

**TENDER DOCUMENT**

**FOR**

**Engineering, Design, Supply, Installation & Commissioning and Comprehensive Operation  
& Maintenance for Five years of 100kWp Grid tied Solar Rooftop PV plant**



**Issued by:**

**Karnataka Engineers Academy**

CA Site no1, 8th Main, 2nd Cross, Kamalanagar,

Bangalore - 560079

Karnataka

July, 2019

## TENDER NOTICE

Karnataka Engineers Academy at Kamalanagar, Bengaluru invites tender from eligible Bidders for Engineering, Design, Supply, Installation & Commission & Comprehensive Operation & Maintenance For Five Years of 100kwp Grid tied Solar Rooftop PV plant, on the roof-top of the KEA Buildings, under Net-metering scheme, as per the Scope, of the work and the terms and condition indicated in the Tender Document. Soft copy of the bid documents containing the terms & condition of the contract, qualifying requirement and eligibility criteria of bidders, scope of the services to be provide etc ,may be downloaded from the website: <http://www.engineersacademy.co/>

### Calendar of Events:

1. Tender documents can be downloaded from Karnataka Engineers Academy official website <http://www.engineersacademy.co/> from -----.
2. Last date for submission of tenders through registered post/speed post/courier: on or before ----- at 4.00 PM. No hand delivery will be consider for submission of tender
3. Technical Bid opening ----- at 11:00 A.M
4. Financial Bid opening - ----- at 11:00A.M
5. Time for completion – 3months from the LOI

Further information, please contact helpdesk Mobile No: -----, 96326 13848. The KEA Management reserves the right to alter, modify, withdraw part or full scope of Tender without assigning any reason what so ever and the decision of the Board will be final.

SECRETAR

KEA

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## ABBREVIATIONS

KEA	Karnataka Engineers Academy
IFB	Information's to Bidders
SRTPV	Solar Rooftop PV Plant
kW	Kilo Watt
kWp	Kilo Watt peak
kVA	Kilo Volt Ampere
O&M	Operation & Maintenance
CT	Current Copper wound, ONAN, OCTC Transformer
PT	Potential Copper wound, ONAN, OCTC Transformer
SLD	Single Line Diagram
HT LT	High tension Low tension
BESCOM	Bengaluru Electricity supply Company
PV	Photo Voltaic
UPVC	Un-plasticized Poly vinyl chloride
CPVC	Chlorinated-PVC
NEEGG	Net Electricity Energy Generation Guarantee
RMS	Remote monitoring system
ACDB	Alternate current distribution board
SPD	Surge Protection device
CUF	Capacity Utilization factor
kWh	Kilo Watt hour
MWp	Mega Watt peak
kV	Kilo Volt
V	Volt
EMD	Earnest Money Deposit

LOI	Letter of Intent
PO	Purchase order
EPC	Engineering Procurement & construction
PCU	Power Conditioning Unit
MMS	Module Mounting Structure
PMC	Project Management consultant
TPI	Third party inspection
IEC	International Electro technical commission
IS	Indian Standards
UV	Ultra violet
RFID	Radio Frequency identification
ISO	International organization for standardization
STC	Standard test conditions
BIS	Bureau of Indian Standards
IP	Ingress Protection
MS	Mild Steel
MOV	Metal Oxide varistor
XLPE	Cross linked poly ethylene
MPPT	Maximum Power point tracking

## 1 INFORMATION / INSTRUCTIONS TO BIDDERS (IFB)

### 1.1 INTRODUCTION

Karnataka Engineers academy is an independent self-governing and non-profit organization established to serve the state in matters of engineering concerns. The academy has a convention hall and Seminar halls with State-of-art facilities. The academy organizes seminars, conferences on matters of interest to the engineering community & Karnataka state. Members can also avail the facilities of the academy to conduct Private functions, get-together etc. The academy has well furnished, top class rooms with phones, internet connections, Wi-Fi networking facilities etc. The activities of the Academy Center are to provide quality life to their members besides maintaining a network of alumni through various events. The activities which saw humble beginning as far back as 1988, is expanding with greater aspirations with the co-operation and dedication of engineering fraternity.

It is proposed to establish a 100 kWp solar Power plant on the rooftop of the building, under net metering scheme, through a turnkey contractor for Design, Supply, Installation & Commissioning, including obtaining all required approvals & clearances from the statutory bodies and O&M for 5 years.

### 1.2 THE SCOPE OF WORK

The scope of work for proposed 100kW SRTPV:

Lump sum turnkey contract basis (LSTK) - Engineering, Design, Supply, Installation & Commissioning, O&M for five years of 100kW SRTPV

- a. Site visit, surveying of building roof top and detail inspection of the roof area of the building for:
  - i. Identifying the North, South, East & West directions of the constructed building roof.
  - ii. Identifying Shadow area and shadow free areas on the roof duly considering the surrounding high-rise buildings and space left over for installing, solar PV panels, for maximum efficiency, of solar panels, leaving minimum required setbacks around PV panels.
  - iii. Assessing the capacity of solar PV panels that could be accommodated / installed on the building roof, to obtain maximum energy yield with optimal roof space utilization.

- iv. KEA has engaged the consultants and the solar panel layout on the sloped roof area is given in the Annexure 1. The Bidder could review the provided panel layout details for their design purpose.
- b. Arrange for Applying and obtaining relevant permission from the BESCO, to comply with net-metering policy and execute the power purchase agreement with BESCO.
- c. Design the Module mounting structures for sloped roof for mounting the solar PV panels to have maximum efficiency of Solar PV panels and to withstand the wind speed of 33m/s, as per the IS 875 Part 3. Non-penetrating type of Module mounting structure for fixing the solar panel on sloped GI sheeted roof will be added advantage. Since these non-penetrating type MMS wouldn't puncture the GI sheet of the sloped roof.
- d. Design and supply of the PV panels and other associated equipment viz Invertors, connecting cables, switches, circuit breakers, Lightning protection system, earthing system, and energy meters, providing provision for routine washing SRTPV panels with UPVC/CPVC pipe and water jet facility etc., as per the technical specifications.
- e. The bidders are encouraged offer state of the art and reliable technologies/components in terms solar pv panels, inverters, non-penetrating type of Module mounting structure etc., as this tender intends to provide best returns on the investment by owner rather than a power plant of the cheapest configure.
- f. Obtain necessary approvals by statutory bodies for the commissioning Solar Roof Top Power Plant.
- g. Testing and commissioning of the complete solar PV system.
- h. The KEA building is four floor building and very much prone to lightning strikes, so the solar plant on the building should be protected by providing the individual & suitable lightning protection system (LPS) as per the IEC 62305/62561 with dedicated earth pit.
- i. Remote monitoring system (RMS) to monitor the performance of the solar plant. The remote monitor system should provide the instant as well as cumulative energy generation (daily, weekly & monthly). Remote monitor system should be capable of



- logging the occurred electrical faults and data from sensors like Pyranometer, thermocouples & Anemometer and facilitate computation of Performance ratio.
- j. Installation of Weather station on the building including one calibrated pyranometer to determine irradiance on the plane of solar panel array (with a target measurement uncertainty of  $\pm 2$ ). Two nos. thermocouples to measure module temperature with a measurement uncertainty of  $\pm 1$  °C and ambient temperature. An anemometer mounted on a 10m mast to measure wind speed (without additional shadowing on modules).
  - k. Contractor should provide 5 Log in credentials of the remote monitoring system.
  - l. Solar ACDB should be provided with the solar generation meter with class 1 accuracy.
  - m. Any up gradation/replacement of distribution board/ UG cable connecting the distribution board will also be included in the scope of this part of the tender.
  - n. Maintenance of the plant for 5-year period. During Maintenance period, contractor should undertake routine cleaning of the solar panel in addition to routine preventive & breakdown maintenance. The contractor shall also maintain adequate stock of consumables like fuses, SPD's etc., and replace them whenever required at his cost. Contractor should coordinate with the BESCO metering official for the proper meter reading with solar plant generation accounting.
  - o. KEA will provide Water and Electricity free of cost during execution and operation & maintenance period at one point near the building.

The entire scope of work shall be executed on lump sum turnkey (LSTK) contract basis. If any minor item(s) not included in the scope of work, but required for completion of the work shall have to be carried out/supplied without any extra cost. Such works, not listed in the scope of works but elaborately described to perform or to facilitate particular operation(s) required for completion of the project shall be deemed to have been included in the scope of this work and the Contractor shall supply, install the same without any extra cost.

Preferred manufacturer of the major equipment's and the design drawing of the 100kW solar plant is provided in the annexure 1 & 2 respectively for the reference.

The KEA intends to avail the services of the turn key contractor for above scope of works.

### 1.3 NET ELECTRICAL ENERGY GENERATION GUARANTEE (NEEGG)

- a. The Bidder shall be required to quote the Net Electrical Energy Generation Guarantee (NEEGG) for Twenty five (25) years period. The Bidder shall give NEEGG per annum after considering proposed configuration and all local conditions, solar insolation, wind speed and direction, air temperature & relative humidity, barometric pressure, rainfall, sunshine duration, grid availability and grid related all other factors and losses due to near shading, incidence angle modifier, irradiance level, temperature loss, array loss, module quality loss, module array mismatch loss, soiling loss and various inverter losses etc. To assess/ verify feasibility of quoted NEEGG, Bidders are required to provide computation documents (PVSyst report) along with considered factors based on which NEEGG has been computed.
- b. Bidders are expected to undertake their own study of solar profile and other related parameters of the area and make sound commercial judgment about power output i.e. Net Electrical Energy Guaranteed Generation. It shall be the responsibility of the Bidder to access the corresponding solar insolation values and related factors of solar plant along with expected grid availability. The Bidder should access all related factors about the selected Project Site for the Project and quote the NEEGG for the proposed Project Site.
- c. The Contractor shall be responsible for achieving NEEGG. For any shortfall in NEEGG corresponding to the offer, the compensation shall be recovered from the Contractor. The Contractor shall maintain the Plant equipment including its repair, replacement, overhauling, etc, so as to give the agreed NEEGG per year.
- d. The NEEGG quoted for each consecutive year should have maximum 1 % annual degradation factor in NEEGG. If the bidder anticipates any degradation of the modules during the first year, it shall be taken care of to provide additional capacity of solar PV modules to meet guaranteed generation at the end of first year to avoid liquidated damages/compensation on account of Performance Guaranteed Generation. The NEEGG of consecutive year should not be more than the previous year's NEEGG. Bids not following these conditions shall be summarily rejected.
- e. This NEEGG shall be used for the evaluation of the technical & Financial Bid.

## 1.4 QUALIFYING REQUIREMENT OF TENDERER / BIDDER

### 1.4.1 TECHNICAL REQUIREMENTS

- a. Bidders should have 3 years' experience in carrying out similar works comprising of Engineering and Design, Procurement and Testing & Commissioning of solar PV power system.
- b. Bidders should have executed more than cumulative 2MWp Rooftop installation works for office buildings /commercial premises/ residential buildings/Educational institutions in the last 3 years. This should include at least one project of 200kW or more under a single DISCOM meter. Bidders should submit a valid proof such as purchase order, completion certificates with technical details while submitting the tender.
- c. The Bidder shall be a legal entity registered and recognised under the Act prescribed by the Government of India.
- d. The bidder should have adequate technically qualified personnel with capability to undertake the assignment, as per the terms of reference, considering the numerous tasks to be performed by them, from the inception to the completion of the assignment, within the time frame prescribed by the KEA.
- e. Bidders shall furnish/ attach to their offer all relevant documents in proof and support of the above with technical bid formats.

### 1.4.2 FINANCIAL REQUIREMENTS

- a. The cumulative Turnover of the Tenderer / Bidder during the last 3 years shall be more than Rs.2 crore. The Tenderer / Bidder to furnish proof in this regard by way of Annual Accounts i.e. by way of Balance Sheet and Profit and Loss A/c, (includes Income & Expenditure, Receipts and Payment Account instead of P&L A/c), audited and certified by a Chartered Accountant.
- b. The liquid assets of the bidder consisting of cash in hand + cash at bank + term deposits + availability of fund-based credit facility in any Nationalized Scheduled Bank, shall not be less than Rs.1.0 crore as on 30.06.2019 or at later date before submission of the bid. Certificate regarding the same shall be provided by a practicing chartered accountant.
- c. The Bidder must be registered for GST with the concerned department.

- d. The Bidder must be registered with Income tax department and should produce Latest Income Tax clearance certificate/income tax return details.
- e. The documents justifying the said financial requirements shall be uploaded to e-procurement portal in the technical bid.
- f. The bidder should not have been black listed by any organization. The bidder is required to furnish a declaration in format -11.

#### 1.5 DESCRIPTION OF BIDDING PROCESS

- a. The KEA invites Bids from eligible “Bidders”, for selection of contractor for Lump sum turnkey contract for said scope of work in the section 1.2.
- b. The Bids are invited and to be submitted through registered/speed post/courier services and personal hand delivery. The bidding notification & document is available on “[www.engineersacademy.co](http://www.engineersacademy.co)”.
- c. The tender documents can be downloaded through KEA official website **from -----**.
- d. The bids shall be submitted before -----, **4:00PM 2019**, through **registered/speed post/courier services and, personal hand delivery**. The tender/bid should be submitted in two separate parts as follows:
  - I. Part-1 –Technical Bid.
  - II. Part-2 – Price Bid
- e. Technical Bid will be opened on ----- **at 11:00AM**, and financial bid will be opened on ----- **at 11:00AM**.
- f. **Earnest Money Deposit (EMD)**
  - a) Bid Security (EMD) for an amount of Rs. 1,00,000/- (Rupees One lakhs only).
  - b) Government/Quasi Government/Public Sector Undertakings are not exempted from furnishing the Bid security.
- g. **Cost towards submission of bids**

All the costs and expenses incidental to preparation and submission of the proposals, discussion and conferences, if any, including pre-award discussions of the bidder with the owner, technical and other presentations including any demonstration etc., shall be to the account of the bidders only and the KEA will not reimburse any of these expenses.
- h. **Payment modes for Earnest Money Deposit (EMD)**

- a. The bidder should pay the Earnest Money Deposit (EMD) through demand draft only along with the technical bid.
- i. Bidder has the no option of Withdrawing the Bid after the submission.
- j. The Project Management consultants nominated by KEA shall evaluate all the bids received against Tender on the parameter indicated under heading Qualifying Requirement / Eligibility conditions and other relevant clause of the Tender.
- k. A Bidder requiring any clarification of the Tender documents may notify KEA in writing or by e-mail to KEA contact: admin@engineersacademy.co, contact no : +080-23232294, 9632613848

**l. Help Desk**

Support Timings: **(10.00hrs to 16.00Hrs)** on all working day (Monday – Saturday)

E-mail Id: admin@engineersacademy.co.

Contact No: +080-23232294, 9632613848

## **1.5 MODE OF SUBMISSION & TERMS OF BIDS**

### **1.5.1 PART-1 TECHNICAL BID**

Technical Bid should be submitted through registered/speed post/courier services and personal hand delivery with the following documents duly signed by authorized personnel.

- a) Demand draft towards the payment of EMD
- b) Audited balance sheet for the last 3 years duly certified by the chartered accountant.
- c) The registration with GST department.
- d) The registration with Income tax department and Latest Income tax clearance certificate or income tax return details.
- e) Tenderers / Bidder's should submit duly signed Formats 1 to 12 in the Company's letter head only.
- f) General Technical Particulars-1 & 2.
- g) The proof of technical & financial qualifying requirements mentioned in the section 1.4.1 & 1.4.2 respectively.

### **1.5.2 PART -2 PRICE BID**

- 1. All Price Bid should be registered/speed post/courier services only, in provided formats.

2. The Bidders are requested to submit their Bids in accordance with the Bidding Documents. The Bid shall be valid for a period of not less than 90 (Ninety) days from the specified “Bid Opening Date”.
3. Any amendments issued subsequent to this notification, but before the Bid Due Date, will be deemed to form part of the Bidding Documents.
4. The Contract to be entered into will be treated as a “*SINGLE CONTRACT*” for said scope of work in section 1.2.

### **1.5.3 MODIFICATION AND WITHDRAWAL OF BIDS**

- a) The Bidder may modify or withdraw its bid after the bid’s submission prior to the deadline prescribed for submission of bids.
- b) No bid may be modified subsequent to the deadline for submission of bids

### **1.5.4 LATE BIDS**

Late bids will be rejected without considering for the technical evaluation and KEA will not be responsible for delayed submission due registered/speed post/courier services.

**Note: -**

- i. KEA will have the right to modify or add events to the calendar and the same will be communicated to the bidders through the KEA website <http://www.engineersacademy.co/>.
- ii. The bidders can obtain the tender documents from the KEA website free of cost.
- iii. Bidders can get any clarifications regarding the scope of work, qualifying requirements and technical features of the project from the undersigned during office hours.

### **1.5.5 TERMS & CONDITION OF PRICE BID**

- a) The Bid price (price quoted) for scope of work explained in the section 1.2 shall be inclusive of all taxes viz., GST, work contract Tax and other applicable taxes, if any.
- b) The price quoted shall remain fixed and firm during the period of contract and shall not be subject to any change due to increase in material cost and if there is a change in the law, related to taxation after the date of submission of bid and before

the date of invoicing, any difference in the taxation amount will be a pass through to the contractor.

- c) The prices for establishing the 100 kWp Solar PV plant and maintaining the same for five years to be indicated in the price bid as per the format furnished.
- d) The entire scope of work shall be executed on lump sum turnkey (LSTK) contract basis. If any minor item(s) not included in the scope of work, but required for completion of the work shall have to be carried out/supplied without any extra cost. Such works, not listed in the scope of works but elaborately described to perform or to facilitate particular operation(s) required for completion of the project shall be deemed to have been included in the scope of this work and the Contractor shall supply, install the same without any extra cost.

### 1.5.6 BID OPENING DATE

**a) Part-1: Technical Bid.**

The Technical Bids will be opened at 11:00AM on -----, **2019.**

**b) Part-2: Price Bid opening:**

The Price Bids of those Bidders Whose Technical Bids are found to be responsive, will be opened on -----, **at 11:00AM, 2019.**

**NOTE: Price Bids of Technically Non - Responsive Bidders will not be opened**

## 1.6 PROCESS / METHODOLOGY OF BID EVALUATION

### 1.6.1 TECHNICAL EVALUATION

- a) Technical Bids will be evaluated by KEA taking into account the Qualifying Requirements, Completeness of the offer and payment of EMD, as per the bid document. Technical bids will be evaluated taking into consideration the following:
  - i. **Payment of EMD.**
  - ii. **Qualifying requirement of Technical & Financial as per the section 1.4.**
  - iii. **Net Electricity Energy Generation Guarantee and**
  - iv. **Detailed work plan of the project execution.**

## 1.6.2 PRICE BID EVALUATION

- a) The Price Bids of the technically qualified / responsive bidders will be opened by KEA at a predetermined date (duly informing all the technically qualified/ responsive Bidders). Authorized representatives of the bidders may be present at the time of opening, if they so desire. The proposed prices shall be read aloud and recorded in a minute of the opening of financial bids.
- b) KEA will review the Price Bid proposals. Arithmetical errors will be corrected and price evaluation will be done. Such price shall include all the costs including duties, levies, taxes and also any discounts offered by the Bidder.
- c) For Price bid evaluation, the following methodology will be adopted:  
$$= (\text{Total value of the bid} + \text{NPV of five years O\&M}) / \text{Sum of NEEGG of first five years}$$
- d) LOI (letter of intent) will be issued to lowest bidder as derived in 1.6.2(c)

## 1.7 ACCEPTANCE OF TENDER/AWARD OF CONTRACT

1. The successful bidder would be called for negotiation, if required and the negotiated price will be the final price for awarding the contract
2. **Acceptance of the Tender**  
The final acceptance of the Tender is entirely vested with KEA who reserves the right to accept or reject any or all of the Tenders in full or in part. The Tender accepting authority may also reject any tender for reasons such as changes in the new technologies, court orders, accidents or calamities and other unforeseen circumstances. After acceptance of the Tender by KEA, the Bidder shall have no right to withdraw their Tender or claim higher price.
3. **Award of contract**
  - a) The Successful Bidder/Contractor will be issued letter of intent (**L.O.I**) along with the draft contract agreement.
  - b) The Successful Bidder/Contractor to accept the contract and communicate within two weeks of the **L.O.I** and furnish the following documents:
    - i. Detailed Work plan/Project execution timeline in Pert/Gant Chart.
    - ii. Detailed engineering with bill of materials.



- iii. **Payment of Performance guarantees at 10.0% (Ten percent)** of the contract value *excluding* maintenance charges in form of bank guarantee / DD there upon his EMD will be refunded. Performance guarantee should be valid until Five years from the date of LOI.
- The performance guarantee will be refunded to the Successful Bidder within 90 days, after successful completion of the Operation & Maintenance period of Five year from the date of commissioning the plant.
  - The guarantee for the performance held by KEA will be refunded to the Successful Bidder will not earn any interest thereof.
- iv. Contract agreement duly executed on Rs.200 non-judicial stamp paper bought in Karnataka only in the name of the bidder.
- c) In case the Successful Bidder/Contractor fails to respond within the stipulated time of two weeks for accepting the contract and observe the formalities as above, the **L.O.I** will be cancelled and his EMD will be forfeited.
- d) The next lowest bidder will be issued **L.O.I**.

## 1.8 REFUND & FORFEITURE OF EMD

### 1.8.1 REFUND OF EMD

The EMD of unsuccessful Bidder/Tenderer's will be refunded within 30 days of execution of the contract with the Successful Bidder/Contractor.

### 1.8.2 FORFEITURE OF EMD

- a) The earnest money deposited with the tender shall be forfeited by KEA if the tenderer/bidder fails to:
- i. Accept the LOI
  - ii. In case a bidder withdraws his offers within the offer validity period specified by the bidder.
  - iii. If the bidder does not accept the arithmetical correction of its bid price.
  - iv. In case of a successful bidder fails to submit performance, guarantee and execute the contract agreement mentioned in the Letter of Intent (LOI).

KEA shall have full discretion to cancel the LOI communicated to the said bidder.

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## 1.9 REFUND OF PERFORMANCE BANK GUARANTEE

Performance guarantee will be refunded after the satisfactory performance of the SRTPV equipment after Five year of Commissioning of the plant.

## 1.10 TERMS OF PAYMENT / MODE OF PAYMENT

The KEA shall pay the Contractor in the following manner for supply of material and at the following time for achieving the respective milestones,

### Payment Milestone

Sr. no	Payment Milestones	Amount
1	Upon delivery and acceptance of PV modules at site	30% of the contract value excluding O&M cost.
2	Upon complete delivery of Balance of Systems including inverter, MMS etc. at site	30% of the contract value excluding O&M cost.
3	Upon achieving Completion of the Facilities (Switching on the individual inverters and showing the full capacity generation of the plant)	20% of the contract value excluding O&M cost.
4	Upon achieving Grid synchronization, obtaining the Commissioning certificate of the plant from the BESCO & submitting it to the KEA & giving the plant performance & remote monitoring system working presentation to the KEA.	20% of the contract value excluding O&M cost.
	<b>Total</b>	100%
<b>Payment of Operation &amp; Maintenance charges will be made on Quarterly basis at the end of the respective quarter based on the yearly price quoted subject to any adjustment of LD if applicable.</b>		

## 1.11 COMPLETION PERIOD / TIME SCHEDULE

The 100 kWp solar roof top plant & associated scope of work mentioned in the section 1.2 shall be successfully commissioned within 3 months (12 weeks) from date of Letter of Intent (L.O.I). or else the delay will be subjected to the liquidated damages as per the clause 1.12 .

## 1.12 PENALTY FOR THE DELAY /LIQUIDATED DAMAGES

- a. The Bidder shall clearly note that time is the essence of the Contract. The entire scope of work under this contract shall be completed within the stipulated period of 3

months from the date of issue of letter of Intent (L.O.I). However, early completion of the works will be appreciated.

- b. If the Successful Bidder / contractor fails to complete the scope within the period of 3 months specified in the contract, the KEA shall, without prejudice to its other remedies under the contract, deduct from the contract price or performance bank guarantee as liquidated damage, a sum equivalent to 0.5 % of the contract price for each week of delay, subject to a maximum of 5% of the total contract value.
- c. The KEA reserves the right to terminate the Contract without any liability, in case of failure to undertake / complete the work within the specified period and in case there is a delay in completion & successful commissioning of the plant.

### 1.13 PENALTY FOR LOSS OF GENERATION DURING O&M

- a. For each Contract Year, the Contractor shall demonstrate cumulative “Actual Delivered Energy” at the Metering Point of all the building as compared to the *NEEGG* for the particular year (calculated as per the methodology given in Format 14).
- b. If for any Contract Year, it is found that the cumulative “Actual Delivered Energy” is less than *NEEGG* for the particular year, the Contractor shall pay the compensation to KEA equivalent to Rs. [BESCOM Electricity Tariff to KEA] per kWh of under-generation. All penalties shall be recovered from payments yet to be made by KEA to the Contractor or from the Bank Guarantees available with KEA.
- c. However if the grid downtime is more than 2% in the solar window of 8am to 4pm, cumulatively in a year, then the *NEEGG* for the particular year will be corrected, applying the factor  $(1 - \text{Actual cumulative Grid downtime for the year in decimal})/0.98$
- d. The bidders are advised to avail insurance policies for covering the irradiance risk.
- e. In case of any defect in the system after Commissioning, the Contractor shall repair it within forty-eight (48) hours. After 48 hours, penalty shall be charged and the same shall be deducted from the Bank Guarantee submitted to KEA penalty at the rate of Rs. [BESCOM Electricity Tariff to KEA] per kWh shall be charged by the company for the loss of generation. The loss of generation shall be calculated with respect to the *NEEGG* of that particular year.

- f. In case the Project fails to generate any power continuously for 2 months any time during the O&M period, it shall be considered as an “Event of Default”.
- g. Upon occurrence of any Event of Default herein above, KEA shall have the right to encash the entire amount of Bank Guarantee submitted by the Contractor and withheld any other pending payment.

The KEA management reserves the right to perform random audits of weather monitoring system of the plant anytime during the entire O&M period. If any discrepancy is found between the measured parameters, the difference between the measured parameters by KEA from secondary sources and the weather monitoring system installed by the Contractor at the site will be factored in calculating the adjusted NEEGG during the entire year. However, KEA will have the final authority to decide on this matter.

**SECRETARY**

**KEA**

## 2 GENERAL TERMS & CONDITIONS OF CONTRACT

### 2.1 GENERAL TERMS

In the deed of contract unless the context otherwise requires: -

1. **“KEA”** shall mean Karnataka Engineers Academy, Kamalanagar, Bengaluru, Karnataka.
2. **“The Successful Bidder/ Turnkey contractor”** shall mean the person whose tender has been accepted by KEA and shall include his legal representatives, successor in interest and assignees.
3. **“The Contract”** means the **“Agreement”** entered into between the **KEA** and **successful bidder** as per the Contract Agreement signed by the Parties including all attachments and appendices there to and all Documents incorporated by reference therein.
4. **“Contractor’s Work”** shall mean works as specified in the scope of the work.
5. The term **“Contract Price”** shall mean the Lump Sum Price including all applicable taxes and insurance if any, quoted by the **bidder** in the Bid or negotiated price if any, agreed to and incorporated in the Letter of Award, for the entire Scope of the Work.
6. **“Letter of Award/Intent (LoI)”** shall mean the Official Notice issued by the KEA notifying the bidder that his Bid has been accepted.
7. **“Date of Contract”** shall mean the date on which Letter of Award has been issued.
8. **“A Week”** shall mean continuous period of Seven (7) Days. **Days** are calendar days; **months** are calendar months.
9. **“Writing”** shall include any Manuscript, Type Written, Fax, Computer Generated or Printed Statement, under or over Signature and/or Seal, as the case may”

### 2.2 GENERAL CONDITIONS OF CONTRACT

The Successful Bidder shall have to comply with all the rules, regulations, laws and by-laws for the time being in force and the instructions if any, of the organizations, in whose premises the work has to be done. KEA shall have no liability in this regard.

1. The successful bidder shall not transfer; assign the work under this contract to any other party.
2. If any dispute or difference whatsoever arises between the KEA and the successful bidder in connection with the agreement, either party may forthwith give to the other, a notice in

writing of the existence of such dispute or difference and the same shall be referred to the sole arbitrator in accordance with the provisions of Arbitration and conciliation Act 1996 and Rules made there under.

3. KEA may at any time; either stops the contractors work all together by sending notice in writing to the successful bidder. If the work is stopped all together, the successful bidder will not be paid anything and his Performance security will be forfeited.
4. A Project Management Consultancy (PMC) or Third-Party Inspection agency (TPI) will be appointed by KEA, at its sole discretion, to conduct any kind of inspection regarding procurement, fabrication, installation, hook-up, quality, execution, commissioning, operation and maintenance during the span of the Project. The Contractor shall provide necessary access and coordination to conduct such inspections. The Contractor shall provide all necessary access and cooperation for inspection to Project Management Consultancy (PMC) or Third-Party Inspection agency (TPI)
5. Notices, statements and other communications sent by KEA through registered post or fax or e-mail to the Successful Bidder at his specified addresses shall be deemed to have been delivered to the Successful Bidder / Consultant.
6. Any work related to scope of work mentioned in the tender, which is not covered under this contract (as indicated in the price Bid format & Scope of the Work) but incidental to core work and is essentially & successful commissioning of the plant to the satisfaction of KEA, shall be carried out by the Successful Bidder / contractor without any extra cost to KEA and scope of work mentioned in the Part 2, should be at item rate contract basis.
7. The Successful Bidder shall not display the photographs of the work they have executed and not take advantage through publicity of the work without written permission of KEA.
8. During the period of Warranty/ Guarantee the Contractor shall remain liable to replace any defective parts, that becomes defective in the Plant, of its own manufacture or that of its Subcontractors, under the conditions provided for by the Contract under and arising solely from faulty design, materials or workmanship, provided such defective parts are not repairable at Site. After replacement the defective parts shall be returned to the Contractors works at the expense of the Contractor unless otherwise arranged.
9. At the end of Guarantee/O&M period, the Contractor's liability shall cease. In respect of goods not covered above, KEA shall be entitled to the benefit of such Guarantee given to the Contractor by the original Contractor or manufacturer of such goods.

10. During the Operation and Maintenance and Guarantee period, the Contractor shall be responsible for any defects in the work due to faulty workmanship or due to use of sub-standard materials in the work. Any defects in the work during the guarantee period shall therefore, be rectified by the Contractor without any extra cost to KEA within a reasonable time as may be considered from the date of receipt of such intimation from KEA failing which KEA shall take up rectification work at the risk and cost of the Contractor.
11. The Operation and Maintenance shall be comprehensive. The maintenance service provided shall ensure project functioning of the Solar PV system as a whole and Power Evacuation System to the extent covered in the Contract. All preventive / routine maintenance and breakdown / corrective maintenance required for ensuring maximum uptime shall have to be provided. Accordingly, the Comprehensive Operation & Maintenance shall have two distinct components as described below:
12. Preventive / Routine Maintenance: This shall be done by the Contractor regularly and shall include activities such as cleaning and checking the health of the Solar PV system, cleaning of module surface, tightening of all electrical connections, and any other activity that may be required for proper functioning of the Solar PV system as a whole. Necessary maintenance activities.
13. Breakdown / Corrective maintenance: Whenever a fault has occurred, the Contractor has to attend to rectify the fault & the fault must be rectified within 24 hrs. time from the time of occurrence of fault failing which the Contractor will be penalized as per terms & conditions under Performance Guarantee.
14. The Contractor should ensure adequate insurance of Solar PV systems against robbery, theft, fire and acts of God such as natural calamities; flood etc. for 5 years from the date of commissioning the cost of this should include in O&M cost.
15. **Patent Right And Royalties:**

The Successful Bidder shall indemnify the KEA against all third party claims of infringement of patent, royalty's trademark arising from the total assignment or any part thereof. **The indemnity shall be limited to the tender price.**
16. **EHS (Environment, Health & Safety) compliance:**

The contractor will be responsible to ensure the cleanliness of the work place surroundings during and after the works. Also, the contractor shall ensure that appropriate

safety measures are adopted by his workers during all tasks related to execution of works such as Transportation, loading & unloading, erection, testing & commission of the contract works. The contractor shall abide by all the applicable and prevalent labour laws. The contractor should also purchase appropriate insurance policies (Erection all risk /Contractor all risk policies) and provide copies of the policies to the owner, before start of the work. The contractor should provide the list of all his staff at the site to the owner and intimate any changes as and when the changes are made. KEA will not be responsible for any untoward incidence occurred during the execution of the contract.

**17. Termination For Insolvency:**

KEA may at any time terminate the contract by giving written notice to the Successful bidder without compensation to them, if he becomes bankrupt or otherwise insolvent, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the KEA.

**18. Applicable Law**

The contract shall be interpreted in accordance with the laws of the land in India. **The exclusive jurisdiction in all matters arising under this contract shall be Bengaluru.**

**19. Notice**

Any notice given by one party to the other pursuant to the contract shall be sent in writing or mail/Fax/cable and any other form acceptable to each other and confirmed in writing to the address specified for that purpose. A notice shall be effective when delivered or on the notice's effective date, whichever is later.

**20. Taxes and duties:**

- i. The Bidder shall specify all Taxes and Duties in the bills.
- ii. KEA will deduct applicable Taxes at Source as per law from the payable amount to the successful bidder and necessary TDS Certificates will be issued to the successful bidder /contract.
- iii. As regards the Income Tax, Surcharge on Income Tax and any other Corporate Tax, KEA shall not bear any Tax liability whatsoever. The Bidder shall be liable and responsible for Payment of such Taxes as mandated under the provisions of the Law.



- iv. Notwithstanding anything stated in the Sub-Clauses above, the KEA shall have the right to make deduction at Source from the amounts payable to the successful bidder/contractor against this Contract in respect of any Tax liability as may be mandatory in terms of the Law. The KEA shall not bear any liability in this regard but shall issue necessary TDS Certificate in respect of such deductions made.

**21. Price Basis:**

- a) The price quoted shall remain fixed and firm during the period of contract.
- b) The quoted Unit price & total price should include all applicable Duties and Taxes, GST, insurance and any other charges.
- c) The quoted price should include professional and any other incidental charges.

**22. Inspection and Tests:**

- a. The KEA authorized representative including appointed Consultant for the project shall have, at all times, access to the Contractor's premises and also shall have the power to inspect and examine the materials and workmanship of project work during its manufacture, shop assembly and testing. If part of the plant is required to be manufactured in the premises other than the Contractor's, the necessary permission for inspection shall be obtained by the Consultant on behalf of KEA or its duly authorized representative.
- b. KEA shall have the right to serve notice in writing to the Contractor on any grounds of objections, which he may have in respect of the work. The Contractor has to satisfy the objection, otherwise, the KEA at his liberty may reject all or any component of plant or workmanship connected with such work.

**23. Right of the KEA to Make Change(s) in Design**

- a. All designs shall be approved by KEA prior to the execution of such designs. Approval of design by KEA does not absolve the contractor of his accountability for the performance of the project.
- b. The KEA shall have the right to make any change in the design, without absolving the contractor's accountability for proper performance of the project. Modification in the design would be sought by KEA, make the plant layout, cable alignment etc., to suit KEA requirements. Such changes in design shall be incorporated by the contractor without extra cost to KEA.

## 24. Manuals

The Contractor shall supply all necessary erection and commissioning manuals, O&M manuals etc. as and when required. Two sets of test results, manuals etc. shall be submitted by the Contractor on completion of the work in hard and soft copies.

25. During the execution of the contract any disruption in the power supply should be avoided by making parallel line arrangement.
26. If power supply disruption is unavoidable, the disruption should not last more than 12 hours, should be limited to day time hours and should be done with the prior consent of the KEA. If power supply disruption is more than 12 hours, contractor should bear the fuel cost for extended hours of DG operation.

## 2.3 PROJECT EXECUTION TIMELINE

1. The Contractor shall provide full schedule of the supply in detail and delivery schedule along with work schedule thereto. Strict adherence and guaranteed delivery schedule mentioned in terms and conditions shall be the essence of the Contract and delivery schedule must be maintained.
2. The Contractor shall also provide a Bar/ PERT Chart indicating completion schedule for various items involved in the work within the stipulated completion period and the Contractor should strictly adhere to that schedule.
3. The issue of LoI shall be considered as the Zero Date
4. The Bar/ PERT Chart provided by the Contractor shall be submitted to KEA for approval prior to commencement of the execution of the Project. All comments and modifications provided by KEA shall be incorporated and adhered by the Contractor in the Timeline, Bar/ PERT Chart, detailed execution plan, etc. for execution of the Project.
5. This schedule shall be prepared so as to ensure the commissioning of complete plant on or before from 12 weeks of LoI.
6. Partial commissioning of the solar PV plant shall not be considered.

## 2.4 PENALTY FOR THE DELAY & COMPLETION / LIQUIDATED DAMAGES:

- a. The Bidder shall clearly note that time is the essence of the Contract. The Engineering, design, supply, installation commission of SRTPV plant and associated electrical works shall be completed within the stipulated period of 3 months from the date of issue of LOI. . However, early completion of the works will be appreciated.

- b. If the Successful Bidder / contractor fails to commission the plant within the period of 3 months specified in the contract, the KEA shall, without prejudice to its other remedies under the contract, deduct from the contract price as liquidated damage, a sum equivalent to 0.5 % of the contract price for each week of delay, subject to a maximum of 5% of the total contract value.
- c. The KEA reserves the right to terminate the Contract without any liability, in case of failure to undertake / complete the work within the specified period and in case there is a delay in completion & successful commissioning of the plant.

### 3 TECHNICAL SPECIFICATIONS

#### 3.1 STANDARDS

<b>Applicable BIS /Equivalent IEC Standards / MNRE Specifications</b>		
<b>SI No</b>	<b>Equipment /Material</b>	<b>Standard</b>
1	Crystalline Silicon Terrestrial PV modules poly/ mono	IEC 61215/ IS14286
2	Solar PV module safety qualification requirements	IEC 61730 (P1 – P2)
3	PV modules to be used in a highly corrosive atmosphere (Nearby Chemical factories, Coastal area etc.) must qualify Salt Mist corrosion Testing	IEC 61701/ IS 61701
4	Earthing	IS 3043: 1987
5	Switches/ Circuit Breakers/ Connectors	IEC 60947 Part I,II, III / IS 60947 Part I,II, III / EN 50521
6	Junction Boxes/ Enclosures for Charge Controllers/ Luminaries	IP 65 (for outdoor)/ IP 21 (for indoor) As per IEC 529
7	Cables	IEC 60227 / IS 694 IEC 60502 / IS 1554 (part I & II)
8	Overall PVC insulation for UV protection	IEC 69947

### 3.2 SOLAR PV MODULES

1	Type	Crystalline silicon – Poly or Mono
2	Module Efficiency	$\geq 15.2\%$ . I-V curve of the sample module should be submitted
3	Fill factor	$\geq 70\%$
4	Power warranty	25 years limited warranty on power output & 5 years product warranty
5	Performance Warranty	Should not be less than 90% of designed nominal power at the end of 10 years and 80% of designed nominal power at the end of 25 years.
6	Module frame	Anodized aluminum, Non-corrosive and electrolytic ally compatible mounting structure
7	Mounting structure	M.S. mounting structure with Hot dip Galvanized having 70 microns thickness
8	Module minimum rated power	The nominal power of a single PV module shall be $\geq 330W_p$
9	RF Identification tag for each solar module	Must be able to withstand environmental conditions and last the life of the solar module and shall be kept inside the module laminate
10	RF Identification tag data	<ul style="list-style-type: none"> <li>a) Name of the manufacturer of PV Module</li> <li>b) Name of the Manufacturer of Solar cells</li> <li>c) Month and year of the manufacture(separately for solar cells and module)</li> <li>d) Country of Origin (separately for solar cells and module)</li> <li>e) I-V curve for the module</li> <li>f) <math>W_p</math>, <math>I_m</math>, <math>V_m</math> and FF for the module</li> <li>g) Unique Serial No and Model No of the module</li> <li>h) Date and year of obtaining IEC PV module qualification certificate</li> <li>i) Name of the test lab issuing IEC certificate</li> <li>j) Other relevant information on traceability of solar cells and module as per ISO 9000 standard</li> </ul>

- a) The PV modules used must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC 61215 / IS14286. In addition, the modules must conform to IEC

61730 Part-1 - requirements for construction & Part 2 - requirements for testing, for safety **qualification or equivalent IS**

- b) For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to **IEC61701**.
- c) The total solar PV array capacity should not be less than 100 kWp and should comprise of solar crystalline modules of minimum 300Wp and above wattage.
- d) Module capacity less than 300 watts will not be accepted.
- e) Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.
- f) PV modules must be tested and approved by one of the IEC authorized test centers.
- g) The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.
- h) The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. KEA may allow only minor changes at the time of execution.
- i) Other general requirement for the PV modules and subsystems shall be the following:
  - i. The rated output power of any supplied module shall have tolerance within +3%.
  - ii. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode.
  - iii. **The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.**
  - iv. I-V curves at STC should be provided by bidder.
- j) Warranties & guaranties & System performance guarantee.
  - i. Material Warranty:
    - **Material Warranty:** The manufacturer should provide warranty for 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 Solar RTPV Plant,**

- Defects and/or failures due to manufacturing
- Defects and/or failures due to quality of materials
- 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 replace the solar module(s).

ii. Performance Warranty:

Should not be less than 90% of designed nominal power at the end of 10 years and 80% of designed nominal power at the end of 25 years.

- iii. The Bidder shall be required to quote the Net Electrical Energy Generation Guarantee (NEEGG) for Twenty five (25) years period. The Bidder shall give NEEGG per annum after considering proposed configuration and all local conditions, solar insolation, wind speed and direction, air temperature & relative humidity, barometric pressure, rainfall, sunshine duration, grid availability and grid related all other factors and losses due to near shading, incidence angle modifier, irradiance level, temperature loss, array loss, module quality loss, module array mismatch loss, soiling loss and various inverter losses etc. To assess/ verify feasibility of quoted NEEGG, Bidders are required to provide computation documents (PVSyst report) along with considered factors based on which NEEGG has been computed.
- v. Bidders are expected to undertake their own study of solar profile and other related parameters of the area and make sound commercial judgment about power output i.e. Net Electrical Energy Guaranteed Generation. It shall be the responsibility of the Bidder to access the corresponding solar insolation values and related factors of solar plant along with expected grid availability. The Bidder should access all related factors about the selected Project Site for the Project and quote the NEEGG for the proposed Project Site.
- vi. The Contractor shall be responsible for achieving NEEGG. For any shortfall in NEEGG corresponding to the offer, the compensation shall be recovered from the Contractor. The Contractor shall maintain the Plant equipment

including its repair, replacement, overhauling, etc, so as to give the agreed NEEGG per year.

- vii. The NEEGG quoted for each consecutive year should have maximum 1 % annual degradation factor in NEEGG. If the bidder anticipates any degradation of the modules during the first year, it shall be taken care of to provide additional capacity of solar PV modules to meet guaranteed generation at the end of first year to avoid liquidated damages/compensation on account of Performance Guaranteed Generation. The NEEGG of consecutive year should not be more than the previous year's NEEGG. Bids not following these conditions shall be summarily rejected.

### 3.3 MOUNTING STRUCTURE

- a) Suitable number of PV panel structures shall be provided. Structures shall not be penetrating the roof. Suitable method and arrangement of fixing of structures to be selected to avoid roof damage and the same should be got approved from KEA. The successful bidder is responsible to rectify damages if any during the installation of PV panels. Successful bidder may consider to designing foundation (RCC and PCC) and structure considering the wind loads and structural load bearing capacity of the building.
- b) The solar PV modules shall be mounted on fixed metallic structures of adequate strength and appropriate design, which can withstand the load of the modules and high wind velocities up to 33m/s.
- c) The MS and Aluminum Structure material, its fasteners, nuts and bolts shall be corrosion resistant and should be hot dip galvanized for MS structure. Galvanizing should meet ASTM A-123 hot dipped galvanizing or equivalent which provides at least spraying thickness of 70 microns.
- d) The module mounting structure shall be designed in such a way that, it will accommodate maximizing the solar RTPV output.
- e) The mechanical and electrical installation structures shall be designed such that, there shall be no welding requirement or complex machinery at the installation site.
- f) The successful Bidder shall specify installation details of the PV modules and



the mounting structures with appropriate diagrams and drawings. Such details shall include, but not limited to, the following:

- I. Details with drawings for fixing the modules;
- II. Structure installation details and drawings;
- III. Electrical grounding (earthing);
- IV. Inter-panel/Inter-row distances with allowed tolerances;

g) Detailed specifications for the mounting structure are given below:

Sl No	Particulars	Specifications
1	Wind velocity withstanding capacity	33m/s
2	Structure material	Structural materials shall be made of corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, and nuts and bolts. Hot dip galvanized steel with galvanization thickness of minimum 70 microns or Aluminum with the same standards.
3	Bolts, nuts, fasteners, panel mounting clamps	Stainless steel SS304
4	Mounting arrangement for flat roofs	The mounting structures shall be erected to achieve required slope from north to south to have a maximum solar PV output efficiency throughout the year The minimum height of Solar panel on lower side of the lean to roof (on southern side) shall not be less than 250mm. Structures shall be mounted on the building roof with Removable concrete ballast made of Pre-fabricated PCC (1:2:4), M15. The mounting structures shall be made of M.S. with Hot dip galvanized steel with galvanization minimum thickness of 70 micron or Aluminum with the same standards.
5	Installation	The structures shall be designed for simple mechanical on-site installation
6	Minimum distance between roof edge and mounting structure (Horizontal Clearance)	$\geq 0.60$ m
7	Minimum clearance between lowest part of panel and mounting	Shall not be less than 250mm

	structure (Vertical Clearance)	
8	Access for panel cleaning and maintenance	All solar panels must be accessible from the top for cleaning and from the bottom for access to the junction box
9	Panel tilt angle	North – south orientation with a fixed tilt angle depending on location (south facing)
10	Spares	Required numbers of spare structures must be provided
11	Warranty	The structure must have a free replacement warranty for 5 years.

- h) The successful bidder shall specify installation details of the solar PV modules and the support structures with lay-out drawings and array connection diagrams. The work shall be carried out as per the designs approved by the KEA.

### 3.4 ARRAY JUNCTION BOX

- a) The array junction boxes made of Thermo-Plastic are to be free of dust, vermin and waterproof. The terminals shall be connected to copper bus-bar arrangement of proper sizes made of tinned copper flats. The array junction boxes will have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables.
- b) Technical Specification – Junction Boxes:

Sl No	Particulars	Specifications
1	Material	Dust, Vermin & Water proof Thermoplastic
2	Hardware SS 304	Cable Gland Thermoplastic
3	Protection	IP 65 enclosures with transparent covers with Surge Protection Device (SPD) Class-I/II, DC Fuse with holder and string disconnect or

### 4.5 SURGE PROTECTION DEVICE

- a) Internal surge protection shall consist of three MOV/GDT (glass discharge tube) type arrestors connected from +ve and –ve terminals to earth (via Y arrangement) for higher withstand of the continuous PV-DC voltage during earth fault condition. SPD shall have safe disconnection and short circuit interruption arrangements through integrated DC inbuilt bypass fuse (parallel)

which should get tripped during failure mode of MOV, extinguishing DC arc safely in order to protect the installation against fire hazards.

- b) Nominal discharge current ( $I_n$ ) shall be minimum of 10kA with max. Discharge current ( $I_{max}$ ) of 20kA with discharge time of 8/20 micro seconds.
  - i. A surge protection device in each sub-array line shall be provided to prevent the high current transients from entering into the DC bus.
  - ii. It must be with DC disconnect switch and DC fuses positive side shall have a voltage rating of 1000V DC and current rating as required.

### 3.5 DC DISTRIBUTION BOX

- a) DC distribution box shall be mounted close to the solar grid inverter. The DC distribution box shall be of thermos-plastic IP65 DIN rail mounting type and shall comprise the following components and cable terminations:
  - i. 2/3 pole DC circuit breaker
  - ii. DC surge protection device (SPD) class 2 as per IEC 60364-5-53.
  - iii. Cable termination glands for DC cables from DC combiner box and grid inverter.
- b) The bus bars shall be made of copper of adequate size.

### 3.6 AC DISTRIBUTION BOX

- a) AC Distribution Panel Board (ACDPB) shall control the AC power from PCU/ inverter and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- b) An AC distribution box shall be mounted close to the solar grid inverter. The AC distribution box shall be of wall / rail mounting type and shall comprise of following components:
  - i. 2 pole / 4 pole AC circuit breaker.
  - ii. AC surge protection device (SPD), class 2 as per IEC 60364-5-53. Suitable cable termination glands for cable from inverter and electrical distribution board.
- c) A manual disconnect switch beside automatic disconnection to grid would have to be provided to ensure physical isolation for enabling the utility personal to carry out any maintenance. This manual switch shall have the locking provision.

- d) All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.
- e) The changeover switches, cabling work should be undertaken by the bidder as part of the project.
- f) All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air - insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50Hz
- g) All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.
- h) Should conform to Indian Electricity Act and rules

### 3.7 DC and AC CABLES

- a) All Cables shall confirm to relevant IS/ IEC standards.
- b) For the DC cabling, XLPE insulated and PVC sheathed, UV stabilized single core flexible copper cables shall be used. Multi-core cables shall not be used. Only FRLS copper wires of appropriate size and of reputed make shall have to be used.
- c) For the AC cabling, PVC or XLPE insulated and PVC sheathed single or multi-core flexible copper cables shall be used. Outdoor AC cables shall have a UV-stabilized outer sheath.
- d) The total voltage drop on the cable segments from the solar PV modules to the solar grid inverter shall not exceed 2.0%.
- e) The total voltage drop on the cable segments from the solar grid inverter in the roof of third floor to the building A.C. distribution board in the ground floor shall not exceed 2.0%.
- f) Cabling shall be carried out as per IE Rules.
- g) Cable Ends: All connections are to be made through suitable cable/lug/terminals; crimped properly & with use of Cable Glands.
- h) Cable Marking: All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified.
- i) All cable schedules with cable sizes /layout drawings and design aspect of the cable sizes have to be got approved from the KEA prior to installation.
- j) All cable tests and measurement methods should confirm to IEC 60189.
- k) Multi Strand, annealed high conductivity copper conductor PVC type 'A' pressure extruded insulation.

- l) Overall PVC insulation for UV protection and confirm to IEC 69947.
- m) Armoured cable shall be used for underground cable laying

### 3.8 EARTHING PROTECTION

- a) A minimum of two separate dedicated and interconnected earth electrodes must be used for equipment earthing both on DC side and AC side.
- b) An additional dedicated earth electrode shall be provided to Surge Protection Device.
- c) Earthing shall be done in accordance IS 3043-1987, provided that earthing conductors shall have a minimum size of 6.0 sqmm copper wire or 10 sqmm aluminum wire or 6mm X 25 mm hot dip galvanized iron flat. Unprotect aluminum or copper-clad aluminum conductors shall not be used for final underground connections to earth electrodes.
- d) The earth electrodes shall have a pre-cast concrete enclosure with a removal lid for inspection and maintenance. The entire earthing system shall comprise non-corrosive components

### 3.9 CAUTION SIGNS & DANGER BOARDS

- a) Danger boards or labels as per Electricity Act, 2003 shall be provided at all the appropriated places.
- b) In addition to above the following noncorrosive caution boards with the following text shall be provided at the AC distribution box near the solar grid inverter and the building distribution board to which the AC output of the solar PV system is connected:
  - i. **WARNING – DUAL POWER SOURCE**
  - ii. **SECOND SOURCE IS SOLAR SYSTEM**
- c) The size of the danger boards and caution label shall be appropriate to visualize with white letters on a red background.
- d) Two set of laminated CEIG and Solar PV plant single line diagram should be submitted after the plant commission.

### 3.10 GRID INVERTER AND BI-DIRECTIONAL METER

Only BESCOM/BESCOM empanelled grid tied inverters and bi-directional meters shall be used.

1. Inverter/PCU shall be non- Transformer string inverters, grid tied in nature, shall consist of MPPT controller. Inverters shall be decided based on array design/suitable rating in case of string design, associated control and protection devices etc. all integrated into PCU. It shall provide necessary protections for Grid Synchronization. The Inverters should convert DC power produced by SPV modules in to AC power and must synchronize automatically its AC output to the exact AC Voltage and frequency of Grid.
2. The DC energy produced has to be utilized to maximum and supplied to the bus for inverting to AC voltage to extract maximum energy from solar array and provides 3-ph, 400V AC/ (+10% to – 10%), 50+/-1.5 Hz with total harmonic voltage distortion less than 3% to synchronize with local grid.
3. The Inverters shall be of very high quality having efficiency not less than 97% and shall be capable of running in integrated mode.
4. Degree of protection of the indoor Inverters shall be at least IP-42 and that of outdoor at least IP-65.
5. Built in with data logging to remotely monitor plant performance through external PC shall be provided.
6. The Inverters should be designed to be completely compatible with the SPV array voltage and Grid supply voltage.
7. The dimension, weight, foundation details etc. of the PCU shall be clearly indicated in the detailed technical offer.
8. The PCU shall be capable of complete automatic operation, including wake-up, synchronization & shut down independently& automatically.
9. Both AC & DC lines shall have suitable fuses & surge arrestors and Bidder to allow safe start up and shut down of the system. Fuses used in the DC circuit should be DC rated.
10. Inverters/PCU shall operate in sleeping mode when there will no power connected.
11. The inverter should be capable of injecting the reactive power to the grid in case of requirement.

**12. Protections to include:**

- i. Over voltage both at input & output
- ii. Over current both at input & output
- iii. Heat sinks over temperature
- iv. Short circuit
- v. Protection against lightning
- vi. Surge arrestors to protect against Surge voltage induced at output due to external source
- vii. Anti- Islanding Protection and other required protections.
- viii. It should have user friendly LED/LCD or touch display for programming and view on line parameters such as:
  - Inverter per phase Voltage, current, kW, kVA and frequency,
  - Grid Voltage and frequency,
  - Inverter (Grid) on Line status,
  - PV panel voltage,
  - Solar charge current
  - Individual power stage heat sink and cabinet temperature,
  - Inverter Import export kWh summation
  - Solar kWh summation
  - Inverter on
  - Grid on
  - Inverter under voltage/over voltage
  - Inverter over load
  - Inverter over temperature

13. PCU shall be capable to synchronize independently & automatically with grid power line to attain synchronization and export power generated by solar plant to grid.

14. The PCU shall be capable of operating in parallel with the grid utility service and shall be capable of interrupting during faults.

15. The PCU shall be able to withstand an unbalanced load conforming to IEC standard (+/-5% voltage) and relevant Indian electricity condition. The PCU shall include appropriate self- protective and self-diagnostic features to protect itself and the PV array from damage in the event of PCU component failure or from parameters –

beyond the PCU's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the PCU front panel to cause the PCU to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the PCU, including commutation feature, shall be cleared by the PCU protective devices and not by the existing site utility grid service circuit breaker.

16. The Inverter shall go to shutdown/standby/sleep mode, with its contacts open, under the following conditions before attempting an automatic restart after an appropriate time delay.
  - i. When the power available from the PV array is insufficient to supply the losses of the PCU, the inverter shall go to standby/shutdown/sleep mode.
  - ii. The PCU control shall prevent excessive cycling of shut down during insufficient solar radiance.
17. Operation outside the limits of power quality as described in the technical data sheet should cause the power conditioner/inverter to disconnect the grid. Additional parameters requiring automatic disconnection are
  - i. Over current
  - ii. Earth fault
  - iii. In each of the above cases, tripping time should be less than a few seconds.
18. Detailed technical description of the complete unit of offered Inverter should be furnished with bid document.
19. Following Technical documents of Inverter shall be supplied for approval from KEA
  - i. Detailed technical description of the complete unit
  - ii. Instructions for installation and operation
  - iii. Electrical diagrams of all internal cabling necessary for installation, maintenance and fault identification.
  - iv. Description of electrical and mechanical characteristics of individual units
  - v. Maintenance and fault-identification procedures.
  - vi. Safety precautions
  - vii. Data capability, acquisition and storing for future analysis
  - viii. Factory test reports in details for various parameters.



- ix. Trouble shooting procedures

## **20. Grid Islanding**

- i. Disconnection of the PV generator in the event of loss of the main grid supply is to be achieved by in built protection within the power conditioner unit (PCU). This may be achieved through rate of change of current, phase angle, unbalanced voltage or reactive load variants. Operation outside the limits of power quality as described in the technical data sheet should cause the PCU to disconnect from the grid.
  - ii. In case of the above, tripping time should be less than 0.5 seconds. Response time in case of grid failure due to switch off or failure based shut down should be well within 5 seconds. In case of use of two or more Inverters of total capacity, suitable equipment for synchronizing the AC output of both the Inverters to the ACDB/Grid should be provided.
  - iii. Automatic reconnection after the grid supply is restored
  - iv. Inverter shall have facility to reconnect automatically to the grid following restoration of grid.
- 21. All maintenance requirements and their schedules, including detailed instructions on how to perform each task.
  - 22. Detailed schematics of all power instrumentation, control equipment and subsystems along with their interconnection diagrams. Schematics shall indicate wiring diagrams, their numbers and quantities, type and ratings of alternate components and subsystems.
  - 23. All documents and write ups shall be in English. They shall be clean and legible, signed, approved by a competent representative of the successful bidder.

### **3.11 DRAWINGS & PROJECT EXECUTION SCHEDULE**

To be furnished by tenderer after award of contract

The successful bidder shall furnish the following drawings Award/Intent and obtain approval

- a) General arrangement and dimensioned layout
- b) Schematic drawing showing the requirement of SPV panel, Power conditioning Unit(s)/ inverter, Junction Boxes, AC and DC Distribution

Boards, meters etc.

- c) Structural drawing along with foundation details for the structure.
- e) Itemized bill of material for complete SPV plant covering all the components and associated accessories.
- f) Layout of solar Power Array.
- g) Shadow analysis of the roof.
- h) Bar/Pert charts of the project execution schedule and should strictly adhere to the same time line.

## 4 SCHEDULE OF TECHNICAL INFORMATION

The Bidder/Tenderer to attach /enclose the following particulars along with the Technical

### 4.1 GENERAL TECHNICAL PARTICULARS-1

A	SPV Module			
i.	Manufacture's Name & Address			
ii.	Type of Modules with catalogue Reference			
iii.	Design of module at standard test condition			
	a) Peak power watt			
	b) Peak Voltage			
	c) Peak current			
	d) Open circuit Voltage			
iv.	No. of SPV Modules proposed to achieve minimum 100 kWp power			
v.	Short circuit current of PV module (Amp)			
vi	Open circuit voltage of PV Module (V)			
vii	Max. Power rating of one PV Module (KWp)			
viii	Photo electrical conversion efficiency of SPV module (not less than 15%)			
ix	Fill factor of the SPV module (> 0.70)			
x	Designated life of the SPV			

	modules			
xi	Overall dimensions (in mm)			
xii	Weight			
xiii	Frame materials			
xiv	Reference of Standards / approval, if any			
xv	Life of SPV Module (Years of Operation)			
<b>B</b>	<b>PV ARRAY CAPACITY</b>			
i	Number of Module in series in each array			
ii	Peak power rating of one array			
iii	Number of array considered to achieve the specified output			
<b>C</b>	<b>MODULE MOUNTING STRUCTURE</b>			
i	Type of accessories structure and its materials used in frame and accessories			
ii	Type of mounting structures (Fixed or any other type)			
iii	Overall dimensions			
iv.	Type of mounting			
v.	Surface azimuth angle of PV Modules			
vi	Tilt angle (Slope) of PV			

	module		
vii	Confirm structure & module frame shall be designed at wind speed 150 km/hr.		
D	<b>INVERTER WITH POWER CONDITIONING UNITS (PCUs)</b>		
i	Manufacturer's name & address		
ii	Type of PCU (Centralized or string type)		
iii	Number of units proposed		
iv.	Rated capacity of each PCU		
v.	Input DC Voltage range		
vi	Output voltage		
vii	Frequency		
viii	Minimum efficiency at full load		
ix	Location (outdoor/indoor)		
x	Output wave shape		
xi	Dimensions in mm		
xii	IP protection level		
xiii	Type of cooling required		
xiv	Type of mounting		
xv	Suitability for specified Ambient Temp. range & Humidity at		
xvi	Type of Protection provided		
xvii	Over Load Condition		

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xviii	Short Circuit Protection		
xix	Low/High Voltage Protection		
xx	Power Electronic Component Protection		

E	<b>METERING</b>		
i	Nos. of meters proposed to be provided		
ii	Location of meters		
iii	Manufacturer's name & address		
iv.	Confirm compliance with laid down specification		

To be printed on Bidder letter head

**5 FORMAT NO-1-SUBMISSION OF TENDER**

**FORMAT NO-1-SUBMISSION OF TENDER**

FROM: - (Full Name and Address of the Tenderer/Bidder)      Dated -----

M/S-

.....  
.....  
.....

To,

**THE SECRETARY  
KARNATKA ENGINEERS ACADEMY  
Kamalanagar, Bengalur, Karnataka.**

Sir,

**For Design, Supply, Installation & Commissioning of Solar RTPV Grid connected power plant on the Roof-top of KEA under Net-metering scheme including operation and maintenance for a period of five years.**

We hereby submit our offer in full compliance with terms & conditions of the subject tender. The tenders are sent separately marked as below in the register/speed post/courier:

- a) Part- 1 - Technical Bid.
- b) Part- 2 - Price Bid.

Yours faithfully

**(Signature of Bidder with Seal).**

## **6 FORMAT NO -2-TERMS OF THE CONTRACT PERIOD**

### **FORMAT NO -2-TERMS OF THE CONTRACT PERIOD**

**Particulars of the work: Engineering, Design, Supply, Installation & Commissioning of 100kW Solar RTPV Grid connected power plant on the Roof-top of KEA under Net-metering scheme including operation and maintenance for a period of five years.**

1. Penalty at 0.5% of cost of the work award per week subject to the Maximum of 5% of the contract value.
2. **Last date and time of submission of tender: ----- up to 4:00PM.**  
**Demand Draft of Earnest money deposit: Rs. 1,00,000/- only.**
3. **Period of validity of tender offer: 90 (Ninety) Days from date of Bid opening date.**
4. **Date and Time of opening of technical bid: -----, 11:00AM.**
5. **Place of opening of tender:**  
**Karnataka Engineers Academy, Kamalanagar, Bengaluru, Karnataka.**
6. Name and status of consultant / firm by whom tender document is down loaded.  
(To be filled in by the Tenderer).

**(Signature of Bidder with Seal).**



**7 FORMAT NO -3-GENERAL PARTICULARS OF TENDER**

**FORMAT NO -3-GENERAL PARTICULARS OF TENDERER**

1. Name of Tenderer / Bidder:.....
2. Postal Address: .....
3. Telephone, Fax No.:
4. E-mail id:
5. Name and designation of the representative of the Tenderer / Bidder to whom all references shall be made.
6. Amount and particulars of the earnest money (EMD) deposited.
7. Financial capacity/turnover of the Tenderer / Bidder for carrying out the work (*Attach audited balance sheets certified by the Chartered Accountant of last three years*).
8. Has the bidder paid arrears of income tax? (Attach copy of three years Income Tax returns).
9. Has the bidder has been ever debarred/black listed by any Govt. department /undertaking from undertaking any work?
10. Has the bidder have any relative working in KEA? If yes mention the name and designation.

**(Signature of Bidder with Seal).**

## **8 FORMAT NO -4- DECLARATION BY THE TENDERER**

### **FORMAT NO -4-DECLARATION BY THE TENDERER**

I/We.....(Herein after referred to as the bidder) being desirous of taking up the work, under the above mentioned tender and having fully understood the nature of the work and having carefully noted all the terms and conditions, specifications etc. as mentioned in the tender document, DO HEREBY DECLARE THAT-

1. We are fully aware of all the requirements of the tender document and agree with all provisions of the tender document.
2. We are capable of executing and completing the work as required in the tender.
3. We accept all risks and responsibilities directly or indirectly connected with the performance of the tender.
4. We have no collusion with other bidder, any employee of KEA or with any other person or firm in the preparation of the bid.
5. We have not been influenced by any statement or promises by KEA or any of its employees but only by the tender document.
6. We are financially solvent and sound to execute the tendered work.
7. We are sufficiently experienced and competent to perform the contract to the satisfaction of KEA.
8. The information and the statements submitted by us with the tender are true.
9. We are familiar with all general and special laws, acts, ordinances, rules and regulations of the Municipal, District, State and Central Government that may affect the work, its performance or personnel employed therein.
10. We have never been debarred/block listed from similar type of work by any Government undertaking /Department.
11. We have remitted the earnest money (EMD) as required in the tender document & attached here with proof of the same.
12. **We accept that the earnest money may be absolutely forfeited by KEA if we fail to undertake the work or sign the contract and furnish the performance guarantee within the stipulated time.**

13. The rates quoted in this offer will be valid up to 90 days from the date of opening of Price Bid.
14. We give an assurance to execute the tendered work as per scope of the work, terms and conditions of the tender for Engineering, design, supply, erection, testing & successful commissioning of solar roof top power plant at KEA & Associated electrical works.
- 15. We accept that, we will sign an agreement on stamp paper with KEA and furnish performance guarantee as stipulated after agreeing to rates approved through this Bid & issue of L.O.I & before issue of L.O.A.**
16. We have read and examined Tender Notification, Information/instructions to Bidders, scope of work (Part-1&2), General conditions of contract, Special conditions of contract, in all respects.
17. We hereby submit our Bid and undertake to keep our Bid Valid for a period of **90 days** from the date of bid opening. We hereby further undertake that during said period we shall not vary/alter or revoke our Bid.
18. This undertaking is in consideration of KEA agreeing to open my Bid and consider and evaluate the same for the purpose of award of Work in terms of provisions of clause entitled "**Award of Contract**"
19. Should this Bid be accepted, we also agree to abide by and fulfill all the terms, conditions of provision of the above mentioned bid documents.

**(Signature of Bidder with Seal).**

## **9 FORMAT NO -5- ELIGIBILITY OF TENDERER**

### **FORMAT NO -5-ELIGIBILITY OF TENDERER**

#### **WE UNDERSTAND THAT THE ELIGIBILITY OF TENDERER AS FOLLOWS**

1. The bidder should have adequate technical and financial capability to undertake such task as per terms of reference provided to them considering various steps to be performed from the inception to the successful commissioning of solar roof top power plant within the time frame prescribed by the Commission.

2. The prospective bidder shall have following qualifying requirements:

#### **2.1. Technical Requirements:**

- a. Bidders should have 3 years' experience in carrying out similar works comprising of Engineering and Design, Procurement and Testing & Commissioning of solar PV power system.
- b. Bidders should have executed more than cumulative 2MWp Rooftop installation works for office buildings /commercial premises/ residential buildings in the last 3 years. Bidders should submit a valid proof such as completion certificates with technical details while submitting the tender.
- c. The Bidder shall be a legal entity registered and recognised under the Act prescribed by the Government of India.
- d. The bidder should have adequately technically qualified personnel with capability to undertake the assignment, as per the terms of reference, considering the numerous tasks to be performed by them, from the inception to the completion of the assignment, within the time frame prescribed by the KEA.
- e. Bidders shall furnish/ attach to their offer all relevant documents in proof and support of the above by uploading to e-procurement portal along with technical bid formats.

**2.1.1. Financial Requirements**

- a. The cumulative Turnover of the Tenderer / Bidder during the last 3 years shall be more than Rs.5 crore. The Tenderer / Bidder to furnish proof in this regard by way of Annual Accounts i.e. by way of Balance Sheet and Profit and Loss A/c, (includes Income & Expenditure, Receipts and Payment Account instead of P&L A/c), audited and certified by a Chartered Accountant.
- b. The liquid assets of the bidder consisting of cash in hand + cash at bank + term deposits + availability of fund-based credit facility in any Nationalized Scheduled Bank, shall not be less than Rs.1.0 crore as on 31.07.2018 or at later date before submission of the bid
- c. The Tenderer / Bidder must be registered for GST with the concerned department.
- d. The Tenderer / Bidder must be registered with Income tax department and should produce Latest Income Tax clearance certificate/income tax return details.
- e. The documents justifying the said financial requirements shall be uploaded to e-procurement portal in the technical bid.
- f. The bidder should not have been black listed by any organization.

**(Signature of Bidder with Seal)**

## 10 FORMAT NO -6- UNDERTAKING

### FORMAT NO -6-Undertaking

#### WE HAVE UNDERSTOOD THE FOLLOWING CONDITIONS OF TENDER

1. We have submitted complete Tender in all respects with all schedules, documents etc. as per the tender document issued by KEA.
2. We have submitted tender documents by up loading to e-procurement portal within the due date and time as mentioned in tender form.
3. We understand that KEA reserves the right for not accepting the lowest of any/all the tenders in whole or in part without assigning any reason for such non/acceptance.
4. We accept that the rates finalized through this tender shall be valid & Firm during the period of contract and also for same unit rates for 125% of the ordered quantity in case of necessity for part 1 scope of work
5. We have quoted the rates as per the scope of the work laid down by KEA mentioned in the tender documents.
6. We have furnished all information in the tender in English language only. Information in any other Language has been accompanied with its translation in English. We know that failure to comply with this may disqualify our tender.
7. We have furnished name, residence and places of our business of the person or persons submitting the tenders printed on our official letter head and have signed with our seal above our usual signatures.
8. We understood the clause fully “If the Tenderer / bidder find discrepancies in, or omissions from the scope of the work or other documents or if in doubt as to their meaning, we should at once intimate KEA and obtain clarification in writing prior to submitting the tender”.
9. We understand that any approach from us, or our representative or our agent trying to influence the decision of the tender, officially or otherwise shall make our offer/tender liable to be summarily rejected.
10. We have uploaded our offers on Electronic mode in two separate Parts as mentioned below:
  - a) **Part-1: “Technical bid” in electronic mode has been uploaded.**
  - b) **Part -2: “Price Bid” in electronic mode has been uploaded**

We have not written anything extra in Price Bid, except prices.

11. We understood the following procedure of opening of tender & awarding the contract:
  - a) **Part-1: Technical Bid:** Technical bid shall be opened at the time and date mentioned in the tender notice.
  - b) **Part-2: Price Bid:** The price bid containing Price bid of the technically responsive bidders shall be opened as per time and date informed.
12. Only our authorized representative has signed all the changes made on tender document.
13. We understand that in the event, the successful bidder /contractor fails to sign the contract with KEA within specified time or withdraws his offer within the validity period or fails to accept the order for any reason whatsoever, or fails to complete the work in time, then the earnest money shall be forfeited by KEA and the bidder shall be black listed for any other such activities in the State of Karnataka.
14. We have submitted our Price bid duly signed, on the original price schedule attached with this tender document. This price schedule has been uploaded super scribed as "PRICE BID".
15. We have understood that Tenders/offers of only those firms or bidders, who are either technically capable or who are accredited representatives of technically expert firms and who give satisfactory evidence of such experience shall be considered.
16. Covering letter for submitting the tender document has been provided in the tender document.
17. We agree for penalty clauses and agree for the same.
18. We agree for the payment terms indicated in the Bid document.

**(Signature of Bidder with Seal).**

**11 FORMAT NO -7- NO DEVIATION CERTIFICATE****FORMAT NO -7-NO DEVIATION CERTIFICATE**

With reference to our Bid Proposal No.....dated.....in respect of **Design, Supply, Installation & Commissioning of Solar RTPV Grid connected power plant on the Roof-top of KEA under Net-metering scheme including operation and maintenance for a period of five years**, We hereby confirm that we have read the provisions of the contract, the stipulation of these clauses are acceptable to us, and we have not taken any deviation whatsoever to these clauses:

SI No	Name of the condition	Reference Clause No	Document reference
1	Terms of Payment		
2	Bid Security /EMD		
3	Warrantee & Contract Performance Guarantee		
	Materials supply & erection portion		
	Maintenance portion		
4	Penalty for the Delay & Completion / Liquidated damages.		
5	Price basis		
6	Completion Period / Work schedule		
7	Taxes and Duties		

**(Signature of Tenderer with Seal)**



## 12 FORMAT NO -8- POWER OF ATTORNEY

### FORMAT NO -8-POWER OF ATTORNEY

(On Non-Judicial Stamp Paper of appropriate Value)

KNOW ALL MEN BY THESE PRESENTS that we .....a Company incorporated under the laws of .....and having its Registered Office/Head Office at ----- as "**contractor**" which expression shall unless repugnant to the Context or meaning thereof, include its successors, administrators and assigns) acting through Mr.....its constitute, nominate and appoint M/s.....a Company incorporated under the laws of .....and having its Registered/ Head Office at as its duly constituted lawful Attorney (hereinafter called "Attorney" or "Authorized Representative") to exercise all or any of the powers for and on behalf of the contractor in regard to Specifications of the bid for which have been invited by ..... (Address "Owner") to undertake the following acts:

- i. To submit proposal and participate in the aforesaid Bid Specification of the "Owner" on behalf of the "**contractor/firm**".
- ii. To negotiate with the "**KEA**" the price for award of the contract pursuant to the aforesaid Bid and to sign the contract with the "**KEA**" for and on behalf of the "**contractor/firm**".
- iii. To receive, accept and execute the contract for and on behalf of the "**contractor /firm**".
- iv. To do any other act or submit any document related to the above.
- v. It is expressly understood that the Power of Attorney shall remain valid, binding and irrevocable till submission of the Contract performance guarantee in terms of the Contract. The "**contractor/firm**" hereby agrees and undertakes to satisfy and confirm all the whatsoever the said "Attorney"/**Authorized Representative**" quotes in the Bid, negotiates and signs the contract with the "**KEA**" and/or purports to act on behalf of the "**contractor/firm**" by virtue of this Power of Attorney and the same shall bind the "**contractor/firm**" as if done by itself.

IN WITNESS WHEREOF THE **“contractor/firm”** has executed these Presents at..... on this day of ----- under the Common Seal of the **“contractor/firm”** company.

Signature of **“contractor”/ “Firm”**

or his authorized Representative

who authorizes the power of attorney

with their Seal:

Acceptance

Signature of

The power of attorney holder

WITNESSES:

1. Signature.....  
Name .....  
Designation.....  
Occupation.....
2. Signature .....  
Name.....  
Designation.....  
Occupation.....

**(Signature of Bidder with Seal).**

**13 FORMAT NO -9- DETAILS OF EXPERIENCE**

**FORMAT NO -9-Details of Experience**

Details of Experience of Engineering, Design, Supply, and Installation & Commissioning of  
Solar RTPV Grid connected power plant on the Roof-top,

<b>Sl. No.</b>	<b>Details of Work order&amp; Date (Attach copy of work order or work completion certificate)</b>	<b>Name of organization</b>	<b>Amount of work in Rs</b>
<b>1</b>			
<b>2</b>			

**(Signature of Bidder with Seal).**

**14 FORMAT NO -10- DETAILS OF TEAM COMPOSITION****FORMAT NO -10- DETAILS OF TEAM COMPOSITION**

Details of the Team composition for carrying out the Engineering, Design, Supply, and Installation & Commissioning of Solar RTPV Grid connected power plant on the Roof-top of KEA under Net-metering scheme including operation and maintenance for a period of five years.

Sl. No.	Name of the person	Qualifications	Nos. of persons	Experience	Remarks
1					
2					
3					
4					

(Signature of Bidder with Seal).

**15 FORMAT NO -11- DECLARATION**

**FORMAT NO -11-DECLARATION**

I, ..... hereby declare that, the firm has not been blacklisted from any of the organizations, in which the firm has under taken the Assignments.

**(Signature of Bidder with Seal).**

## 16 FORMAT NO -12- NET ELECTRICITY ENERGY GENERATION GUARANTEE

### FORMAT NO -12- Net Electricity Energy Generation Guarantee

1. The Contractor shall quote the Net Electrical Energy Generation Guarantee for annual basis considering the Reference Global Average Radiation indicated in this Tender.
2. The Contractor shall demonstrate cumulative “Actual Delivered Energy” at metering point of all the building as compared to the *Base NEEGG* for every year from the date of starting of O&M Period.
3. The quoted NEEGG as in Table no. 1 Bin Format 12 for any year shall be permitted with maximum 1 % degradation factor in previous year generation.
4. The quoted NEEGG will be used for the calculating CUF and Financial evaluation.

**Table 1: Guaranteed Net Electricity Energy Generation**

Sl. No	Year	Net Electricity Energy Generation in kWh
1	Year 1	
2	Year 2	
3	Year 3	
4	Year 4	
5	Year 5	
6	Year 6	
7	Year 7	
8	Year 8	
9	Year 9	
10	Year 10	
11	Year 11	
12	Year 12	
13	Year 13	
14	Year 14	
15	Year 15	
16	Year 16	
17	Year 17	
18	Year 18	

19	<b>Year 19</b>	
20	<b>Year 20</b>	
21	<b>Year 21</b>	
22	<b>Year 22</b>	
23	<b>Year 23</b>	
24	<b>Year 24</b>	
25	<b>Year 25</b>	

**(Signature of Bidder with Seal).**

**17 FORMAT NO -13- Price Bid****FORMAT NO -13- Price Bid****Price bid for**

**Design, Supply, Installation & Commissioning of Solar RTPV Grid connected power plant on the Roof-top of KEA under Net-metering scheme including operation and maintenance for a period of five years,**

Sl. No	Particulars	Solar Plant capacity	Unit price per KWp	Goods & Service Tax (GST)	Total Price in Indian Rs.
			a	b	a+b
1	Engineering, Design, Supply, Installation & Commissioning and comprehensive operation & Maintenance for five years of 100kW grid tied solar rooftop PV plant	100kW			
2	1 <sup>st</sup> year Operation & Maintenance cost	100kW			
3	2 <sup>nd</sup> year Operation & Maintenance cost	100kW			
4	3 <sup>rd</sup> year Operation & Maintenance cost	100kW			
5	4 <sup>th</sup> year Operation & Maintenance cost	100kW			



6	5 <sup>th</sup> year Operation & Maintenance cost	100kW			
7	<b>Total</b>				

# Annexure 1

**PREFERRED MANUFACTURER OF MAJOR EQUIPMENT**

<b>Sl.no</b>	<b>Equipment</b>	<b>Manufacturer</b>
<b>1</b>	Solar PV Modules	Vikram/Trina/Canadian/Renewsys
<b>2</b>	Grid tie string inverter	Delta/Fronius/Power one
<b>3</b>	Module mounting structures	Sapa/Schletter/S-rack
<b>4</b>	Lightning arrestor & Earthing kit	True power/OBO/ABB
<b>5</b>	Surge protection device	Pheonix/True power
<b>6</b>	Protective switchgear	ABB/Schneider/L&T/Legrand
<b>7</b>	Remote Monitoring System	Webdyn/E-senz/Solar log
<b>8</b>	LT & HT cable	Polycab/Havels/Universal
<b>9</b>	DC Solar cable	Polycab/Lap/Siechem
<b>10</b>	Mc4 connectors	Bizlink/ Elcom

**Note: All the specification of the Balance of system should be as per the section 3: technical specification.**

# Annexure 2

# Schematic Diagram of 100 kW Rooftop Solar PV System for Karnataka Engineers Academy, Bangalore

