Acknowledgement enclosed:
(Yes/No)

8. Name and Designation of person authorized as “**Project in Charge**” on behalf of the Organization/Institution:
9. Email ID:
10. Mobile / Phone Number:
11. Rights of Roof (Must be Self Owned)

Part B - Electricity Connectivity

12. Name of Concerned Distribution Company (*WBSEDCL/CESC/DPL/India Power*):
13. Consumer ID no (Mentioned in the Electricity Bill):
14. Installation No (Mentioned in the Electricity Bill) :
15. Connectivity Voltage level (HT/LT) :
16. Contact Demand (Mentioned in the Electricity Bill):
17. Total electricity consumed (in kWh) over last 12 months (as per electricity bills):

Part C- Installation Location Detail and proposed capacity of GRTSPV System

18. Address of Premises at which Roof Top Solar PV System is to be installed:
19. Rights of the proposed Roof (Must be Self Owned)
20. Latitude and Longitudes of the proposed installation location:
21. Total shadow-free rooftop area considered for installation of GRTSPV system (**in sq. mtr**):
22. Height of the rooftop proposed for installation of GRTSPV System:
23. Proposed Capacity of the GRTSPV system (in kW) :

Part D - Vendor Details

24. Name of the vendor selected from empanelled vendor:
25. Date of Agreement between Customer and Empanelled Contractor

Part E - Document enclosed

- a) Copy of Electricity Bill.
- b) Copy of the Proof of type of organization.

- c) Latest copy of the Audit Report/ Renewal Certificate/ IT Acknowledgement
- d) Copy of the Agreement between Customer and Empanelled Vendor
- e) Drawing of proposed roof identifying the proposed location of GRTSPV System.
- f) Photograph of Proposed Building
- g) Photograph of Proposed Roof
- h) Photograph of Beneficiary (Who have signed the Agreement and Application)
- i) Geo-tagged photograph of the proposed roof

Declaration:

I/we, hereby, declare that the information furnished above is true to the best of my/our knowledge.

Date:

Place:

**Signature with full
name**

**With official Seal
Mentioning Designation**

Proforma

AGREEMENT BETWEEN Vendor AND ELIGIBLE CUSTOMER

(To be executed on Non-Judicial Stamp Paper of Rs. 100/- Duly Notarized)

This Agreement is entered into on _____ (date), at _____ (Location) BY and BETWEEN a company _____ (Name of the Contractor) having its registered office _____ (hereinafter referred to as the "Contractor" which expression shall where the context so admits be deemed to include its executors, administrators, representatives and permitted assigns) of the ONE PART; AND _____ (Eligible Customer) (hereinafter referred to as the "CUSTOMER" which expression shall where the context so admits be deemed to include its heirs, executors, administrators, representatives and permitted assigns) legal owner of the premises _____ (address of the Eligible Consumer where the Grid Connected Roof Top Solar PV (GRTSPV) system is intended to be installed; hereinafter referred to as the "Site"), of the OTHER PART; The expressions "CONTRACTOR" and "CUSTOMER ", wherever the context so permits or requires shall collectively be referred to as "Parties" and individually as the "Party".

The purpose of this Agreement includes the design, engineering, supply, civil work, erection, testing and commissioning including warranty along with maintenance for 5 years for a _____ kWp Grid-Connected Rooftop Solar PV system (hereinafter referred to as the "GRTSPV System").

This agreement has been done resting on the Allotment letter issued by WBREDA in favour of the Contractor vide memo WBREDA/34(2017)/..... Dated :05-03-19

The Agreement will enter into effect from the date of its execution (the "Effective Date") for all contractual obligations under this Agreement.

1. OBLIGATIONS OF THE CONTRACTOR

- a) The design, engineering, supply, civil work, erection, testing and commissioning including warranty along with maintenance for 5 years of the GRTSPV system shall be in accordance with the provisions of the **NieT No: WBREDA /NieT-08 /18-19 DTD: 27-11-2018** (hereinafter referred to as "Tender") of the West Bengal Renewable Energy Development Agency (hereinafter referred to as "**WBREDA**"). The Contractor shall carry out the specified scope of work in adherence to the timelines prescribed in the RFP.

- b) The Contractor will further provide training to at least three (3) person delegated by the Customer and hand over the following documents to the Customer upon successful commissioning of the GRTSPV system:
- i) Technical Manual for all components / equipment of the GRTSPV system
 - ii) Engineering Drawings of the project.
 - iii) Operation & Maintenance Manual (the “O&M Manual”)
 - iv) Warranty documents for the PV modules, inverter(s), as well as other components / equipment of the GRTSPV system for which manufacturer’s warranties are available, in the name of the Customer.
 - v) Copy of clearances
 - vi) Login id and password to the software for remote monitoring of the installed GRTSPV project
 - vii) Copy of test certificates
 - viii) Listed of delegated persons and their contact no. for performing the maintenance activities for the installed GRPV project
- c) All the work guided by the **NIeT No: WBREDA /NIeT-08 /18-19 DTD: 27-11-2018 of WBREDA**

2. OBLIGATIONS OF THE CUSTOMER

- a) The Customer shall ensure the accuracy of all information and/or data to be supplied by the Customer and shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, for preparation and maintenance of proper access roads to, and provide the right of way for, the Site, and for providing possession of and access to all other areas reasonably required for the proper execution of the Agreement, including all requisite rights of way, on or before the Effective Date.
- b) The Customer shall provide access to the Site at all times to the delegated persons of Contractor, for a duration of five (5) years from the date of successful commissioning of the GRTSPV system.

In consideration of the completion of the scope of work of the Contractor in accordance with the provisions of the “Tender”, the Customer shall pay to the Contractor the Price as agreed below:

GRPV system capacity (kW)	Total price (In Rs)
.....kW	.Rs.....
Total Price	(Rupees in Words)

The Price shall remain fixed and will not be subject to revision during the Agreement duration subject to the conditions mentioned within this Agreement.

IN WITNESS WHEREOF the authorized signatories of the Parties hereto have signed this Agreement on the day, month and year first above written:

FOR AND ON BEHALF OF
<Name of Contractor>

FOR AND ON BEHALF OF
<Name of Eligible Customer>

M/s

.....

.....

.....

AUTHORIZED SIGNATORY

AUTHORIZED SIGNATORY

NAME:

NAME:

DESIGNATION:

DESIGNATION:

WITNESS NAME:

WITNESS NAME:

.....

.....

(signature)

(signature)

PROJECT COMPLETION REPORT

Part A- General Details

1. Full Name of the Organization/Institution/Association:
2. Address of the Organization/Institution/Association:
3. Address of Premises at which Roof Top Solar PV System has been installed
4. Type of Organization/ Institution/Association:
(Societies Registration Act 1860/Indian Trust Act 1882)
5. Registration No:
6. PAN / TAN No.
7. Name and Designation of person authorized as “**Project in Charge**” on behalf of the Organization/Institution:
8. Email ID(s):
9. Mobile / Phone Number (s):
10. Rights of Roof (Must be Self Owned)

Part B - Electricity Connectivity

11. Name of Concerned Distribution Company (*WBSEDCL/CESC/DPL/India Power/other*):
12. Consumer ID no (Mentioned in the Electricity Bill):
13. Installation No (Mentioned in the Electricity Bill) :
14. Connectivity Voltage level (HT/LT) :
15. Contact Demand (Mentioned in the Electricity Bill):
16. Total electricity consumed (in kWh) over last 12 months (as per electricity bills):

Part C- Installation Location Detail and capacity of GRTSPV System

17. Address of Premises at which Roof Top Solar PV System has been installed:
18. Rights of the Roof (Must be Self Owned)

19. Latitude and Longitudes of the Installation Location:

20. Height of the rooftop where the GRTSPV System installed:

Part D - Vendor Details

21. Name of the Enlisted Vendor Installed the GRTSPV System:

Part E- Technical Detail:

22. Aggregate Capacity of PV module (kWp):

23. Aggregate capacity of Inverter (kVA):

24. Specifications of the Components and Bill of Material/ Quantities

S. No.	Components	Specification	Quantity	Make
1.	Solar PV Module			
2.	Grid Tied inverter (Type and capacity)			
3.	Module mounting structure			
4.	Array junction box			
5.	AC distribution box			
6.	Cables			
7.	Earthing kit			
8.	Meters			
9.	Online monitoring system			
10.	Any other component			
11.	Transformer			

Part F - Document enclosed

- a) Joint Inspection report/Commissioning certificate (PCR)
- b) Photograph of Customer (Who have signed the Agreement and Application)
- c) Site photograph before and after installation with customer

- d) Photograph of Building
- e) Geo-tagged site photograph before and after installation
- f) Copy of Electricity Bill.
- g) Copy of the Agreement between Customer and Empanelled Vendor.

Declaration:

I/we, hereby, declare that the information furnished above is true to the best of my/our knowledge.

Date:

Place:

Signature with full name

**With official Seal
Mentioning Designation**

[Complete Project document must be submitted in hard copy and soft copy of the same]

**COMMISSIONING REPORT (PROVISIONAL) FOR GRID CONNECTED
SOLARPHOTOVOLATIC POWER PLANT (with Net-metering facility)**

Certified that a Grid Connected SPV Power Plant of _____ kWp capacity has been installed at the site (Name and Address) district _____ of WEST BENGAL which has been installed by M/S _____ . On (date) . The system is as per BIS/ MNRE specifications. The system has been checked for its performance on (Date of Inspection of installation & commissioning) with/without installation of bi-directional meter and it is working satisfactorily. The system is suitable for installation of bi-directional energy meter.

Signature of the beneficiary

Signature of the rep. Of supplier
With name, seal and date

Signature of PO/APO
With name, seal and date