

Date : 21/07/2023

**MAHARASHTRA ENERGY DEVELOPMENT AGENCY**  
**DIVISIONAL OFFICE, KOLHAPUR**

**Corrigendum**  
**(Date and Technical)**

- **Name of Work:** Supply, Installation, Testing & Commissioning of total 6 KW Grid connected Roof Top Solar Power Plant, District Information Office Kolhapur, Tal.Karvir, Dist. Kolhapur.
- Quotation Call No.: 2023/DOK/Technical/Desk -1/Quotation/K- 190 Date: 11/07/2023

With reference to above Quotation, Divisional Office, Kolhapur had invited quotes for Supply, Installation, Testing & Commissioning of total 6 KW Grid Connected Solar Roof Top (03 Kwp x 02 Nos) at District Information Office Kolhapur, Tal.Karvir, Dist. Kolhapur, during 12/07/2023 to 18/07/2023. Since the required number of quotations (Minimum Three) are not received in this period, the last date of quotation submission is extended up to 26/07/2023 till 18.00 Hrs. All the quotations received during this period will be opened on 27/07/2023 at 03.00 PM. The conditions in the quotation document are revised and details of same furnished as below. Interested and qualified Contractor/Supplier/Installer should note these corrections/revisions and submit their quotes accordingly.

**1. Clause of quotation document:** Eligibility Criteria/Point no. 04 /Page no. 02.

Existing Clause	Revised Clause
<b>Eligibility Criteria</b> <ol style="list-style-type: none"><li>1. Shall have a registered firm/company with GST registration within Kolhapur division.</li><li>2. Shall provide brief information in prescribed format (enclosed).</li><li>3. Shall not be black listed in any govt and/or other organizations.</li><li>4. Shall provide documentary proof about having experience of supply, installation and commissioning of minimum 10 KW of SPV Grid Connected Solar Power Plant. (Work experience must be of government work).</li><li>5. Shall have an annual average turnover of Rs. 20 lakh per year for FY 2020-21 and 2021-22 duly certified by chartered accountant.</li></ol>	<b>Eligibility Criteria</b> <ol style="list-style-type: none"><li>1. Shall have a registered firm/company with GST registration within Kolhapur division.</li><li>2. Shall provide brief information in prescribed format (enclosed).</li><li>3. Shall not be black listed in any govt and/or other organizations.</li><li>4. Shall provide documentary proof about having experience of supply, installation and commissioning of minimum 05 KW of SPV Grid Connected Solar Power Plant. (Work experience must be of government work).</li><li>5. Shall have an annual average turnover of Rs. 20 lakh per year for FY 2020-21 and 2021-22 duly certified by chartered accountant.</li></ol>

<p>6. Shall provide self-attested copy of IT returns for FY 2020-21 and 2021-22 (Assessment year 2021-22 and 2022-23 )</p> <p>7. Shall have arrangement of providing after sale service in area of installation of systems.</p> <p style="text-align: center;">-----o-----o-----o-----</p>	<p>6. Shall provide self-attested copy of IT returns for FY 2020-21 and 2021-22 (Assessment year 2021-22 and 2022-23 )</p> <p>7. Shall have arrangement of providing after sale service in Kolhapur/Sangli District.</p> <p><b>8. <i>Start-Up's Entrepreneur/Enterprises are eligible for the Exemption in Work Experience and Annual Turn Over as per govt. terms. However such proposals will be analysed for exemption as per MEDA circular no. REN/Circular/2022/2027 Dated: 03 June 2022</i></b></p> <p><b>9. <i>Start-ups who are participating in this tender and seeking exemptions of Work Experience and Annual Turn Over, should have registered Electrical Contractor licence and shall submit the valid registration certificate.</i></b></p> <p style="text-align: center;">-----o-----o-----o-----</p>
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SD/-

**Divisional General Manager  
MEDA, Divisional Office Kolhapur**

**TECHNICAL SPECIFICATION FOR 09 METER HEIGHT 300 WP CAPACITY SOLAR HIGHMAST**

<b>PV Module</b>	Only indigenous modules shall be used in the project. For each High mast SPV module aggregate capacity 1980Wp (min 330Wp X 6Nos Module.
<b>Battery</b>	Li Ferro Phosphate (LiFePo4) batteries of capacity 12.8 Volt, 600Ah @, (12.8V, 100 Ah x 6 nos.) for each High Mast. With cells in a suitable weather resistant enclosures and sophisticated designed battery management system (appropriate over charging, over heating deep discharge protection) without paralleling battery bank. Battery should be in IP-65 enclosure
<b>Light Source</b>	White Light Emitting Diode (W-LED) flood light 6*50Watt (LED +Driver) DC operated conforming to IP65 or above with proper dimmer arrangement Using LEDs which emits ultraviolet light will not be Permitted
<b>Light Output</b>	White color (color temperature 5500-6500 K). Lumen efficiency of LED- min 140 lumens/Watt. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred.
<b>Pole (Minimum Microns)</b>	9M Long, polygonal Raising lowering mast shaft in Single section Suitable for basic wind speed 50 m/sec (180 Km/Hr) complete with head frame, Luminaries carriage suitable to install 6 nos. Luminaries, Solar Panels & battery on the top of the mast .There should be provision to install the type tested Winch inside the mast for raising & lowering of complete solar lighting system along with compact unit of modules through a mounting structure around the pole including hardware. The mast must be hot dip galvanized 20 sided polygonal structure having Bottom A/F minimum Dia 330 mm and top A/ F Dia 150 mm of 3 mm thick. The high mast should have a designed life of 25 years.

<b>Stainless Steel Wire Rope</b>	Wire rope of Grade AISI 316 grade, 7/19 construction, with two ropes continuous min.6 mm diameter and breaking load capacity min. 2000 kg x 2. The breaking load test report obtained from govt. laboratory of the wire rope should justify the desired breaking load capacity.
<b>Raising and Lowering lighting mast</b>	Manual pulley system
<b>Electronics Efficiency</b>	Minimum 85% total

• **MINIMUM TECHNICAL REQUIREMENTS / STANDARDS:**

**1. DUTY CYCLE**

The Solar PV White- LED High Mast Light system should be designed to operate from dusk to dawn.

**2. MODULES**

- a. Only indigenous modules (Make in India) of reputed brand IEC Tested shall be used in the project. Crystalline high power/efficiency cells shall be used in the Solar Photovoltaic module.
- b. The open circuit voltage of the PV modules under STC should be at least 21.0 Volts.
- c. Crystalline high power/efficiency cell shall be used in the Solar Photovoltaic module. The cell efficiency should not be less than 16%.
- d. PV module must be warranted for output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.
- e. The terminal box on the module shall be IP 65 and designed for long life out door operation in harsh environment should have a provision of opening for replacing the cable, if required.
- f. The offered module shall be in accordance with the requirements of MNRE.
- g. Latest edition of IEC 61215 edition II / IS 14286 for Crystalline and shall be certified by MNRE authorized test centre. The bidder shall submit appropriate certificates.
- h. PV modules must qualify to IEC 61730 Part 1- requirements for construction & Part 2 – requirements for testing, for safety qualification.
- i. Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided and if required, blocking diode(s) may

also be provided.

- j. Identification and traceability
- k. Each PV module must use a RF identification tag (RFID), which must contain the following information:
  - a) Name of the manufacturer of PV Module
  - b) Name of the Manufacturer of Solar cells
  - c) Month and year of the manufacture (separately for solar cells and module)
  - d) Country of origin (separately for solar cells and module)
  - e) I-V curve for the module
  - f) Peak Wattage,  $I_m$ ,  $V_m$  and FF for the module
  - g) Unique Serial No and Model No of the module
  - h) Date and year of obtaining IEC PV module qualification certificate
  - i) Name of the test lab issuing IEC certificate
  - j) Other relevant information on traceability of solar cells and module as per ISO 9000 series.
  - k) The RFID should be inside the module laminate

### **3. BATTERY:**

Battery shall be Lithium Ferro phosphate ( $\text{LiFePo}_4$ ) with maximum Depth of Discharge 90%, the batteries should conform to the latest BIS /International standards. The battery shall be of  $\text{LiFePo}_4$  storage batteries as per MNRE/BIS/IEC standards with control electronics, BMS, interconnecting wire/cables properly sealed. Should have designed battery management system (appropriate over charging, over heating deep discharge protection).

- a. Capacity of each battery shall not be less than 12 .8V, 100Ah and 75 Ah as per above table.
- b. DOD shall be 90% i.e., at least 90% of the rated capacity of the battery should be between fully charged & load cut off conditions.
- c. Battery terminal shall be provided with covers.
- d. Suitable carrying handle shall be provided.
- e. Bidder shall mention the design cycle life of batteries at 75%, 50% and 25% depth of discharge at ambient temperature up to 45 degree C.
- f. The batteries shall be designed for operating in ambient temperature of site upto 55 degree C.
- g. The self-discharge of batteries shall be less than 2 % per month of rated

capacity at 27 degree C.

#### **4. LIGHT SOURCE:**

- The light source will be of white LED type The color temperature of white LEDs used in the system should be in the range of 5500 degree K – 6500 degree K. Use of LEDs which emits ultraviolet light will not be permitted.
- The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred. The light output from the white LED light source should be almost constant.
- The lamps should be housed in an assembly suitable for outdoor use and shall comply with IP65. The LED housing should be made of pressure die cast aluminium having sufficient area for heat dissipation and heat resistant toughened clear glass/ high quality poly carbonate fitted with pressurized die cast aluminium frame with SS screws. The temperature of heat sink should not increase more than 30 degree C above ambient temperature even after 48 hrs of continuous operation. This condition should be complied for the dusk to dawn operation of the lamps while battery operating at any voltage between the load disconnect and charge regulation set point.
- High power LED of minimum capacity 1 watt each capable to withstand maximum 1 amp driving current having lens angle greater than 120 degree shall be used. The LED LM 80 test report shall only be used.
- The LED efficiency should be more than 140 lumen / watt.
- All LED in circuit must be connected in series only. It must incorporate fail short mechanism in all LEDs
- The LEDs used in the luminary should have life time more than 50,000 hrs.
- The lumen depreciation of LED shall not be more than 30% even after 50,000 burning hours.
- Power consumption of the each LED Luminary / Lighting unit shall not be more than 30 W (including LED Driver power loss).
- The LED efficacy should be more than 140 lumen / watt.
- Other Parameters :
- LED DC current regulation – better than 3 %
- Input – 12 V DC
- Driver Type- DC-DC ( as per IEC 62384)
- CRI - 70 % Typical
- Lighting quality- Free from glare and flickering and UV
- Ambient temp– up to 50 deg
- DC to DC converter efficiency > =90 %
- The connecting wires used inside the luminaries, shall be low smoke halogen free,

- fire retardant e-beam cable and fuse protection shall be provided at input side.
- Auto reset table reverse polarity protection shall be provided
- LED lighting unit shall comply with LM -79-08 and LM -80-08 Standards and copy of test certificate (LM 80-08) should be submitted.
- The make, model number, country of origin and technical characteristics of whiteLEDs used in the lighting system must be furnished.
- The luminaries must have light distribution polar curve as per LM 79 test specifications.

**5. ELECTRONICS:**

MPPT charge controller to maximize energy drawn from the Solar PV array. The MPPT charger shall be microcontroller based. The MPPT should have four stage charging facilities i.e Bulk, Absorption, Float and Equalization. The auto equalization facilities for every (30+<sub>3</sub> days) and provision to verify it during testing. The PV charging efficiency shall not be less than 90% and shall be suitably designed to meet array capacity. The charge controller shall conform to IEC 62093, IEC 60068 as per specifications

- a. Protection against polarity reversal of PV array and battery, Over Current, Short Circuit, Deep Discharge, Input Surge Voltage, Blocking diode protection against battery night time leakage through PV Module
- b. Electronics should operate from 10 volt to 21 volt and its Euro efficiency should be at least 90%.
- c. The system should have protection against battery overcharge and deep discharge conditions. The numerical values of the cut off limits of lower voltages should not be less than 12 Volt
- d. The system should have protection against Microwave radar sensor auto Dimming system.
- e. Full protection against open circuit, accidental short circuit and reverse polarity should be provided.
- f. Charge controller shall have automatic dusk-dawn circuit based on SPV module as sensor for switching on/off the high mast light without manual intervention. The sensor must not get triggered by impulse lighting like lightning flashes and firecrackers.
- g. The self-consumption of the charge controller shall not be more than 20 mA at rated voltage and rated current. Adequate protection shall also be incorporated under no-load conditions (i.e. when the system is ON & the load(LED Lamp is removed)
- h. The system should be provided with 2 LED indicators: a green light to indicate

charging in progress and a red LED to indicate deep discharge condition of the battery. The green LED should glow only when the battery is actually being charged.

- i. All capacitors shall be rated for max. temp. of 105° C.
- j. Resistances shall preferably be made of metal film of adequate rating.
- k. Device shall have adequate thermal margin should be at least 25 degree below the allowable junction temperature while operating at an ambient temperature of 55 degree C and full load.
- l. Fibre glass epoxy of grade FR 4 or superior shall be used for PCBboards.

## **6. MECHANICAL HARDWARE**

- I. A galvanized metallic frame structure to be fixed on the pole to hold the SPV module(s). The frame structure should be fixed at 30 degree from horizontal facing true south.
- II. The pole should be hot dip Galvanized Iron Octagonal pole of 12.5.0 mtr. Height as per specification as under:
- III. The Octagonal poles shall be Hot dip galvanized to min 80 microns. The material of pole shall be as per specification of BS EN 100025, ISO1461.
- IV. The size of the pole shall be min 150 mm (A/F) at Top side, 330 mm (A/F) at bottom side with thickness of 3 mm minimum.
- V. Diameter of base plate min. (mm)= 540mm; Thickness of base plate (mm)= min 16 mm.
- VI. Separate Pole should have the arrangement for module and battery at top for mounting of Solar panel of design capacity with mounting structure at an angle of latitude  $\pm 2^0$  degree.
- VII. The batteries shall also be mounted on this pole at suitable height hence provision should be made accordingly
- VIII. The pole shall be mounted on suitable RCC foundation at least 1.5 meter deep and 600mm above ground with 6 bolt of min 24 mm size
- IX. The Nut -Bolts in battery box and panel structures should be properly riveted to ensure the theft proof.
- X. The design and foundation details of the pole shall be got approved before execution of work.
- XI. Battery box:  
Two vented metallic box of 20 SWG thick made of pre coated galvanized ms sheet with 60 microns thickness for housing the storage battery outdoors should be provided with proper lock and key.. The size of box should be as per battery size (including vent plug/level indicator) providing minimum clearance of 25 mm on all sides. The battery box is to be properly



rest/mounted on pole at least 04 meters of height from ground level. Louvers for proper ventilation should be provided on one side and back of the battery box. No vents shall be provided on top of battery box. Box should be provided with proper locking arrangement. The edges of box should be turned properly to give smooth edge and good strength. Two wooden battens should be fixed inside the battery box to avoid the electrical contact between battery and box. Components and hardware shall be vandal and theft resistant. All parts shall be corrosion-resistant

Electric cable:

The electric cable used shall be twin core PVC insulated water and UV resistance copper cable of minimum size 1.5sq mm. Cable shall meet IS 1554 / 694 Part 1:1988 & shall be of 650 V/ 1.1 kV.

**7. INSTALLATION OF SYSTEM:**

The system should be properly installed at site. The SPV module mounting structure along with telescopic octagonal pole should be properly grouted depending upon the location and requirement of the site. The grouting should be such that it should withstand the maximum wind speed /storm of 180 kmph. The pole should rest on a suitable RCC foundation. Of (RCC Foundation minimum size of 900 mm x 900 mm x 1500 mm deep and 600 mm above the ground level. must have min 6 nos. foundation bolts of min 1000 mm & 24mm dia.) Adequate space should be provided behind the PV module/array for allowing un-obstructed air flow for passive cooling. Cables of appropriate size should be used to keep electrical losses to a bare minimum. Care should be taken to ensure that the battery is placed with appropriate levelling on a structurally sound surface. The control electronics should not be installed directly above the battery. All wiring should be in a proper conduit or capping case. Wire should not be hanging loose. Any minor items which are not specifically included in the scope of supply but required for proper installation and efficient operation of the SPV systems is to be provided by the manufacturer as per standards.

**8. WARRANTIES:**

The mechanical structures, electrical works including power conditioners /charge controllers/ maximum power point tracker units/distribution boards/digital meters/ switchgear/ storage batteries, etc. and overall workmanship of the Solar LED High Mast / systems must be warranted against any manufacturing/ design/ installation defects for a minimum period of 5 years

**9. PROTECTIONS:**

- **LIGHTING PROTECTION:**

The SPV module shall be provided with lightning & over voltage protection. The

maintain in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc the entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per NFC 17- 102:2011 standard. The protection against induced high-voltages shall be provided by the use of metal oxide varistors (MOVs) and suitable earthing such that induced transients find an alternate route to earth.

- **Earthing**

1. Equipment grounding (Earthing) shall connect all non-current carrying metal receptacles, electrical boxes, appliance frames, chassis and PV panel mounting structures in one long run. The grounding wire should not be switched, fused or interrupted.
2. The complete earthing system shall be electrically connected to provide return to earth from all equipment independent of mechanical connection.
3. The equipment grounding wire shall be connected to solar PV module.
4. Earthing system design should be as per the standard practices.

- **CABLES & WIRES**

Cablings shall be carried out as per IE Rules

- Wires: Only FRLS copper wires of appropriate size and of reputed make shall have to be used.
- Cables Ends: All connections are to be made through suitable cable / lug / terminals; crimped properly & with use of Cable Glands.
- 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. Any change in cabling schedule/sizes if desired by the bidder/supplier be got approved after citing appropriate reasons, All cable schedules/layout drawings have to be got approved from the purchaser prior to installation. All cable tests and measurement methods should confirm to IEC 60189.

- **Electrical Safety, Earthing Protection Electrical Safety**

- Internal Faults: In built protection for internal faults including excess temperature, commutation failure, overload and cooling fan failure (if fitted) is obligatory.
- Over Voltage Protection: Over Voltage Protection against atmospheric lightning discharge to the PV array is required
- Cabling practice: Cable connections must be made using PVC Cu cables, as per BIS standards. All cable connections must be made using suitable terminations for effective contact. The PVC Cu cables must be run in GL trays with covers for protection.

➤ **EARTHING PROTECTION**

Each array structure of the PV yard should be grounded properly. In addition the lightning arrester/masts should also be provided inside the array field. Provision should be kept be provided inside the array field. Provision should be kept for shorting and grounding of the PV array at the time of maintenance work.

**Warranties and Guarantees**

1. Solar Modules: Workmanship/ product replacement for 10 years.
2. Solar Modules: 90% power output for 10 years & 80% power output for 25years.
3. BoS: Parts and Workmanship for 10 years, service for 25 years.
4. Power Plant Installation : Workmanship for 10 years, service for 25 years
5. PV Array Installation : Structural for 25 years

Detailed specifications of Foundation are as per details given below.

