

GOVERNMENT OF UT OF JAMMU AND KASHMIR

Jammu & Kashmir Energy Development Agency (JAKEDA)

invites

EXPRESSION OF INTEREST (EOI)

FOR

EMPANELMENT OF FIRMS / VENDORS

for

**Design, Supply, Erection, Testing and Commissioning including
Warranty, Comprehensive Operation & Maintenance of Grid
Connected Rooftop Solar Plants of various capacities (1-10 kW) under
the Phase-II of Grid Connected Rooftop Solar Scheme of MNRE
(Cumulative cap. 200MW) in Jammu City of UT of Jammu & Kashmir
under Jammu Solar City Mission**

EoI NO: ST/EDA/RTSPV/200MW/51/5744

Dated. 17/04/2023



Issued by

Chief Executive Officer (CEO)

**JAMMU AND KASHMIR ENERGY DEVELOPMENT AGENCY (JAKEDA)
(SCIENCE AND TECHNOLOGY DEPARTMENT)**

38-A/B GANDHI NAGAR JAMMU- 180004 /

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EXPRESSION OF INTEREST (EoI)

Jammu and Kashmir Energy Development Agency (*hereinafter called "JAKEDA"*), invites sealed EoI from eligible firms/vendors for Solar Photovoltaics as per MNRE, GoI, Policy and Guidelines for Phase-II of Grid Connected Rooftop Solar PV Power Plants Scheme for Site Survey, Design, Supply, Erecting, Testing and Commissioning including Warranty, Comprehensive Maintenance Contract (CMC) for Five (05) years of 200 MW Cumulative Capacity of Grid Tied Rooftop Solar Photovoltaic Power Plants in the capacity range of 1 to 10 kWp, in the city of Jammu in UT of Jammu and Kashmir (*hereinafter called the Bidder*) under Jammu Solar City Mission on MNRE Benchmark Rates.

For implementation of the above mentioned work, the interested vendors/firms should submit their acceptance of MNRE Benchmark Rates and Terms and Conditions as per the standard bidding document (SBD) of MNRE (reproduced below) along with non-refundable processing fee and Performance Bank Guarantee, complete in all respect, as per the EoI information sheet, to JAKEDA, by the due date as specified herein. EoI proposals received without the prescribed processing fee will be rejected. In the event of any date indicated above being a Holiday, the next working day shall become operative. EoI document which includes Eligibility criteria, Technical Specifications, various conditions of contract, formats, etc. could be downloaded from JAKEDA's official website www.jakeda.in.

Any amendment(s)/corrigendum/clarifications with respect to this EoI shall be uploaded on www.jakeda.jk.in website only.

DETAILS OF EXPRESSION OF INTEREST

Dated- 17/04/2023

S. No.	Scope of Work	Place of installation	Proposed Cumulative Capacity
1	Site Survey, Design, Supply, Erection, Testing and Commissioning including Warranty, Comprehensive Maintenance Contract (CMC) for Five (05) years of Grid Connected Rooftop Solar Photovoltaic Power Plants in the capacity Range of 1 to 10 kWp as per technical specifications of MNRE, GoI.	Jammu City	200 MW to be achieved within two years period.

Allocation of the capacity may change, if MNRE changes the allocation.

- Note : 1. This EoI is being floated with some minor changes in continuation to the tender earlier floated by the Agency vide e-tender No: ST/EDA/GCRT-Phase II/20MW/12/2021/1193 dated 03-01-2022, as such all the other terms & conditions which have not been mentioned in this EoI, shall be applicable in terms of the e-tender, dated 03-01-2022.**
- 2. The vendors would be empanelled within three days after submission of requisite documents as per the EoI.**

Details of Expression of Interest

EoI No.	ST/EDA/RTSPV/200MW/51/5744
Broad Scope	The project cost of a Grid Connected Rooftop PV System will include the hardware i.e. PV modules, inverters, meters, support structures, charge controllers, cables and battery bank (optional) and other balance of system (BOS). It will also include the cost of transportation to the site of installation, and would be inclusive of all applicable taxes.
Last date & Time for submission of EoI	14/5/2023 ,17:00 Hrs <i>(In case response would be low, JAKEDA at its discretion may extend date for empanelment)</i>
EoI processing fee (Rs.) (Non-refundable)	Rs.20,000/- (Rupees Twenty thousand only) through Demand Draft in favor of CEO, JAKEDA payable at Jammu/Srinagar.
Max. allowable project cost	The maximum allowable project cost in the EoI will be as per prevailing MNRE Benchmark Price. If Bidder fails to agree on that project cost, the EoI processing fee shall be forfeited.
Address for communication and Venue for EoI opening	Chief Executive Officer JAMMU AND KASHMIR ENERGY DEVELOPMENT AGENCY 38 A/B, Gandhi Nagar, Jammu Phone No: - 0191-2456492 (J), 0194-2490269(S) Email: ceojakeda2@gmail.com

It is compulsory to pay EoI document fee through DD in favour of CEO JAKEDA payable at Jammu/Srinagar. Eligible Bidders can submit the hard copy of the EoI in the Office of CEO JAKEDA, 38A/B, Gandhi Nagar, Jammu or Tawanai Ghar, SDA Colony, Bemina, Srinagar.

Forwarding Letter

(to be submitted in the letter head of the Bidder)

Chief Executive Officer
JAMMU AND KASHMIR ENERGY DEVELOPMENT AGENCY
38A/B Gandhi Nagar, JAMMU, J&K-180004

Subject:- Submission of EoI for Empanelment for Site Survey, Design, Supply, Erection and Commissioning including Warranty, Comprehensive Maintenance Contract (CMC) for Five (05) years of Grid Connected Rooftop Solar Photovoltaic Power Plants

Ref: EoI NO: ST/EDA/RTSPV/200MW/51/2023/5744

Dated. /2023

Sir,

Having studied the EoI carefully I/we, the undersigned, offer to submit our EoI for Site Survey, Design, Supply, Erection, Testing and Commissioning including Warranty, Comprehensive Maintenance Contract (CMC) for Five (05) years of Grid Connected Rooftop Solar Photovoltaic Power Plants in the capacity Range of 1 to 10 kWp as per technical specifications of MNRE, GoI.

We have read the provisions regarding Design, Supply, Installation and Commissioning including Warranty, Comprehensive Maintenance Contract (CMC) for Five (05) years of Solar Photovoltaic Power Plants I/We have also read the various provisions of the EoI and confirm that the same are acceptable to us. We further declare that any additional conditions, variations, deviations, if any, found in our EoI offer shall not be given effect. We further understand that any deficiency / illegibility in documents shall make our EoI liable for rejection.

I/we submit our EoI, understanding fully well that :-

- (a) The EoI and other documents submitted along with the same will be subject to verification by appropriate authorities.
- (b) JAKEDA reserves the right to accept or reject any application or the EoI process itself without assigning any reasons thereof and shall not be held liable for any such action.
- (c) All acts, rules, regulations, norms and conditions of Govt. of India and Govt. of Jammu and Kashmir shall be applicable during the process of EoI. We hereby declare that all the information and statements made in this proposal are complete, true and correct and also accept that any misinterpretation contained in it may lead to our disqualification.

We hereby declare that our EoI is made in good faith and the information contained is true and correct to the best of our knowledge and belief.

Yours faithfully,

Signature of Firm/Vendor authorized representative

INTRODUCTION, EoI DETAILS & INSTRUCTIONS TO THE BIDDERS

INTRODUCTION :-

- MNRE has launched a scheme for promotion of Grid Connected Rooftop Solar PV projects and JAKEDA is the implementing agency for this scheme in the UT of Jammu and Kashmir. The generated solar power may be utilized for captive application and the surplus power, if any, may be fed to the grid on Net Metering basis. The scheme aims to reduce the consumption of fossil fuel based electricity and make buildings self-sustainable from the point of energy consumption, to the extent possible.
- This scheme with aggregate capacity of 200 MW in Jammu City of UT of J&K envisages installation of grid-connected rooftop solar PV projects on the roofs/premises of domestic consumers of JPDCL in Jammu City of UT of J&K.

Category	Coverage of Buildings
Residential	All types of residential buildings in Jammu City

- The interested firms/vendors who full fill the formalities as specified in the EoI,, shall be empanelled with JAKEDA. The tenure of empanelment shall be till 31-03-2024 or as per timelines approved by MNRE.

INSTRUCTIONS TO BIDDERS:-

Intending Bidders are requested to carefully study the instructions contained hereunder before preparing their EoI documents for submission.

- a) All terms and conditions, technical specifications, guidelines etc. as stipulated in the Standard Bidding Document – 2021, issued by MNRE for empanelment of vendors for the scope of work mentioned herein, shall apply mutatis mutandis.
- b) An Bidder shall submit a single offer-EoI only.
- c) EoI document fees (It is compulsory to pay EoI document fee through DD in favour of CEO JAKEDA, payable at Jammu/Srinagar.
- d) EoIs must be submitted in English language only.
- e) Incomplete, telegraphic or conditional EoIs shall not be accepted.

- f) MNRE, GoI benchmark 2021- cost per kWp is applicable and in case same are revised the decision would be taken accordingly in consultation with the MNRE.
- g) **It may be noted that JAKEDA will not assign any work to the empanelled firms/vendors; either the work will be automatically generated or the firms/vendors will have to generate the work in market mode.**
- h) The Bidders must sign at the bottom of each page of the EoI documents at the time of submission in token of unconditional acceptance of the rates, terms and conditions and technical specifications etc.

APPLICABLE RATES FOR EXECUTION OF THE PROJECT:

Category	Size of Solar PV Plants*	MNRE Benchmark Rates for UT of J&K**	
		Excluding GST	Including GST 13.8%
Category-A	Up to 1 KW	₹ 51,616.00	₹ 58,739.00
Category-B	>1 kW to 2 kW	₹ 47,447.00	₹ 53,995.00
Category-C	>2kW up to 3 kW	₹ 46,216.00	₹ 52,594.00
Category-D	>3 kW up to 10 kW	₹ 45,087.00	₹ 51,309.00

*The project capacity shall be considered as Inverter capacity or the SPV module array capacity, whichever is lower, for the purpose of determining CFA.

**In case the Ministry increases or decreases the Benchmark Prices during the course of implementation of the project, the same shall be applicable to the remaining capacity of the project, however, JAKEDA will take this decision with the consent of the MNRE.

The Subsidy structure applicable is as Tabulated below (As per MNRE Guidelines or as applicable at the time of commissioning of the project):

Type of Residential Sector	Central Financial Assistance (CFA) (as percentage of benchmark cost)	UT of J&K Subsidy (as percentage of benchmark cost)
Residential sector (maximum up to 3 kWp capacity)	40 %	25%
Residential sector (above 3 kW capacity and up to 10 kW capacity)	40 % up to 3 kWp Plus 20% for RTS system above 3 kWp and up to 10 kWp	25%

Note: Central Financial Assistance (CFA) disbursement will be governed as per MNRE Office Memorandum No.318/331/2017-GCRT Dated 3rd September, 2019 on “Clarification on applicability of CFA individual residential households for installation of rooftop solar system under Phase-II of Grid-connected Rooftop Solar Programme”.

Rate (in Rs) for Rooftop Solar Power Plants under "Jammu Solar City Mission"					
Project Capacity	Project cost	J&K UT Subsidy	MNRE Subsidy	Beneficiary Share	Net Subsidy %
1 kW	58739	14685	23496	20558	65
2 kW	107990	26998	43196	37796	65
3 kW	157781	39445	63112	55224	65
4 kW	205236	51309	71833	82094	60
5 kW	256545	64136	82094	110315	57
6 kW	307854	76964	92356	138534	55
7 kW	359163	89791	102618	166754	53.6
8 kW	410472	102618	112880	194974	52.5
9 kW	461781	115445	123142	223194	51.7
10 kW	513090	128273	133403	251414	51

General Conditions of Eligibility for all Bidders :

To meet the General Conditions of Eligibility Criteria, Bidders must have one of the following credentials:

The Bidder should be either a body incorporated in India under the Companies Act, 1956 or 2013 including any amendment thereto.

Or

The Bidders should be a **Limited Liability Partnership firm or Partnership firm.**

Or

The Bidders should be a **Proprietor firm.**

The Bidder should have valid PAN & GST registration certificate for General Bidder, and for MSMEs, UT GST Registration is mandatory.

ELIGIBILITY CRITERIA:

(i) Bidder should have experience of design, supply, installation & commissioning of Grid connected Rooftop Solar Power Projects through Government Organisations/ Government Agencies/ SNAs/ PSUs of state or central Government or under MNRE sponsored programmes which should have been commissioned prior to the submission of EoI, Vendor must have to submit scanned copy of the Commissioning certificate and Work order/ Contract/ Agreement/ from the Client/ Owner/ department.

In respect Local New Entrepreneurs not having the requisite experience in installation of Solar Power Plants, it should have atleast one of the Director/team Leader from engineering background ie. either Diploma/BE/B.Tech & having first hand experience in execution of Solar related projects. A detailed resume with relevant certificates should be submitted alongwith EoI.

(ii) In case of firms located outside J&K, the bidder has to Submit Performance Guarantee of Rs 2.5 lakh initially for a period of five and half years to get empanelled with JAKEDA for execution of 200 MW RTSPV in Jammu City. The tentative allocated capacity shall be 100kW in the first phase. For subsequent allocations the firm shall submit fresh PBG @5% of the cost of new allocated capacity calculated at average cost of 1-3kW capacities.

(iii) In case of firms (MSMEs/ Startups/ System integrators) located within the UT of J&K, the bidder has to Submit Performance Guarantee of Rs 2.5 lakh initially for a period of five and half years to get empanelled with JAKEDA for execution of 200 MW RTSPV in Jammu City. The tentative allocated capacity shall be 100kW in the first phase. For subsequent allocations the firm shall submit fresh PBG @5% of the cost of new allocated capacity calculated at average cost of 1-3kW capacities.

PERFORMANCE BANK GUARANTEE (PBG)

The bidder has to submit the PBG in the following manner:

Performance Bank Guarantee for Installation and Commissioning (I&C):

The bidder shall furnish the performance bank guarantee for installation and commissioning based on the following calculations:

PBG amount for I&C = INR 5% of the total cost of allocated capacity (@ Average cost of 1-3 KW)

The initial PBG shall be submitted along with the documents to be submitted for empanelment which shall not be released till its expiry and accordingly LoI/ LoA/Work Order, shall be issued by JAKEDA. Subsequently after completing installation as per first LoI, the PBGs are to be submitted for allotment of further work in the same ratio for outside/ within UT vendor. The Performance Bank Guarantee shall be released after completion of the O&M period with the compliance of entire obligations in the contract.

Performance Bank Guarantee for Operation and Maintenance:

The Performance Bank Guarantee shall be released after completion of the O&M period with the compliance of entire obligations in the contract. In case the Bidder does not provide O&M, the PBG will be en-cashed by JAKEDA.

The Performance Bank Guarantee shall be denominated in Indian Rupees and shall be in the format as per Annexure of this document..

The PBG shall be forfeited as follows without prejudice to the Bidder being liable for any further consequential loss or damage incurred to the Plant.

- i. If the Empanelled Vendor is not able to commission the projects to the satisfaction of JAKEDA, PBG (for I&C period) amount on pro-rata basis by the empanelled vendor shall be 100% encashed.
- ii. In all the above cases corresponding unidentified/non-commissioned capacity shall stand cancelled.
- iii. If the empanelled vendor is unable to submit the PBG no work shall be allotted and shall not be empanelled.

PAYMENT CLAUSES:

The following payment schedule shall be adhered to :-

- a) Payment to the extent of Beneficiary share of the project cost shall be released on the supply of equipment at the site, subject to the condition that the material has been inspected by JAKEDA authorized personnel.
- b) Payment to the extent of UT component 25% if available shall also be released after delivery of material at site.
- c) Payment to the extent of MNRE component shall be released after installation of the RTSPV system and its successful Commissioning & functioning for a minimum period of 15 days after installation/enabling of Net Meter and submission of requisite documents for uploading on the Portal.

COMPLETE SCOPE OF THE WORK:-

The Bidder should act for providing an End-to-End solution for their identified locations including but not limited to Site survey, design, supply of the required Solar Photovoltaic power plant, with all accessories, grid tied inverter (Hybrid in case of battery backup), Batteries (optional), a bidirectional meter, peripherals like cables, junction boxes, earthing, etc. and applicable warranty etc. and its installation and successful commissioning. The Bidders have to ensure planning and smooth execution of the project as per the time schedule provided in the work order. If the work is not satisfactory as per the MNRE guidelines, the payments, under such circumstances to the vendor, will not be released. The bidder has following responsibilities:

- a) Providing the Net-meter and facilitating its installation through JPDCL as per the guidelines of JERC. In case of installation of Smart meter by the JPDCL, the vendor has to facilitate the consumer in enabling activation of bi-directional feature of the Smart meter.
- b) Supply of complete system (BOQ) as per technical specifications given by MNRE, GoI specifications / appropriate IS standards.
- c) It is responsibility of the empanelled Firm/vendor to submit the data in designated portal software of MNRE/JAKEDA as well as submit the hard copies of proposal for obtaining the CFA/UT subsidy in prescribed format to JAKEDA.
- d) Installation of the supplied systems and commissioning of the same as per the prevailing electrical norms on the rooftops or ground within the premises of the beneficiaries. The date of commencement of CMC shall be reckoned from the date of commissioning of the system.
- e) The beneficiary shall be made aware about the use of system. Instruction and safety manual of RTS system, in English or Hindi languages should be provided to each beneficiary.
- f) The successful Bidder shall after completion and commissioning of the systems submit all details in the formats supplied by JAKEDA from time to time.
- g) Providing all necessary protection devices to protect the power plant from lightening, sudden surges in voltage and current and to ensure safety of the grid to which the plant is connected to ensure protection of life and property likely to be endangered due to the installed solar power plant.
- h) Bidder shall adhere to safety standards, reliability, operability & maintainability aspects, metering arrangement as per the standards, norms and regulations specified/notified by JERC for UT of J&K.

OTHER COMPLIANCES:-

The Bidder will provide necessary drawings to JAKEDA to ensure among other things that :-

- a) While installing solar power plants on rooftops the physical condition of the roof should be taken in to consideration.
- b) There should not be any damage what so ever to the roof top due to installation of the solar power plant so that on a later day there is leakage of rain water, etc. from the rooftop.
- c) In case small damages are inevitable for erecting the footings for the module mounting structure etc. the roof top may be given a suitable grading plaster with suitable leak proof compound so as to render the roof entirely leak proof.
- d) If the rooftop does not have any access such as stairs or Ladder, a proper and safe ladder must be provided to ensure easy access to the roof top mainly for the purpose of maintenance and inspection.
- e) While cabling the array care must be taken such that no loose cables lie on the rooftops. The roof top should look clean and tidy after installation of the array. Inverter shall be fixed in a prominent place.

TECHNICAL SPECIFICATIONS

The proposed projects shall be commissioned as per the technical specifications given below. Any shortcomings will lead to cancelation of work order in full or part as decided by CEO, JAKEDA. Domestic Modules are to be used failing which it will be assumed that system is not matching the requirement of the scheme and Bidder's PBG shall be forfeited. Competent Authority's decision will be final and binding on the Bidder.

1. DEFINITION

A Roof Top Solar (RTS) Photo Voltaic (PV) system shall consist of following equipment/components:

1. Solar Photo Voltaic (SPV) modules consisting of required number of Crystalline PV modules
2. Inverter/PCU
3. Module Mounting structures
4. Energy Meter
5. Array Junction Boxes
6. DC Distribution Box
7. AC Distribution Box
8. Protections – Earthing, Lightning, Surge

9. Cables
10. Drawing & Manuals
11. Miscellaneous

1. Solar PV modules

- 1.1. The PV modules and Solar Cell used should be made in India.
- 1.2. The PV modules used must qualify to the latest edition of IEC standards or equivalent BIS standards, i.e. IEC 61215/IS14286, IEC 61853-Part I/IS 16170-Part I, IEC 61730 Part-1 &Part 2 and IEC 62804 (PID). For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701/IS 61701.
- 1.3. The rated power of solar PV module shall have maximum tolerance up to +3%.
- 1.4. The peak-power point current of any supplied module string (series connected modules) shall not vary by +1% from the respective arithmetic means for all modules and/or for all module strings (connected to the same MPPT), as the case may be.
- 1.5. The peak-power point voltage of any supplied module string (series connected modules) shall not vary by + 2% from the respective arithmetic means for all modules and/or for all module strings (connected to the same MPPT), as the case may be.
- 1.6. The temperature co-efficient power of the PV module shall be equal to or better than -0.45%/°C.
- 1.7. Solar PV modules of minimum capacity 250 Wp to be used.
- 1.8. The PV Module efficiency should be minimum 16%.
- 1.9. Solar PV modules of minimum fill factor 75%, to be used.
- 1.10. All electrical parameters at STC shall have to be provided
- 1.11. The PV modules shall be equipped with IP 65 or better protection level junction box with required numbers of bypass diodes of appropriate rating and appropriately sized output power cable of symmetric length with MC4 or equivalent solar connectors. The IP level for protection may be chosen based on following conditions:
 - i. An IP 65 rated enclosure is suitable for most outdoor enclosures that won't encounter extreme weather such as flooding.
 - ii. An IP 67 rated enclosure is suitable at locations which may encounter temporary submersion at depths of up to one meter.
 - iii. An IP 68 enclosure is recommended if there may exist situations of submergence for extended periods of time and at substantial depths.
- 1.12. All PV modules should carry a performance warranty of >90% during the first 10 years, and >80% during the next 15 years. Further, module shall have performance warranty of >97% during the first year of installation—degradation of the module below 1 % per annum.

- 1.13. 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:
- 1.14. Defects and/or failures due to manufacturing.
- 1.15. Defects and/or failures due to quality of materials.
- 1.16. Nonconformity 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 Owners sole option.
- 1.17. PV modules must be tested and approved by one of the NABL accredited and BIS approved test centers.
- 1.18. Modules deployed must use a RF identification tag laminated inside the glass.

The following information must be mentioned in the RFID used on each module:

- i. Name of the manufacturer of the PV module
 - ii. Name of the manufacturer of Solar Cells.
 - iii. Month & year of the manufacture (separate for solar cells and modules)
 - iv. Country of origin (separately for solar cells and module)
 - v. I-V curve for the module Wattage, I_m , V_m and FF for the module
 - vi. Unique Serial No and Model No of the module
 - vii. Date and year of obtaining IEC PV module qualification certificate.
 - viii. Name of the test lab issuing IEC certificate.
 - ix. Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001.
 - x. Nominal wattage +3%.
 - xi. Brand Name, if applicable.
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- 1.19. Other details as per IS/IEC 61730-1 clause 11 should be provided at appropriate place. In addition to the above, the following information should also be provided:
 - i. The actual Power Output P_{max} shall be mentioned on the label pasted on the back side of PV Module.
 - ii. The Maximum system voltage for which the module is suitable to be provided on the back sheet of the module.
 - iii. Polarity of terminals or leads (colour coding is permissible) on junction Box housing near cable entry or cable and connector.
 - 1.20. Unique Serial No, Model No, Name of Manufacturer, Manufacturing year, Make in India logo and module wattage details should be displayed inside the laminated glass.

2. Inverter/PCU

- 2.1. Inverters/PCU should comply with applicable IEC/equivalent BIS standard for efficiency measurements and environmental tests as per standard codes IEC 61683/IS 61683, IS 16221 (Part 2), IS 16169 and IEC 60068-2(1,2,14,30)/Equivalent BIS Std.
- 2.2. Maximum Power Point Tracker (MPPT) shall be integrated in the inverter/PCU to maximize energy drawn from the array. Charge controller (if any) / MPPT units environmental testing should qualify IEC 60068-2(1, 2, 14, 30)/Equivalent BIS standard. The junction boxes/enclosures should be IP 65 or better (for outdoor)/ IP 54 or better (indoor) and as per IEC 529 Specifications.
- 2.3. All inverters/PCUs shall be IEC 61000 compliant for electromagnetic compatibility, harmonics, Surge, etc.
- 2.4. The PCU/ inverter shall have overloading capacity of minimum 10%.
- 2.5. Typical technical features of the inverter shall be as follows-
 - i. Switching devices: IGBT/MOSFET
 - ii. Control: Microprocessor/DSP
 - iii. Nominal AC output voltage and frequency: as per CEA/State regulations
 - iv. Output frequency: 50 Hz
 - v. Grid Frequency Synchronization range: as per CEA/State Regulations
 - vi. Ambient temperature considered: -20°C to 60°C
 - vii. Humidity: 95 % Non-condensing
 - viii. Protection of Enclosure: IP-54 (Minimum) for indoor and IP-65(Minimum) for outdoor.
 - ix. Grid Frequency Tolerance range: as per CEA/State regulations
 - x. Grid Voltage tolerance: as per CEA/State Regulations
 - xi. No-load losses: Less than 1% of rated power
 - xii. Inverter efficiency (Min.): >93% (In case of 10 kW or above within-built galvanic isolation)>97% (In case of 10 kW or above without inbuilt galvanic isolation)
 - xiii. Inverter efficiency (minimum): > 90% (In case of less than 10 kW)
 - xiv. THD: < 3%
 - xv. PF: > 0.9 (lag or lead)
 - xvi. Should not inject DC power more than 0.5% of full rated output at the interconnection point and comply to IEEE 519.
- 2.6. The output power factor of inverter should be suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustain fault in feeder line and against the lightning on feeder.
- 2.7. All the Inverters should contain the following clear and indelible Marking Label & Warning Label as per IS16221 Part II, clause 5. The equipment shall, as a minimum, be permanently marked with:
 - i. The name or trademark of the manufacturer or supplier;
 - ii. A model number, name or other means to identify the equipment,
 - iii. A serial number, code or other marking allowing identification of manufacturing location and the manufacturing batch or date within a three-month time period.

- iv. Input voltage, type of voltage (a.c. or d.c.), frequency, and maximum continuous current for each input.
 - v. Output voltage, type of voltage (a.c. or d.c.), frequency, maximum continuous current, and for a.c. outputs, either the power or power factor for each output.
 - vi. The Ingress Protection (IP) rating
- 2.8. Marking shall be located adjacent to each fuse or fuse holder, or on the fuse holder, or in another location provided that it is obvious to which fuse the marking applies, giving the fuse current rating and voltage rating for fuses that may be changed at the installed site.
- 2.9. In case the consumer is having a 3- ϕ connection, 1- ϕ /3- ϕ inverter shall be provided by the vendor as per the consumer's requirement and regulations of the State.
- 2.10. Inverter/PCU shall be capable of complete automatic operation including wake-up, synchronization & shutdown.
- 2.11. The Inverter should have a provision of remote monitoring of inverter data through sim card. Required website/mobile app platform, where the user (Consumer) can access the data, should be provided/explained to consumer while installation. Additionally, if inverter has the facility of in-built wi-fi module, that should also be explained to the consumer. On demand, Inverter should also have provision to feed the data to the remote monitoring server using relevant API/ protocols. All the inverter data should be available for monitoring by giving web access.
- 2.12. For CFA calculation, minimum of following two shall be considered:
- i. Solar PV array capacity in KWp
 - ii. Inverter Capacity in KW
- 2.13. Integration of PV Power with Grid & Grid Islanding:
- i. The output power from SPV would be fed to the inverters/PCU which converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization.
 - ii. In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as "islands." Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided, if not available in inverter.
 - iii. MCB/MCCB or a manual isolation switch, besides automatic disconnection to grid, would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel.

3. Module Mounting Structure (MMS):

- 3.1. Supply, installation, erection and acceptance of module mounting structure (MMS) with all necessary accessories, auxiliaries and spare part shall be in the scope of the work.
- 3.2. Module mounting structures can be made from three types of materials. They are Hot Dip Galvanized Iron, Aluminium and Hot Dip Galvanized Mild Steel (MS). However, MS will be preferred for raised structure.
- 3.3. MMS Steel shall be as per latest IS 2062:2011 and galvanization of the mounting structure shall be in compliance of latest IS 4759. MMS Aluminium shall be as per AA6063 T6. For Aluminium structures, necessary protection towards rusting need to be provided either by coating or anodization.
- 3.4. All bolts, nuts, fasteners shall be of stainless steel of grade SS 304 or hot dip galvanized, panel mounting clamps shall be of aluminium and must sustain the adverse climatic conditions. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts.
- 3.5. The module mounting structures should have angle of inclination as per the site conditions to take maximum insolation and complete shadow-free operation during generation hours. However, to accommodate more capacity the angle of inclination may be reduced until the plant meets the specified performance ratio requirements.
- 3.6. The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed. The PV array structure design shall be appropriate with a factor of safety of minimum 1.5.
- 3.7. The upper edge of the module must be covered with wind shield so as to avoid build air ingress below the module. Slight clearance must be provided on both edges (upper & lower) to allow air for cooling.
- 3.8. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed. The Empanelled Agency shall be fully responsible for any damages to SPV System caused due to high wind velocity within guarantee period as per technical specification.
- 3.9. The structures shall be designed to allow easy replacement, repairing and cleaning of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels. Necessary testing provision for MMS to be made available at site.
- 3.10. Adequate spacing shall be provided between two panel frames and rows of panels to facilitate personnel protection, ease of installation, replacement, cleaning of panels and electrical maintenance.
- 3.11. The structure shall be designed to withstand operating environmental conditions for a period of minimum 25 years.
- 3.12. The Rooftop Structures maybe classified in three broad categories as follows:

i. Ballast structure

- a. The mounting structure must be Non-invasive ballast type and any sort of penetration of roof to be avoided.
- b. The minimum clearance of the structure from the roof level should be in between 70-150 mm to allow ventilation for cooling, also ease of cleaning and maintenance of panels as well as cleaning of terrace.
- c. The structures should be suitably loaded with reinforced concrete blocks of appropriate weight made out of M25 concrete mixture.

ii. Tin shed

- a. The structure design should be as per the slope of the tin shed.
- b. The inclination angle of structure can be done in two ways-
 - b.1. Parallel to the tin shed (flat keeping zero-degree tiling angle), if the slope of shed in Proper south direction
 - b.2. With same tilt angle based on the slope of tin shed to get the maximum output.
- c. The minimum clearance of the lowest point from the tin shade should be more than 100mm.
- d. The base of structure should be connected on the Purlin of tin shed with the proper riveting.
- e. All structure member should be of minimum 2 mm thickness.

iii. RCC Elevated structure: It can be divided into further three categories:

A. Minimum Ground clearance (300MM – 1000 MM)

- a. The structure shall be designed to allow easy replacement of any module and shall be in line with site requirement. The gap between module should be minimum 30MM.
- b. Base Plate – Base plate thickness of the Structure should be 5MM for this segment.
- c. Column – Structure Column should be minimum 2MM in Lip section / 3MM in C-Channel section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
- d. Rafter - Structure rafter should be minimum 2MM in Lip section / 3MM in C-Channel section. The minimum section should be 70MM in Web side (y-axis) and 40MM in flange side (x-axis).
- e. Purlin - Structure purlin should be minimum 2MM in Lip section. The minimum section should be 60MM in Web side and 40MM in flange side in Lip section.
- f. Front/back bracing – The section for bracing part should be minimum 2MM thickness.
- g. Connection – The structure connection should be bolted completely. Leg to rafter should be connected with minimum 12 diameter bolt. Rafter and purlin should be connected with minimum 10 diameter bolt. Module mounting fasteners should be SS-304 only and remaining fasteners either SS-304 or HDG 8.8 Grade.
- h. For single portrait structure the minimum ground clearance should be 500MM.

B. Medium Ground clearance (1000MM – 2000 MM)

- a. Base Plate – Base plate thickness of the Structure should be Minimum 6MM for this segment.
- b. Column – Structure Column should be minimum 2MM in Lip section / 3MM in C-Channel section. The minimum section should be 80MM in Web side and 50MM in flange side in Lip section.
- c. Rafter - Structure rafter should be minimum 2MM in Lip section / 3MM in C-Channel section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
- d. Purlin - Structure purlin should be minimum 2MM in Lip section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
- e. Front/back bracing – The section for bracing part should be minimum 2MM thickness.
- f. Connection – The structure connection should be bolted completely. Leg to rafter should be connected with minimum 12 diameter bolt. Rafter and purlin should be connected with minimum 10 diameter bolt. Module mounting fasteners should be SS-304 only and remaining fasteners either SS-304 or HDG 8.8 Grade.

C. Maximum Ground clearance (2000MM – 3000 MM)

- a. Base Plate – Base plate thickness of the Structure should be minimum 8 MM for this segment.
- b. Column – Structure Column thickness should be minimum 2.6MM in square hollow section (minimum 50x50) or rectangular hollow section (minimum 60x40) or 3MM in C-Channel section.
- c. Rafter - Structure rafter should be minimum 2MM in Lip section / 3MM in Channel section. The minimum section should be 80MM in Web side and 50MM in flange side in Lip section.
- d. Purlin - Structure purlin should be minimum 2MM in Lip section. The minimum section should be 80MM in Web side and 50MM in flange side in Lip section.
- e. Front/back bracing – The section for bracing part should be minimum 3MM thickness.
- f. Connection – The structure connection should be bolted completely. Leg to rafter should be connected with minimum 12 diameter bolt. Rafter and purlin should be connected with minimum 10 diameter bolt. Module mounting fasteners should be SS-304 only and remaining fasteners either SS-304 or HDG 8.8 Grade.

D. Super elevated structure (More than 3000 MM)

D.1. Base structure

- a. Base Plate – Base plate thickness of the Structure should be 10MM for this segment.
- b. Column – Structure Column minimum thickness should be minimum 2.9MM in square hollow section (minimum 60x60) or rectangular hollow section (minimum 80x40).

- c. Rafter - Structure Rafter minimum thickness should be minimum 2.9MM in square hollow section (minimum 60x60) or rectangular hollow section (minimum 80x40).
- d. Cross bracing – Bracing for the connection of rafter and column should be of minimum thickness of 4mm L-angle with the help of minimum bolt diameter of 10mm.

D.2. Upper structure of super elevated structure –

- a. Base Plate – Base plate thickness of the Structure should be minimum 5MM for this segment.
- b. Column – Structure Column should be minimum 2MM in Lip section / 3MM in Channel section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
- c. Rafter - Structure rafter should be minimum 2MM in Lip section / 3MM in Channel section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
- d. Purlin - Structure purlin should be minimum 2MM in Lip section. The minimum section should be 60MM in Web side and 40MM in flange side in Lip section.
- e. Front/back bracing – The section for bracing part should be minimum 2MM thickness.
- f. Connection – The structure connection should be bolted completely. Leg to rafter should be connected with minimum 12 diameter bolt. Rafter and purlin should be connected with minimum 10 diameter bolt. Module mounting fasteners should be SS-304 only and remaining fasteners either SS-304 or HDG 8.8 Grade.

D.3. If distance between two legs in X-Direction is more than 3M than sag angle/Bar should be provide for purlin to avoid deflection failure. The sag angle should be minimum 2MMthick, and bar should be minimum 12Dia.

D.4. Degree - The Module alignment and tilt angle shell be calculated to provide the maximum annual energy output. This shall be decided on the location of array installation.

D.5. Foundation – Foundation should be as per the roof condition; two types of the foundation can be done- either penetrating the roof or without penetrating the roof.

- a. If penetration on the roof is allowed (based on the client requirement) then minimum 12MM diameter anchor fasteners with minimum length 100MM can be use with proper chipping. The minimum RCC size should be 400x400x300 cubic mm. Material grade of foundation should be minimum M20.
- b. If penetration on roof is not allowed, then foundation can be done with the help of ‘J Bolt’ (refer IS 5624 for foundation hardware). Proper Neto bond solution should be used to adhere the Foundation block with the RCC roof. Foundation J - bolt length should be minimum 12MM diameter and length should be minimum 300MM.

3.13. Material standards:

- i. Design of foundation for mounting the structure should be as per defined standards which clearly states the Load Bearing Capacity & other relevant parameters for foundation design (As per IS 6403 / 456 / 4091 / 875).
- ii. Grade of raw material to be used for mounting the structures so that it complies the defined wind loading conditions (As per IS 875 - III) should be referred as follows (IS 2062 – for angles and channels, IS 1079 – for sheet, IS 1161 & 1239 for round pipes, IS 4923 for rectangular and square hollow section)
- iii. Test reports for the raw material should be as per IS 1852 / 808 / 2062 / 1079 / 811.
- iv. In process inspection report as per approved drawing & tolerance should be as per IS 7215.
- v. For ascertaining proper welding of structure part following should be referred:
 - a. D.P. Test (Pin Hole / Crack) (IS 822)
 - b. Weld wire grade should be of grade (ER 70 S - 6)
- vi. For ascertaining hot dip galvanizing of fabricated structure following should be referred: -
 - a. Min coating required should be as per IS 4759 & EN 1461.
 - b. Testing of galvanized material
 - Pierce Test (IS 2633)
 - Mass of Zinc (IS 6745)
 - Adhesion Test (IS 2629)
 - CuSO₄ Test (IS 2633)
 - Superior High-Grade Zinc Ingot should be of 99.999% purity (IS 209) (Preferably Hindustan Zinc Limited or Equivalent).
- vii. Foundation Hardware – If using foundation bolt in foundation then it should be as per IS 5624.

3.14. Design Validation- The Structure design and drawing should be duly verified by a licensed Structural designer before installation for all types of structure arrangements including the extension made, as per specification.

4. Metering

- 4.1. A Roof Top Solar (RTS) Photo Voltaic (PV) system shall consist of following energy meters:
 - i. Net meter: To record import and export units
 - ii. Generation meter: To keep record for total generation of the plant.
- 4.2. The installation of meters including CTs & PTs, wherever applicable, shall be carried out by the Empanelled Vendor as per the terms, conditions and procedures laid down by the concerned SERC/DISCOMs.

5. Array Junction Boxes:

- 5.1 The junction boxes are to be provided in the PV array for termination of connecting cables. The Junction Boxes (JBs) shall be made of GRP/FRP/Powder Coated aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands. Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.
- 5.2 Copper bus bars/terminal blocks housed in the junction box with suitable termination threads conforming to IP 65 or better standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry, Single /double compression cable glands should be provided.
- 5.3 Polyamide glands and MC4 Connectors may also be provided. The rating of the junction box shall be suitable with adequate safety factor to interconnect the Solar PV array.
- 5.4 Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.
- 5.5 Junction boxes shall be mounted on the MMS such that they are easily accessible and are protected from direct sunlight and harsh weather.

6 DC Distribution Box (DCDB):

- 6.1 May not be required for small plants, if suitable arrangement is available in the inverter.
- 6.2 DC Distribution Box are to be provided to receive the DC output from the PV array field.
- 6.3 DCDBs shall be dust & vermin proof conform having IP 65 or better protection, as per site conditions.
- 6.4 The bus bars are made of EC grade copper of required size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the inverter along with necessary surge arrestors. MCB shall be used for currents up to 63 Amperes, and MCCB shall be used for currents greater than 63 Amperes.

7 AC Distribution Box (ACDB):

- 7.1 AC Distribution Panel Board (DPB) shall control the AC power from inverter, and should have necessary surge arrestors, if required. There is interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- 7.2 All switches and the circuit breakers, connectors should conform to IEC 60947:2019, part I, II and III/ IS 60947 part I, II and III.
- 7.3 The isolators, cabling work should be undertaken as part of the project.

- 7.4 All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air - insulated, cubical type suitable for operation on $1-\phi/3-\phi$, 415 or 230 volts, 50 Hz (or voltage levels as per CEA/State regulations).
- 7.5 The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.
- 7.6 All indoor panels will have protection of IP 54 or better, as per site conditions. All outdoor panels will have protection of IP 65 or better, as per site conditions.
- 7.7 Should conform to Indian Electricity Act and CEA safety regulations (till last amendment).
- 7.8 All the 415 or 230 volts (or voltage levels as per CEA/State regulations) AC devices / equipment like bus support insulators, circuit breakers, SPDs, Voltage Transformers (VTs) etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions.
 - i. Variation in supply voltage: as per CEA/State regulations
 - ii. Variation in supply frequency: as per CEA/State regulations
- 7.9 The inverter output shall have the necessary rated AC surge arrestors, if required and MCB/ MCCB. RCCB shall be used for successful operation of the PV system, if inverter does not have required earth fault/residual current protection.

8 Protections

The system should be provided with all necessary protections like earthing, Lightning, and Surge Protection, as described below:

8.1 Earthing Protection

- i) The earthing shall be done in accordance with latest Standards.
- ii) Each array structure of the PV yard, Low Tension (LT) power system, earthing grid for switchyard, all electrical equipment, inverter, all junction boxes, etc. shall be grounded properly as per IS 3043-2018.
- iii) All metal casing/ shielding of the plant shall be thoroughly grounded in accordance with CEA Safety Regulation 2010. In addition, the lightning arrester/masts should also be earthed inside the array field.
- iv) Earth resistance should be as low as possible and shall never be higher than 5 ohms.
- v) For 10 KW and above systems, separate three earth pits shall be provided for individual three earthings viz.: DC side earthing, AC side Earthing and Lightning arrester earthing.

8.2 Lightning Protection

- i) The SPV power plants shall be provided with lightning & over voltage protection, if required. The main aim in this protection shall be to reduce the overvoltage to a

tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc.

- ii) The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors (LAs). Lightning protection should be provided as per NFC17-102:2011/IEC 62305 standard.
- iii) The protection against induced high-voltages shall be provided by the use of Metal Oxide Varistors (MOVs)/Franklin Rod type LA/Early streamer type LA.
- iv) The current carrying cable from lightning arrestor to the earth pit should have sufficient current carrying capacity according to IEC 62305. According to standard, the minimum requirement for a lightning protection system designed for class of LPS III is a 6 mm² copper/ 16 mm² aluminum or GI strip bearing size 25*3 mm thick). Separate pipe for running earth wires of Lightning Arrestor shall be used.

8.3 Surge Protection

- i) Internal surge protection, wherever required, shall be provided.
- ii) It will consist of three SPD type-II/MOV type surge arrestors connected from +ve and -ve terminals to earth.

9 CABLES

- 9.1 All cables should conform to latest edition of IEC/equivalent BIS Standards alongwith IEC 60227/IS 694, IEC 60502/IS 1554 standards.
- 9.2 Cables should be flexible and should have good resistance to heat, cold, water, oil, abrasion etc.
- 9.3 Armored cable should be used and overall PVC type 'A' pressure extruded insulation or XLPE insulation should be there for UV protection.
- 9.4 Cables should have Multi Strand, annealed high conductivity copper conductor on DC side and copper/FRLS type Aluminium conductor on AC side. For DC cabling, multi-core cables shall not be used.
- 9.5 Cables should have operating temperature range of -10°C to +80°C and voltage rating of 660/1000 V.
- 9.6 Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop less than 2% (DC Cable losses).
- 9.7 The size of each type of AC cable selected shall be based on minimum voltage drop. However; the maximum drop shall be limited to 2%.
- 9.8 The electric cables for DC systems for rated voltage of 1500 V shall conform to BIS 17293:2020.
- 9.9 All cable/wires are to be routed in a RPVC pipe/ GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable is easily identified.
- 9.10 All cable trays including covers to be provided.
- 9.11 Thermo-plastic clamps to be used to clamp the cables and conduits, at intervals not exceeding 50 cm.

- 9.12 Size of neutral wire shall be equal to the size of phase wires, in a three phase system.
- 9.13 The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25 years.

10 DRAWINGS& MANUALS:

- 10.1 Operation & Maintenance manual/user manual, Engineering and Electrical Drawings shall be supplied along with the power plant.
- 10.2 The manual shall include complete system details such as array lay out, schematic of the system, inverter details, working principle etc.
- 10.3 The Manual should also include all the Dos & Don'ts of Power Plant along with Graphical Representation with indication of proper methodology for cleaning, Operation and Maintenance etc.
- 10.4 Step by step maintenance and troubleshooting procedures shall also be given in the manuals.
- 10.5 Vendors should also educate the consumers during their AMC period.

11 Miscellaneous:

- 11.1 Connectivity: The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the SERC regulation for Grid connectivity and norms of DISCOM and amended from time to time.
- 11.2 Safety measures: Electrical safety of the installation(s) including connectivity with the grid must be taken into account and all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA Safety Regulation 2010 etc. must be followed.
- 11.3 Shadow analysis: The shadow analysis report with the instrument such as Solar Pathfinder or professional shadow analysis software of each site should be provided and the consumer should be educated to install the system only in shadow free space. Lower performance of the system due to shadow effect shall be liable for penalty for lower performance.
- 11.4 Fire fighting system - Portable fire extinguishers/sand buckets shall be provided wherever required as per norms.

Quality Certification, Standards and Testing for Grid-Connected Rooftop Solar PV Systems/Power Plants

Solar PV Modules/Panels	
IEC61215 and IS14286	Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
IEC 61701:2011	Salt Mist Corrosion Testing of Photovoltaic (PV) Modules

IEC 61853-1:2011/ IS16170-1:2014	Photovoltaic (PV) module performance testing and energy rating–: Irradiance and temperature performance measurements, and power Rating.
IEC 62716	Photovoltaic (PV) Modules–Ammonia (NH3) Corrosion Testing (as per the site condition like dairies, toilets etc)
IEC61730-1,2	Photovoltaic (PV) Module Safety Qualification–Part1: Requirements for Construction, Part2: Requirements for Testing
IEC 62804	Photovoltaic (PV) modules – Test method for detection of potential-induced degradation. IEC 62804-1: Part 1: Crystalline Silicon
Solar PV Inverters	
IEC62109or IS: 16221	Safety of power converters for use in photovoltaic power systems – Part1:General requirements, and Safety of power converters for use in photovoltaic power systems Part2: Particular requirements for inverters. Safety compliance (Protection degree IP65 or better for outdoor mounting, IP54 or better for indoor mounting)
IS/IEC61683latest (as applicable)	Photovoltaic Systems – Power conditioners: Procedure for Measuring Efficiency (10%, 25%, 50%,75% & 90-100% Loading Conditions)
IEC 60068-2 /IEC62093 (as applicable)	Environmental Testing of PV System–Power Conditioners and Inverters
IEC 62116:2014/ IS16169	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
Fuses	
IS/IEC60947(Part 1, 2 &3),EN50521	General safety requirements for connectors, switches, circuit breakers (AC/DC): 1)Low-voltage Switchgear and Control-gear,Part1:General rules 2)Low-Voltage Switchgear and Control-gear, Part2: Circuit Breakers 3)Low-voltage switch gear and Control-gear, Part3: Switches, disconnectors switch-disconnectors and fuse-combination units 4)EN50521: Connectors for photovoltaic system-Safety requirements and tests

IEC60269-6:2010	Low-voltage fuses-Part6:Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems
Solar PV Roof Mounting Structure	
IS2062/IS4759/AA6063 T6	Material for the structure mounting
Surge Arrestors	
BFC17-102:2011/ NFC 102:2011/ IEC 62305	Lightening Protection Standard
IEC 60364-5-53/ IS15086- 5(SPD) IEC 61643- 11:2011	Electrical installations of buildings-Part5-53:Selection and erection of electrical equipment-Isolation, switching and control Low-voltage surge protective devices-Part11:Surge protective devices connected to low-voltage power systems – Requirements and test methods
Cables	
IEC 60227/IS 694, IEC60502/IS 1554 (Part 1&2)/IEC69947(as applicable)	General test and measuring method for PVC (Polyvinyl chloride) insulated cables (for working voltage upto and including 1100V,and UV resistant for out door installation)
BSEN 50618	Electric cables for photovoltaic systems (BT(DE/NOT)258), mainly for DC Cables
Earthing/Lightning	
IEC 62561/IEC 60634 Series(Cheical earthing) (as applicable)	IEC 62561-1: Lightning protection system components (LPSC) - Part:Requirements for connection components IEC 62561-2: Lightning protection system components (LPSC) – Part 2:Requirements for conductors and earth electrodes IEC 62561-7: Lightning protection system components (LPSC) - Part 7: Requirements for earthing enhancing compounds
Junction Boxes	
IEC 60529	Junction boxes and solar panel terminal boxes shall be of the thermo-plastic type with IP 65 or better protection for out door use, and IP54 or better protection for indoor use.

Letter of Authorization

(to be submitted in the letter head of the Bidder)

Chief Executive Officer,
Jammu and Kashmir Energy Development Agency (JAKEDA)
38A/B Gandhi Nagar, Jammu, J&K-180004

Subject:- Submission of EoI for Empanelment for Site Survey, Design, Supply, Erection and Commissioning including Warranty, Comprehensive Maintenance Contract (CMC) for Five (05) years of Grid Connected Rooftop Solar Photovoltaic Power Plants

Ref: EoI NO: ST/EDA/RTSPV/200MW/51/2023/5744 Dated. /2023

Sir,

I/we hereby authorize Ms./Mr. _____ ,
Designation _____ of our company to sign all relevant documents on behalf of
the company/firm in dealing with the above EoI.
She / He is also authorized to attend all meetings and submit technical and commercial
information as may be required by JAKEDA in the course of processing of the EoI.

1. _____

2. _____

Signature attested

Name and designation of the attesting officer with stamp.

Yours faithfully

Head of the organization Name of Organization

Format-1

Covering Letter

(The covering letter should be on the Letter Head of the Bidding Company)

From: _____ **(Insert name and address of Bidding Company)**

Tel.#: Fax#:

E-mail address#

To,

The Chief Executive Officer
Jammu & Kashmir Energy Development Agency (JAKEDA)
38 A/B, Gandhi Nagar, Jammu

Sub: EOI for the empanelment of vendors for “Design, supply, erection, testing and commissioning including warranty, Comprehensive operation & maintenance of grid connected rooftop solar power plant of various capacities in the UT of J&K

Ref: EoI NO: ST/EDA/RTSPV/200MW/51/2023/5744 Dated. /2023

Dear Sir,

1. We, the undersigned...*[insert name of the 'Bidder']* having read, examined and understood in detail the EOI Document for Implementation of Grid connected Roof Top Solar System hereby submit our EoI. We confirm that neither we nor any of our Parent Company / Affiliate/Ultimate Parent Company has submitted EoI other than this EoI directly or indirectly in response to the aforesaid EOI.

2. We give our unconditional acceptance to the EOI, dated.....and EOI Documents attached thereto, issued by JAKEDA, as amended. As a token of our acceptance to the EOI documents, the same have been initiated by us and enclosed with the EoI. We shall ensure that we execute such EOI as per the provisions of the EOI and provisions of such EOI Documents shall be binding on us.

3. In case we are a Empanelled Vendor, we shall furnish a declaration at the time of commissioning of the project to the affect that neither we have availed nor we shall avail in future any CFA other than received from JAKEDA for implementation of the project.

4. Familiarity with Relevant Indian Laws & Regulations

We confirm that we have studied the provisions of the relevant Indian laws and regulations as required to enable us to submit this EoI and execute the EOI Documents, in the event of our selection as successful Bidder. We further undertake and agree that all such factors as mentioned in EOI have been fully examined and considered while submitting the EoI.

5. Contact Person

Details of the contact person are furnished as under:

Name :
Address :
Phone Nos. :
Fax No. :
E-Mail :

6. We are enclosing herewith the Envelope-I (Covering letter, Processing fee and PBG and other relevant documents (through Offline) as desired by you in the EoI for your consideration.

It is confirmed that our EoI is consistent with all the requirements of submission as stated in the EoI and subsequent communications from JAKEDA. The information submitted in our EoI is complete, strictly as per the requirements stipulated in the EoI and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our EoI. We confirm that all the terms and conditions of our EoI are valid for acceptance for a period of 24 month from the EoI deadline. We confirm that we have not taken any deviation so as to be deemed non-responsive.

Dated the day of , 2023

Yours faithfully,

Signature:

Name:

Designation with Seal

Name, Designation and Signature of Authorized Person in whose name Power of Attorney/Board Resolution/Declaration.

General Particulars of the Bidder

S. No.	Particulars	Details
1.	Name of the Company	
2.	Registered Office Address	
3.	E-mail ID	
4.	Web site	
5.	Authorized Contact Person(s) with name, designation Address and Mobile Phone No., E- mail address/ Fax No. to whom all references shall be made	
6.	Year of Incorporation	
7.	Have the Bidder/Company ever been debarred By any Govt. Dept. / Undertaking for undertaking any work	
8.	Reference of any document information attached by the Bidder other than specified in the EOI.	
9.	Details of the Ownership structure (Details of persons owning 10% or more of the Total Paid up equity of the Bidding Company in the Format as below	Yes/No
10.	Whether company is MSME as on the Bidding date	Yes/No
11.	Whether the Company has valid GST Registration Number (Enclose a Copy)	
12.	PAN number (enclosed a copy)	
13.	Bank Account Details	

Please strike-off whichever is not applicable.

Signature:

Name:

Designation with Seal

Format-3

Format for work experience

Details of Orders Received and Executed

Details of Orders Received & Executed by the Firm for S/I/T/C of SPPs to different State Nodal Agencies/ Govt. Undertakings / Govt. Institutions

S.No	*Capacity of RTSPV System installed	Name of the Purchaser	Supply order No / date	Date of installation & commissioning	Location of installed SPP

Yours faithfully,

(Signature of Authorized Signatory)

Name :

Designation :

Company seal :

Note:

(a) Attach Photocopies of Purchase Orders

(b) Separate sheet may be used for giving detailed information in seriatim duly signed. This EoI proforma must be submitted duly signed in case separate sheet is submitted.

(c) Tenderer must produce proof of satisfactory completion against the indicated work/supply orders from the beneficiary organizations.

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FORMAT FOR PERFORMANCE BANK GUARANTEE (PBG)

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

In consideration of the [Insert name of the Bidder] (Hereinafter referred to as selected Solar Power Developer') submitting the response to EOI inter alia for selection of the Project under CAPEX Model of the capacity of kWp / MWp under Roof Top scheme in response to the EOI no. dated issued by JAKEDA and JAKEDA considering such response to the EOI of insert the name of the selected Solar Power Developer] (which expression shall unless repugnant to the context or meaning thereof include its executors, administrators, successors and assignees) and selecting the Solar Power Project of the Solar Power Developer and issuing Letter of allocation no. to (Insert Name of selected Solar Power Developer) as per terms of EOI and the same having been accepted. As per the terms of the EOI, the [insert name & address of bank] hereby agrees unequivocally, irrevocably and unconditionally to pay to JAKEDA at [Insert Name of the Place from the address of the JAKEDA forthwith on demand in writing from JAKEDA or any Officer authorized by it in this behalf, any amount upto and not exceeding Rupees..... [total value] only, on behalf of M/s [Insert name of the selected Solar Power Developer / Project Company] This guarantee shall be valid and binding on this Bank up to and including..... and shall not be terminable by notice or any change in the constitution of the Bank or the term of contract or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to INR.....

Our Guarantee shall remain in force until..... JAKEDA shall be entitled to invoke this Guarantee till [Insert date which is [*Insert the number*] of days after the date in the preceding sentence].

The Guarantor Bank hereby agrees and acknowledges that JAKEDA shall have a right to invoke this BANK GUARANTEE in part or in full, as it may deem fit.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand by JAKEDA, made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to JAKEDA.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by -----[Insert name of the selected Bidder]. The Guarantor Bank shall not require JAKEDA to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against JAKEDA in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts at UT of J&K shall have exclusive jurisdiction.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly JAKEDA shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the selected Solar Power Developer / Project Company , to make any claim against or any demand on the Empanelled Vendor or to give any notice to the selected Solar Power Developer / Project Company or to enforce any security held by JAKEDA or to exercise, levy or enforce any distress, diligence or other process against the selected Solar Power Developer / Project Company.

Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to INR..... (INR..... only) and it shall remain in force until [Insert date which is [*Insert the number*] of days after the date in the preceding sentence]. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if JAKEDA serves upon us a written claim or demand.

Signature

Name

Power of Attorney No.

For,

..... [Insert the bank name]

Banker's Stamp and Full Address.

Dated this day of , 2023

Witness:

1. Signature Name and Address	2. Signature Name and Address
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Notes:

1. The Stamp Paper should be in the name of the Executing Bank and of appropriate value.
2. The Performance Bank Guarantee (PBG) shall be executed by any of the Bank from the List of Banks enclosed as per **Annexure-B**.

**Undertaking/Self- Declaration for domestic content requirement fulfillment
(On a plain Paper)**

This is to certify that M/S.....[Company Name] has installedKW [Capacity] Grid Connected Rooftop Solar PV Power Plant for..... [Consumer Name] at [Address] under sanction number.....dated.....[sanction date] issued by.....[JAKEDA].

It is hereby undertaken that the PV modules installed for the above-mentioned project are domestically manufactured using domestic manufactured solar cells. The details of installed PV Modules are follows:

1. PV Module Capacity:
2. Number of PV Modules:
3. Sr No of PV Module
4. PV Module Make:
5. Purchase Order Number:
6. Purchase Order Date:
7. Cell manufacturer's name
8. Cell GST invoice No

The above undertaking is based on the certificate issued by PV Module manufacturer/supplier while supplying the above-mentioned order.

I,on behalf of M/S.....[Company Name] further declare that the information given above is true and correct and nothing has been concealed therein. If anything is found incorrect at any stage then the due Central Financial Assistance (CFA) that I have not charged from the consumer can be withheld and appropriate criminal action may be taken against me and my company, as per law, for wrong declaration. Supporting documents and proof of the above information will be provided as and when requested by MNRE/state implementing agency.

(Signature With official Seal)

For M/S.....
Name.....
Designation.....
Phone.....
Email.....

Annexure C

(In case the beneficiary intends to install Hybrid Rooftop SPV system or any customized structure, then following agreement shall be executed as per following format).

Agreement between Vendor and beneficiary for additional cost

This agreement is signed between two parties i.e., M/s (Name of Vendor) registered at address, who is an empanelled vendors in the tender/EoI floated by JAKEDA for implementation of grid connected rooftop solar (GCRTS) PV projects in the Jammu city of UT of J&K, hereby referred to in as the ‘Vendor’ or ‘first party’ AND (Name of Consumer, residing at.....) , hereby referred to in as the ‘customer’ or ‘second party’.

Both the parties mentioned above, by mutual consent, are entering into an agreement for installation of grid connected rooftop solar project under Phase-II of grid connected rooftop solar programme of MNRE, being implemented by JAKEDA. The second party has satisfied itself that the first party is an empanelled vendor in the tender floated by JAKEDA and rooftop solar project ofkW capacity will be installed by first party at the residence of second party, under the tender floated by JAKEDA.

Both the parties referred above, do hereby declare that they are aware of the fact that the rate finalized by JAKEDA is Rs. /kW. However, the second party has agreed to pay additional cost to the first party for desired customization in the project which is in the form of (mention the customizations).

The first party hereby declares that the invoice raised to the second party for amount mentioned above, is on actual basis after taking into account the cost of any customization and no other extra/hidden charges are being charged to the second party. The second party hereby declares that they are aware of the provisions of the scheme and do hereby consent to pay the additional cost of customization to the first party for the desired customizations. MNRE and the implementing agency shall not be, in any case, be held responsible for any dispute arising out of this agreement/financial transactions.

This agreement is entered intoday of the month ofin year.....

For First Party
(Name of Company)

For Second Party
(Name of Consumer)