

**Tender for Installation of 12,000 Nos. of Solar Street Lighting Systems and
250 Nos. of Solar High Tower Masts in Manipur**

CHAPTER – VI: TECHNICAL SPECIFICATIONS

SOLAR LED STREET LIGHTING SEMI INTEGRATED SYSTEMS

LED Light: 20 Watt

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 LED light fitting shall have a rating of 20 Watt.

Make: OSRAM / PHILIPS / ielecscs / or any other reputed Make.

Other Parameters :

- LED lumen efficiency should be ≥ 180 lm/W & total luminous flux of 3600.
- Solar charge controller MPPT driver efficiency should be $> 95\%$.
- MPPT efficiency tracking as per IEC 50530, should not be less than 93%.
- Power LED with lenses having Bat wing pattern.
- Solar charge controller MPPT, Solar LiFePO₄ battery and luminaire housing can be of same / different make but must be of single integrated unit.
- Brand name must be engraved/embossed/laser printed on the luminaire.
- All lights should have inbuilt Anti-theft alarm.
- Complete fixture should be Aluminium Die-Cast with lenses.

Pole: GI pole of height – 6 mtr; Pole thickness: Minimum 2.2 - 2.5 mm & Outer dia: 2.5 Inch.

Pole should be of GI with 2 coat of yellow primer and 2 coat zinc paint or aluminium paint. Base plate thickness of light pole: base plate should be minimum 12mm thickness with stiffener attached 3 sides.

The arch pole for light should match the inner dia of light and should be welded or should have proper GI clamp with GI nut and bolts. Party will provide base plate with nut and bolt.

The pole should be hot dip galvanized pipe as per IS 1161 & IS 4736. GI galvanization thickness should be 86 micron or more and test report in this regard to be submitted.

DUTY CYCLE

The LED solar street lighting system should be designed to operate for dusk to dawn. Battery configuration: Lithium Ferro phosphate Battery (LiFePO₄), 42Ah, 12.8V

Battery should conform to the latest BIS/International standards (IEC 62133) Capacity of the battery shall not be less than 12.8V (nominal), 42Ah at STC.

Battery backup-2 days or more.

BMS (Battery Management System) should be part of battery pack and battery pack enclosure should be as per standard. The battery pack should be integrated with the system in such way that it is theft proof and not removable from system. It should be installed with combination of module structure/ luminaries. The system must withstand wind velocity of 150 km/hr. The battery pack should be capable of high rate of heat dissipation. The battery box should be acid proof and corrosion resistant, hot dip galvanized metallic box (IP65) with anti- theft locking arrangement.

The battery should operate between temperature range of 0 degree C to 55 degree C.

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PV module: Solar Module: 100Wp (Minimum)

Only indigenous modules of IEC Tested shall only be used.

Mono PERC with efficiency of 19% or higher should be used in the solar photovoltaic module, preferably of make:- Vikram / Waaree /Adani /Sova /Icon Solar/ Saatvik/ Premier/ Renewsys or any other reputed make. The make of PV modules shall be from approved ALMM list of MNRE.

The terminal box on the module shall be designed for long life outdoor operation in harsh environment and should have a provision for opening for replacing the cable, if required.

Automatically on/off: The light should have feature of an automatically on/off function i.e. senses daylight and automatically turns on at dusk and off at dawn.

Solar charge controller: Should have Solar Charge Controller to regulate charging and discharging of the battery

IP rating: Should have an IP rating of IP65 or higher to ensure good protection against dust and water ingress.

Dimming Profile : The illumination should be 100% for first 4 Hours, 75% for next 3 Hours, 50% for next 3 Hours and 100% for rest of the time. The system must also feature an Intelligent Auto-Dimming Management function to ensure operational autonomy during extended periods of low power generation.

ELECTRIC CABLE

The electric cable used shall be twin core PVC insulated water and UV resistance copper cable of minimum size 1.5 mm. Cable shall meet IS 1554/ 694Part1:1988 & shall be of 650V/ 1.1 kV

Electronics, including protections:

- The system should have protection against battery overcharge and deep discharge conditions.
- Fuse should be provided to protect against short circuit conditions.
- Adequate protection to be provided against battery reverses polarity.
- Adequate protection is to be incorporated under no load conditions.
- Necessary lengths of wires / cables and appropriate fuses should be provided.

Charge Controller: MPPT Charge controller should be used to maximize energy drawn from the solar PV array. The MPPT Charger should be micro-controller based.

Remote Monitoring Systems :

Remote monitoring devices should be included in all the systems integrated for proper monitoring of the solar street lighting systems. RMS should have the facility to enter the complete data during installation through mobile App & monitor health of complete solar street light through the App and Dashboard as well.

Warranty:

Party has to offer minimum 5 year warranty on following items of solar lighting system :

i) Solar Luminary ii) Charge Controller iii) LiFePO4 Battery iv) PV Module (25 Years as per MNRE norms) v) RMS Devices.

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SOLAR HIGH TOWER MAST SYSTEMS

TECHNICAL DETAILED SPECIFICATIONS FOR 9 MTR SOLAR HIGH MAST SYSTEMS

S.N	Particulars	Capacity/ Model
1	SPV Modules	200Wp Mono Perc SPV Under STC x 6 nos
2	Minimum Battery	LiFePo4 Batteries – 80AH at 12.8V (with minimum individual cell capacity 20AH at 3.2V) x 06 nos in a suitable weather resistant enclosures and sophisticated designed battery management system (appropriate over charging, overheating deep discharge protection)
3	Light Source	White Light Emitting Diode 30W x 06 nos. in solar flood light. Total system Wattage (Luminary Wattage) of each luminary should be maximum 30W DC operated confirming to IP66 or above. The LED efficacy should be minimum 165 lm/W (as per LM 80) CCT 5500 - 6500 K, CRI Minimum 70 & LED wattage minimum 01W. The Luminous flux should be minimum 4950 lumens & Luminary Must be LM-79 certified from MNRE/NABL Lab. The colour temperature of White LED used in the system should be in the range of 5500K-6500K. LEDs should not emit ultraviolet light. (strictly as per IS 16101, IS 16102, IS 16103 and IS 16107)
4	Dimming Profile	The illumination should be 100% for first 5 Hours, 50% for next 3 Hours and 30% for rest of the time. The system must also feature an Intelligent Auto-Dimming Management function to ensure operational autonomy during extended periods of low power generation.
5	Central Gateway Monitoring System (CGMS)	Each solar high mast requires a CGMS for remote data monitoring on the dashboard.

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Pole, Accessories and Foundation

Pole	9 M Long, 20 sided polygonal Raising lowering mast shaft in Single section Suitable for basic wind speed 50 m/sec 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. The mast must be hot dip galvanized 20 sided polygonal structure having Bottom A/F Dia 410 mm, top A/ F Dia 150 mm of 3 mm thick. The mast should have a designed life of 25 years. Or 9 meter long, 20 sided polygonal raising lowering mast in two sections, which should be telescopically joined together with a minimum overlap of 500 mm. The dimensions of two sections should be as follows: (a)- Lower section_ bottom dia 420 mmA/F & top dia.286 mm A/F (b)- Top section _ bottom dia. 304 mm A/F & top dia 200 mm A/F.
- Diameter of base plate (MM) - Thickness of base plate (MM)	580 mm 20 mm
Lighting Protection Finial	G I Single Spike of length 1200 mm
WINCH / POWER TOOL	Mechanical device/arrangement to be provided to withstand the complete load of the luminary, PV Modules, Battery during raising lowering of the lighting system for Panel cleaning in every week fort night.
- Number of foundation bolts - PCD of foundation bolts (MM) - Type - Diameter - Length of foundation bolts	6 nos. 500 mm TS 600 24 mm dia. Min. 750 mm long
Warranty	The complete solar mast i.e Flood lights, Battery & solar PV module should be warranted for a period of 5 years from the date of installation.
Foundation	RCC Foundation at least 1.95 M deep (single column of 900 mm x 900 mm x2500 mm) Suitable for mounting of Pole on a pedestal of 0.6 M height (above GL)
Decorative Pedestal	900 mm x 900 mm x 1000 mm
Earthing	Waterless and maintenance free earth electrodes, MS 16 mm copper bonded conductor embedded in electrically conductive concrete of size: Length 1.2 Mtr (63mm dia) (Earthing electrode with Marconite), 05 years warranty from the date of installation.