



दि. मध्यप्रदेश स्टेट एगो इण्डस्ट्रीज डेवलपमेंट कार्पोरेशन लिमिटेड  
(मध्यप्रदेश शासन का उपक्रम)

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मुख्या / मार्केटिंग / सोलर लाईट / 2019-20 / ५३३२

दिनांक 12.12.2019

प्रति,

क्षेत्रीय प्रबंधक (समस्त)

जिला प्रबंधक (समस्त)

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विषय : SUPPLY OF BOS, INSTALLATION- COMMISSIONING & 5 YEARS AMC OF  
STAND- ALONE OFF GRID SOLAR LED STREET LIGHTING SYSTEM के  
प्रदाय हेतु क्रय-विक्रय दरों का प्रसारण ।

संदर्भ : निगम द्वारा जारी आर.सी.ओ. दिनांक 10.10.2019

निगम द्वारा वर्ष 2019-20 के लिए SUPPLY OF BOS, INSTALLATION-  
COMMISSIONING & 5 YEARS AMC OF STAND- ALONE OFF GRID SOLAR  
LED STREET LIGHTING SYSTEM के प्रदाय हेतु दिनांक 10.10.2019 को आनलाइन दरें  
आमंत्रित की गयी थी। उक्त पत्र के साथ तकनीकी मापदण्ड एवं डिजाइन, ड्राईंग इस पत्र के  
साथ संलग्न कर भेजी जा रही है।

कृपया उक्तानुसार कार्यवाही सुनिश्चित करें।

उप महाप्रबंधक (विपणन)

**TECHNICAL SPECIFICATIONS FOR 12 W WHITE-LED BASED SOLAR STREET LIGHTING SYSTEM**

Sr. No	Components	Specification for Solar street light fitting
1.	PV module	75 Wp under STC
2.	Battery	Minimum 12.8V, 30 AH capacity Lithium Ferro Phosphate battery.
3.	Light Source	White Light Emitting Diode (W-LED)  12 Watt, W-LED luminaire, dispersed beam, soothing to eyes with the use of proper optics and diffuser.  LED Chip should be compliance to IES: LM-80 (Approved Method for Measuring Lumen Maintenance of LED Light Sources and LED lumen depreciation time to L70). Test report for same should be submitted.
4.	Light Out put	The luminaire must use high efficacy W-LED with minimum 135 lumens per watt (and UV free). [A certificate to be submitted by the System supplier to the Test Lab during certification]  <b>For single light level:</b>  Minimum 24 Lux when measured at a point 4 meters below the light. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred.  <b>For Multiple Light levels:</b> The luminaire should have two levels of light to take care of different lighting needs during the night. Minimum 24 Lux when measured at a point 4 meters below the light (at "High" illumination level). The illumination Should be uniform without dark bands or abrupt variations. Minimum 12 Lux at lower illumination level. (Higher light output will be preferred)  The luminaire shall be tested for Electrical, Photometry and Color parameters as per IES LM-79:2008 or IS: 16106:2012 for following performance parameters like:  1) Total luminous flux: $\geq 1500$ lm. 2) Luminous efficacy (i.e. system efficacy): $\geq 125$ lm/W. 3) Color Temperature: Between 5500 K to 6500 K.



		<p>4) <math>CRI \geq 70</math></p> <p>5) Luminous intensity distribution should follow the batwing patterns in polar curves.</p> <p>6) Require validation report using .ies file, which is generated during luminous intensity distribution test and using maintenance factor 0.9 and pole height of 4m., Road width 5m and Pole span 15m. The average illuminance level and uniformity should comply with requirement as per IS 1944, wherever applicable.</p> <p>7) The luminaire should be tested for all type tests as per IS 10322 Part 5 Sect 3 or IEC 60598-2-3 standards.</p>
5	Mounting of light	Pole height 5 m above the ground level and 1 m below the ground. Luminaire shall be at least 4.5 m above the ground level.
6	Electronics Efficiency	Overall total Efficiency of the Electronics should be Minimum 90%
7	Duty Cycle	<p>Dusk to dawn:</p> <p>First 4 Hours full light (Min. 24 Lux), rest of the time at lower light (50%, Min. 12 Lux) level.</p> <p>(Higher light output will be preferred)</p>
8	Autonomy	3 days or Minimum 36 operating hours per permissible discharge with fully charged Lithium-Ferro Phosphate Battery.
9	Ingress Protection – IP	Optical and Control gear compartment - IP 65 / IP 66
10	Impact resistance of casing	$\geq IK 08$
11	Radiated Emission Test	As per CISPR-15
12	ESD (Electro Static Discharge) and Radiated susceptibility test	As per IEC 61547



## TECHNICAL DETAILS:

### PV MODULE

- i. Indigenously manufactured PV module should be used.
- ii. The PV module should have crystalline silicon solar cells and must have a certificate of testing conforming to IEC 61215 Edition II / BIS 14286 from an NABL or IECQ accredited Laboratory.
- iii. The power output of the module under STC should be a minimum of 75Wp.
- iv. The module efficiency should not be less than 14 %.
- v. The terminal box on the module should have a provision for opening it for replacing the cable, if required.
- vi. There should be a Name Plate fixed inside the module which will give:
  - a. Name of the Manufacturer or Distinctive Logo.
  - b. Model Number
  - c. Serial Number
  - d. Year of manufacture
- vii. A distinctive serial number starting with NSM will be engraved on the frame of the module or screen printed on the tedlar sheet of the module.

### BATTERY

- i. Minimum 12.8V, 30 AH capacity Lithium Ferro Phosphate Battery.
- ii. Battery pack should have proper 'Battery management System' (BMS) for cell balancing, over charge and over temperature protection.
- iii. Battery should conform to the latest BIS/ International standards.

### LIGHT SOURCE

- i. The light source will be a white LED type.
- ii. The colour temperature of white LED used in the system should be in the range of 5500°K-6500°K.
- iii. W-LEDs should not emit ultraviolet light.
- iv. The light output from the white LED light source should be constant throughout the duty cycle.
- v. The lamps should be housed in an assembly suitable for outdoor use.
- vi. The temperature of heat sink should not increase more than 20°C above ambient temperature during the dusk to dawn operation.

### ELECTRONICS

- i. The total electronic efficiency should be at least 90 %.



- ii. Charge controller should be MPPT Type.
- iii. Electronics should operate at an appropriate voltage suitable for proper charging of the battery.
- iv. No Load current consumption should be less than 20 mA.
- v. The PV module itself should be used to sense the ambient light level for switching ON and OFF the lamp.
- vi. The PCB containing the electronics should be capable of solder free installation and replacement.
- vii. Necessary lengths of wires/cables, switches suitable for DC use and fuses should be provided.

### ELECTRONIC PROTECTIONS

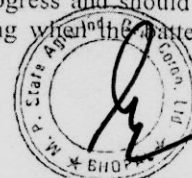
- i. Adequate protection is to be incorporated under "No Load" conditions e.g. when the lamp is removed and the system is switched 'ON'.
- ii. The system should have protection against battery overcharge and deep discharge conditions.
- iii. The System should have protection against short circuit conditions.
- iv. Protection for reverse flow of current through the PV module(s) should be provided.
- v. Adequate protection should be provided against battery reverse polarity.
- vi. Load reconnect should be provided at 80% of the battery capacity status.

### MECHANICAL COMPONENTS

- I. A corrosion resistant metallic frame structure should be fixed on the pole to hold the SPV module.
- II. The frame structure should have provision so that the module can be oriented at the suitable tilt angle.
- III. Pole should be Hot dip galvanized pipe as per IS1161 & IS4736 i.e. Class B.
- IV. Pole height 5 m above the ground level and 1 m below the ground. Luminaire shall be at least 4.5 m above the ground level.
- V. The pole should have the provision to hold the luminaire.
- VI. The battery shall be either included in the luminaire enclosure, which should be water proof (IP 65) and corrosion resistant or outside the luminaire enclosure in a vented, acid proof and corrosion resistant, hot dip galvanized metallic box (IP 65) with anti-theft locking arrangement for outdoor use.

### INDICATORS

- The system should have two indicators, green and red.
- The green indicator should indicate the charging under progress and should glow only when the charging is taking place. It should stop glowing when the battery is fully charged.



- Red indicator should indicate the battery "Load Cut Off" condition.

### QUALITY AND WARRANTY

- i. The street lighting system (including the battery) will be warranted for a period of five years from the date of supply.
- ii. The PV module(s) will be warranted for a minimum period of 25 years from the date of supply. The PV modules must be warranted for their output peak watt capacity, which should not be less than 90% at the end of Ten (10) years and 80% at the end of Twenty five (25) years.
- iii. The Warranty Card to be supplied with the system must contain the details of the system.

### OPERATION and MAINTENANCE MANUAL

An Operation, Instruction and Maintenance Manual, in English and the local language, should be provided with the Solar Street Lighting System. The following minimum details must be provided in the Manual:

- Basic principles of Photovoltaics.
- A small write-up (with a block diagram) on Solar Street Lighting System - its components, PV module, battery, electronics and luminaire and expected performance.
- Type, Model number, Voltage & capacity of the battery, used in the system.
- The make, model number, country of origin and technical characteristics (including IESNA LM-80 report) of W-LEDs used in the lighting system.
- About Charging and Significance of indicators.
- Clear instructions about erection of pole and mounting of PV module (s) and lamp housing assembly on the pole.
- Clear instructions on regular maintenance and troubleshooting of the Solar Street Lighting System.
- DO's and DONT's.
- Name and address of the contact person for repair and maintenance, in case of non-functionality of the solar street lighting system.

