

MAHARASHTRA ENERGY DEVELOPMENT AGENCY, KOLHAPUR

CALL FOR QUOTATION

SUPPLY, INSTALLATION, TESTING, AND COMMISSIONING OF TOTAL 01 NOS OF 06 MTR HEIGHT 200 WP CAPACITY SOLAR HIGHMAST AT GRAMPANCHAYAT KHUJGAON TAL. JATH DIST SANGLI.

Quotation Ref. No: 2024/DOK/Technical/Desk -1/Quotation/GPKS



DIVISIONAL OFFICE
MAHARASHTRA ENERGY DEVELOPMENT AGENCY, KOLHAPUR
MAHARASHTRA, KOLHAPUR

(A Government of Maharashtra Institution)

Address: C.S.NO.249/A-1/55, E WARD, MHADA COMPLEX, NAGALA PARK,
NEAR ZILLAPARISHAD, KOLHAPUR-416003 (M.S)

Contact No.0231-2680009,

Email: medakolhapur@mahaurja.com

Website (for Tender): [https:// mahatenders.gov.in](https://mahatenders.gov.in)

MAHARASHTRA ENERGY DEVELOPMENT AGENCY, KOLHAPUR

2024/DOK/Technical/Desk -1/Quotation/GPWS

Date: 23/08/2024

Quotation Call

To,
(Contractors/Suppliers)

Sub: SUPPLY, INSTALLATION, TESTING, AND COMMISSIONING OF TOTAL 01 NOS OF 06 MTR HEIGHT 200 WP CAPACITY SOLAR HIGHMAST AT GRAMPANCHAYAT KHUJGAON TAL. JATH DIST SANGLI.

With reference to subject matter, we would like to call your quotation in sealed condition for undertaking the work with given technical specifications and technical standards with following terms and conditions –

Sr.No.	Particulars	Solar Highmast Capacity	Nos	Project Cost (Inclusive of all taxes and charges)
1	Name of Location			
2	Deshmukh Vasti ,Grampanchayat Khujgaon , Tal.Tasgaon Dist. Sangli	200 Wp/06 Mtr	01	4,23,423/-
3	Date and time for submission of quotation.		From 26/08/2024; 10:00 Hrs to 02/09/2024 18:00 Hrs	
4	Date and time for opening of quotation.		03/09/2024; 10:00 Hrs	
5	Security Deposit		15,000/- (to be deposited online in favor of Maharashtra Energy Development Agency, Kolhapur)	
6	Address for communication and quotation opening		Maharashtra Energy Development Agency, Divisional Office Kolhapur SR.No. 249/A-1/55, E Ward, MHADA complex, Nagala Park, Near Zilla Parishad, Kolhapur-416003	
7	Site location		Grampanchayat Khujgaon, Tal.Tasgaon, Dist. Sangli	

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1. ELIGIBILITY CRITERIA –

The contractor shall be eligible to quote for this work provided fulfilment of following.

1. Shall have a registered firm/company with GST registration.
2. Shall provide brief information in prescribed format (enclosed).
3. Shall not be black listed in any govt. dept. and/or other organizations in and outside the state.
4. Shall provide documentary proof about having experience of supply, installation, testing and commissioning of minimum cumulative 01 Nos of Solar Highmast OR 10 Nos of Solar Street Lights through Government Scheme or at Government Office /Institute which is installed, commissioned & working successfully.
5. Shall have an annual average turnover of Rs. 20 lakh per year for FY 2021-22 and 2022-23 OR FY 2022-23 and 2023-24 duly certified by chartered accountant.
6. Shall provide self-attested copy of IT returns for FY 2021-22 and 2022-23 OR FY 2022-23 and 2023-24 (Assessment year 2022-23 and 2023-24 OR FY 2023-24 and 2024-25).
7. Professional Tax Certificates for the FY 2021-22 and 2022-23 OR FY 2022-23 and 2023-24.
Professional Tax must be deposited before the date of publication of quotation. Any certificate of tax deposited after the date of publication of quotation shall not be considered valid.
8. Shall have arrangement of providing after sales service within Kolhapur division.

2. TERMS AND CONDITIONS –

- 1) Location/Site for installation of Solar Highmast shall be assigned immediately by the user agency to the selected contractor to get the work done in stipulated time.
- 2) The installation of Solar Highmast should be done in excellent manner and meet technical standards prescribed by the MEDA.
- 3) As per the technical criteria set by the Ministry of New and Renewable Energy, Govt. of India the solar modules should fulfill the IEC standards and shall be procured from manufacturer providing module with RFID tag.
- 4) The contractor shall provide valid test certificate of Battery and LED from manufacturer.
- 5) The contractor shall provide Solar Modules from the approved Manufacturers which are enlisted in the MNRE's latest ALMM list.
- 6) The solar module should be engraved with name of company supplying the same along with installation date etc.
- 7) The contractor should provide appropriate tools and equipment's to the workmen and ensure that those are in proper working condition and the workmen use the appropriate tools and take precaution "PLEASE NOTE THAT ANY ACCIDENT TO THE WORK MEN / PUBLIC / ANIMALS /

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PROPERTY BOTH MOVABLE AND IM-MOVABLE SHALL BE ENTIRE AND SOLE RESPONSIBILITY OF THE BIDDER AND ANY PROCEEDING ARISING OUT OF THE SAME SHALL BE AT THE BIDDER'S RISK AND COST, MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA) OR USER AGENCY ALONG WITH THEIR EMPLOYEES WILL NOT BE RESPONSIBLE FOR ANY SUCH INCIDENT”.

- 8) The successful contractor shall be responsible for providing insurance for the labour/material etc used in the said work. Also, the successful contractor shall be responsible for making PF/ESIC/Insurance and other necessary government payments to the workers as per the Labour Act.
- 9) If the Solar Street Lights does not function as per given standards then the loss incurred shall be borne by the supplier and paid Grampanchayat Khujgaon, Tal.Tasgaon, Dist. Sangli.
- 10) If contractor fails to complete the work then Security Deposit will be forfeited and contractor shall be blacklisted.
- 11) Contractor shall give training of system operation to a person duly nominated by user agency and same shall be informed to divisional office Kolhapur.
- 12) The contractor shall successfully complete the project within timeframe set out by the MEDA. For this purpose, contractor shall provide Activity Bar Chart within a week time after issue of Work Order.
- 13) The contractor shall provide the user manual, warranty card to the user agency and copy of same shall be provided to MEDA Kolhapur.**
- 14) The contractor shall visit the site and ensure scope of work before submission of quote against the enquiry. In this context, the contractor should submit the Site Visit Report in given prescribed format along with this quote.
- 15) The work being of limited nature and to seek prompt after sales service the contractor within Kolhapur division will be preferred while allotting the work against the call of quotation. Required proof in this matter need to be submitted by concerned contractor along with quote.
- 16) The Contractor shall provide the detailed information about Company/firm in attached format (Contractor's Information sheet)
- 17) The contractor shall submit their quotation in two different sealed envelopes i.e. First envelop shall contains documents as per the technical eligibility criteria and Second envelop shall contain Financial details (quoted rate).**
- 18) The contractor shall mention the subject on each sealed envelope i.e Technical Envelop and Financial Envelop.**
- 19) The financial envelop of technically qualified contractor shall only be opened.**

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3. INSURANCE:

1. It is responsibility of the contractor to draw the insurance of Solar Highmasts in the name of Grampanchayat Khujgaon, Tal.Tasgaon from the date of commissioning up to 05 Years CMC period covering the natural calamity, theft, fire and vandalism of project. The contractor should pay the necessary insurance premium for the said project.
2. In case of any loss encountered by any of the Solar Highmast due to natural calamities, theft, fire and vandalism the Contractor shall be responsible for filing the insurance claim towards loss attained by the respective Solar Highmast with the insurance company and ensure to get the compensation for its repair and restoration.

4. COMPREHENSIVE MAINTENANCE CONTRACT (CMC)

1. The complete and commissioned Solar Highmasts must be guaranteed against any manufacturing/ design/ installation defects for a minimum period of 5 years. However PV modules used in Solar Highmasts must be guaranteed for their output peak watt capacity, which should not be less than 90% at the end of 12 years and 80% at the end of 25 years.
2. During the CMC period, MEDA shall have all the rights to cross check the performance of the Solar Highmasts. MEDA may carry out the frequent inspections of the Solar Street Lights installed. If during such inspection, if any part is not found as per the specified technical parameters, MEDA will take the necessary action. The decision of MEDA in this regard will be final and binding on the contractor.
3. Successful contractor shall have to provide office address and name of technical person with contact who is operating in Kolhapur district/division for timely maintenance of Solar Highmasts.
4. During the CMC period, timely cleaning of SPV panels (once in fortnight) of Solar Highmasts shall be binding on the user agency.
5. After site visit the contractor shall submit site visit report to MEDA which duly certified by authorized person of the concern user agency.
6. If any problem occurs in working of Solar Highmasts then successful contractor shall attend the system and rectify the problem immediately.
7. **Grampanchayat Khujgaon, Tal.Tasgaon Dist Sangli shall be responsible to provide security for the project after commissioning of the Solar Highmasts.**

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8. After the completion of the CMC period (after 05 Years) Grampanchayat Khujgaon Tal. Tasgaon Dist. Sangli shall be completely responsible for the maintenance/repair etc. of the Solar Highmasts.
9. In case if contractor fails to provide service during the CMC period, the Performance Bank Guarantee and Security Deposit shall be forfeited and contractor shall be blacklisted.

5. TERMS OF PAYMENT:

- A. 80% of the total cost will be released after successful Installation and Commissioning of the Solar Highmast duly certified by contractor, Officer of MEDA & authorized person of User Agency along with submission of Joint Inspection Report ,Photos, Tax Invoice, Insurance policy documents (covering Natural calamity, theft, fire and Vandalism) effective from date of commissioning up to the CMC period i.e. for 5 Years, Warranty Cards,Manuals,List of Solar Modules numbers,Test Reports also an undertaking of CMC for 5 years from date of commissioning of Solar Highmasts need to be submitted.
- B. 20% of the total cost shall be released on receipt of two months successful performance report which should be duly certified by the contractor, Officer of MEDA & authorized person of User Agency and submission of performance bank guarantee of 10 % of total project cost from any Nationalized/Scheduled Bank valid for period of 5 years from date of commissioning of project.

6. DEDUCTION:-

- i. The TDS at the source will be deducted as per the Govt. rule and regulations.
- ii. MEDA will issue necessary certificates of TDS deduction.
- iii. C / 'D' form will not be issued by MEDA.

7. BILLS TO BE ON PRINTED FORM (TAX INVOICE) :

- The contractor shall submit the Tax Invoice in terms of the 70:30 ratio for basic amount i.e. 70% for goods and 30% for services, respectively by adding applicable GSD on renewable energy projects (i.e. 12% GST on Goods and 18% GST on Services).
- The contractor shall submit the two separate Tax Invoices of 80% and 20% amount while releasing the 80% and 20% payment respectively.(Do not submit the Tax Invoice of 100% amount while releasing the first stage 80% payment)

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8. SECURITY DEPOSIT –

- i. A sum of **15,000** /- shall be deposited by the selected contractor as security deposit by online mode in favor of 'Maharashtra Energy Development Agency, Kolhapur on or before issuing of Work Order.
- ii. Failure to comply with the terms of security deposit shall result into cancellation of work order without any further reference to the Contractor and the EMD shall be forfeited.
- iii. The security deposit shall be liable to be forfeited wholly or partly at the sole discretion of the MEDA, if the Contractor either fails to execute the work of above projects or fails to fulfil the contractual obligations or fails to settle in full his dues to the MEDA.
- iv. If the contractor fails to execute the work in given time or terminates the order prematurely then the security deposit shall be forfeited and contractor shall be blacklisted and no excuses will be entertained.
- v. The security deposit shall be returned to the contractor without interest after successful commissioning (i.e. all work is completed as per terms and conditions of work order) of system and receipt of two month successful performance report duly signed by user agency, MEDA official and representative of the contractor.

9. PENALTY –

- A penalty of 1/2% of the total project cost shall be imposed on the contractor against a delay of one week in project completion subject to a maximum of up to 10% of the total project cost. In case the penalty exceeds 10% of the total project cost, the given order will be canceled & the security deposit will be forfeited and the contractor shall be blacklisted.

10. TIME FRAME:

- The successful contractor shall be required to commission the project within 30 Days from the date of issue of work order.

11. EXTENSION :

- If Installation of Solar Highmasts is not completed within the given time frame due to any inevitable reasons then contractor shall seek the time extension for the project at least 07 Days in advance before expiry of Solar Highmasts installation completion period (30 Days) by giving satisfactory reasons for same. **However if the time extension is not taken before the Solar Highmasts installation completion period then the penalty clause of work order shall be effective till the request is applied for the extension with MEDA.**

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12. STAMP DUTY :

- The successful contractor has to pay the applicable stamp duty as per Maharashtra Stamp Act clause 10. D. (1) to the Stamp Collector Kolhapur against this work contract and the receipt of same has to be produced along with the first invoice to our office.

13. SITE VISIT :

The contractor shall visit the site & carryout the survey along with officials of user agency (as mentioned in scope of work) and upload the site visit report along with photographs (with Lat. and Long.) Indicating that the survey is carried by the contractor as per given format.

14. CHECK LIST OF DOCUMENTS TO BE FURNISHED WITH QUOTATION –

- PAN and GST Details.
- Copy of IT Returns.
- Professional Tax Certificates
- Declaration on company letter head.
- Contractors Information Sheet.
- Annual Turnover Certificate.
- Work Experience Details.
- Site Visit Report.(in format)

We look ahead to seek your sealed quotation on or before 02/09/2024 till 18 Hrs.

Thanking you,

Sd/-

Divisional General Manager
MEDA, Divisional Office, Kolhapur

Encl. :-

1. Contractor Information Sheet.
2. Declaration Format.
3. Annual Turn Over certificate format.
4. Site Survey Form.
5. Technical Specifications of Solar Highmast.

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CONTRACTOR'S INFORMATION

Sr.No	Particulars	
1	Name of Firm	
2	Details of Mailing Address	
3	Firm Status (PSU/Incorporate/Ltd/Pvt.Ltd/LLP/Partnership/Proprietary)	
4	Name & Designation Of Contact Person	
5	Contact No.	
6	E-mail Address for correspondence	
7	Firm website Address	
8	Firm registration No/ROC Establish Year of firm	
9	PAN No.	
10	GST No.	
11	Turnover (in Rs.) for FY 2021-22 and 2022-23 OR FY 2022-23 and 2023-24	
12	Skilled manpower	
13	*Experience in Solar Highmasts	

Authorised Sign and Stamp

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DECLARATION

(On company's letter head)

To,

Divisional General Manager,

Divisional Office Kolhapur

Maharashtra Energy Development Agency

(A Government of Maharashtra Institution)

Address: C. S. No. 249/A – 1/55, E Ward, Mhada Complex, Nagala Park, Near Zilla Parishad,
Kolhapur - 416003

Respected Sir/Madam,

1. We have carefully read and understood all the terms and conditions of the quotation and hereby convey our acceptance to the same.
2. The information / documents furnished along with our offer are true and authentic to the best of my knowledge and belief, We are well aware of the fact that furnishing of any false information/ fabricated document would lead to rejection of our quotation at any stage besides liabilities towards prosecution under appropriate law.
3. We have apprised our self fully about the job to be done during the currency of the period of agreement and also acknowledge bearing consequences to of non-performance or deficiencies in the services on our part.
4. We have no objection, if enquiries are made about the work listed by us.
5. We have not been barred or blacklisted by any Government Agency / Department/ PSU or any such competent Government authority, organization in and outside the state where we have worked. Further, if any of the partners/directors of the organization /firm is blacklisted or having any criminal case against them, our quote shall not be considered. At any later point of time, if this information is found to be false, Divisional General Manager, Divisional Office Kolhapur, Maharashtra Energy Development Agency, may terminate the assigned contract immediately.
6. We have not been found guilty by a court of law in India for fraud, dishonesty or moral turpitude.
7. We agree that the decision of Divisional General Manager, MEDA, Divisional Office Kolhapur, in selection of quotation and shall final and binding to us.

For

(Company Name)

Name of signing authority / Designation / Place / Date

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Annual Turnover

Each Contractor must fill in this form including private/public limited company.

- **Annual Turnover Data for the FY 2021-22,2022-23,2023-24**
- **Name of Company :**

Year	Rs in Lacs
2021-22	
2022-23	
2023-24	

The information supplied should be the Annual Turnover of the Contractor in terms of the amounts billed to clients for each year for work in progress or completed.

Signature of Applicant

Certified by Applicant's Auditor

(Affix Stamp)

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SITE VISIT REPORT

(To be submitted on letterhead of contractor)

Date: _____

To,
The Divisional General Manager,
Divisional Office Kolhapur,
Maharashtra Energy Development Agency
(A Government of Maharashtra Institution)
Address: C. S. No. 249/A– 1/55, E Ward, Mhada Complex, Nagala Park, Near Zilla
Parishad, Kolhapur – 416003.

Sub. : Site Visit Report for Supplying, Installing, Testing, and Commissioning of Total 01 Nos of 200 Wp Capacity Solar Highmast at Grampanchayat Khujgaon Tal. Tasgaon Dist Sangli.

Ref.: Quotation Call No.Date:

Sir,

This has reference to above referred call for quotation regarding Supply, Installation, Testing, and Commissioning of Total 02 Nos of 200 Wp Capacity Solar Highmast at Grampanchayat Khujgaon Tal. Tasgaon Dist Sangli.

I / We hereby declare that we have visited the site.

I / We have made my ourselves acquainted with site conditions, approach to site, requirement of area and safety issues required as per all quotation conditions etc.

I / We have verified all details required to execute the project.

I / We have no problems in undertaking the project and complete them in the given time period.

Thanking you

Yours faithfully,

(Signature of Contractor)

Name of Contractor -----

Designation -----

Seal:

Signature of User Agency authorities.

Seal:.....

TECHNICAL SPECIFICATIONS

A. Technical Specifications for Solar LED Highmast

1. DEFINITION :-

A standalone Solar High Mast Lighting system (SHMLS) is an outdoor lighting unit used for illuminating a street or an open area. The Solar High Mast Lighting System consists of solar photovoltaic (SPV) module, a luminaire, storage battery, control electronics, inter-connecting wires/cables, module mounting steal tower/ pole including hardware and battery box. The luminaire is based on White Light Emitting Diode (W-LED), a solid state device which emits light when electric current passes through it. The luminaire is mounted on the steal tower/ pole at a suitable angle to maximize illumination on the ground. The PV module must be place on separate structure placed at the top of the steal tower/ pole at an angle facing south so that it receives solar radiation throughout the day, without any shadow falling on it. A battery is placed in a box attached to the steal tower/ pole. Electricity generated by the PV module charges the battery during the day time which powers the luminaire from dusk to dawn. The system lights at dusk and switches off at dawn automatically.

For 6 meter Solar LED High Mast Lighting System:

PV Module	Only indigenous modules shall be used in the project. For each High mast SPV module aggregate capacity 1320Wp (min 330Wp X 4Nos Module.
Battery	Li Ferro Phosphate (LiFePo4) batteries of capacity 12.8 Volt, 400Ah @, (12.8V, 100 Ah x 4 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
Light Source	White Light Emitting Diode (W-LED) flood light 4*50Watt (LED +Driver) DC operated confirming to IP65 or above with proper dimmer arrangement Using LEDs which emits ultraviolet light will not be Permitted
Light Output	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.
Pole (Minimum 80 Microns)	6M 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 4 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.
Stainless Steel Wire Rope	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.
Raising and Lowering lighting mast	Manual pulley system
Electronics Efficiency	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

1. 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.
2. The open circuit voltage of the PV modules under STC should be at least 21.0 Volts.
3. Crystalline high power/efficiency cell shall be used in the Solar Photovoltaic module. The cell efficiency should not be less than 16%.
4. 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.

5. 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.
6. The offered module shall be in accordance with the requirements of MNRE.
7. 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.
8. PV modules must qualify to IEC 61730 Part 1- requirements for construction & Part 2 – requirements for testing, for safety qualification.
9. 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.
 - Identification and traceability
 - 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:

1. Battery shall be Lithium Ferro phosphate ($LiFePo_4$) with maximum Depth of Discharge 90%, the batteries should conform to the latest BIS /International standards. The battery shall be of $LiFePo_4$ 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).

2. Capacity of each battery shall not be less than 12 .8V, 100Ah as per above table.
3. 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.
4. Battery terminal shall be provided with covers.
5. Suitable carrying handle shall be provided.
6. 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.
7. The batteries shall be designed for operating in ambient temperature of site upto 55 degree C
8. 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 failshort 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 :
 1. LED DC current regulation – better than 3 %
 2. Input – 12 V DC
 3. Driver Type- DC-DC (as per IEC 62384)
 4. CRI - 70 % Typical
 5. Lighting quality- Free from glare and flickering and UV
 6. Ambient temp– up to 50 deg
 7. 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 white LEDs 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+₋₃ 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 voltage 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 PCB boards.

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 main aim 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

Cabling 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, and 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.

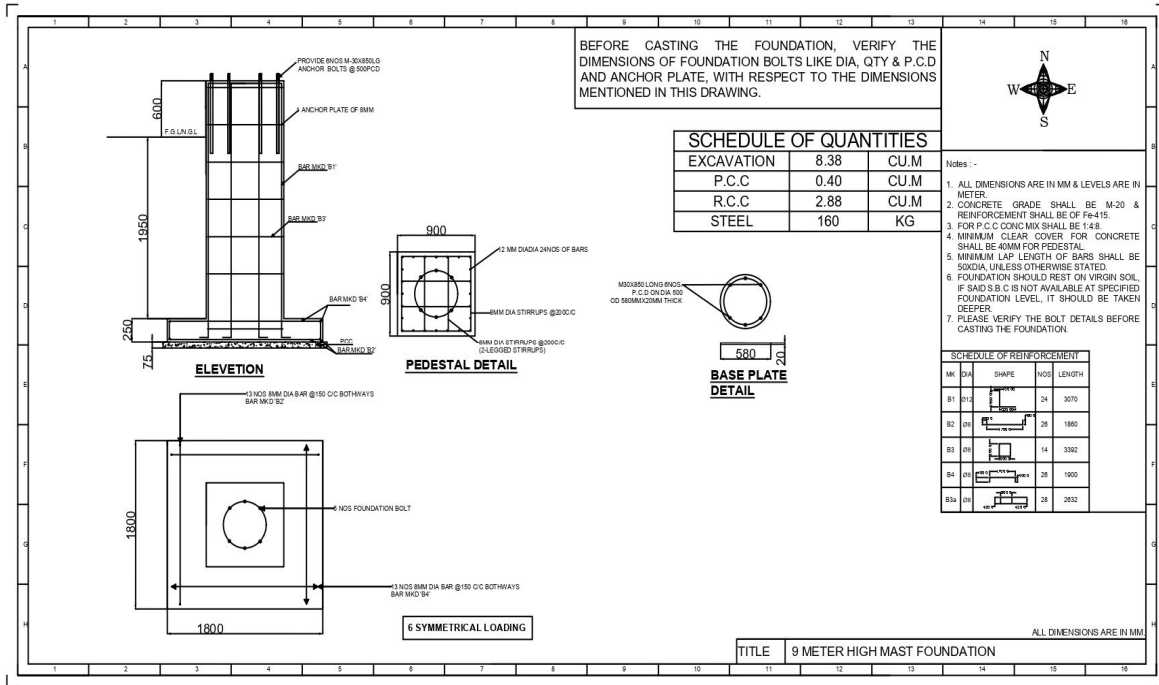
EARTHING PROTECTION

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 25 years.
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



• Details of Project Information Board

Providing and fixing board displaying information, such as 'Name of work, Tender cost, Name of Contractor, Work completion and liability period etc', having rectangular shape of 1.20mx0.90m size made out 18gauge(1.25mm) thick mild steel sheet painted with one coat of Zinc chromate stoving primer and two coats of enamel paint on front side and grey stove enamel on back side and border/messages/symbols etc. with approved colour shade paint complete, on M.S. angle of size 35x35x3mm frame with properly cross braced M.S. angles of size 35mmx35mmx3mm duly painted including Two M.S. angle iron posts of size 65mmx65 mmx 6mm, 3.65m long painted with alternate black and white bands of 25 cm width including all fixtures etc. and fixing the boards in 1:4:8 concrete block of size 60 cm x 60 cm x 75cm including, excavation, refilling, transportation, and labor etc complete. Spec.Number As directed by Engineer in Charge