BID SPECIFICATION
FOR
SOLAR STREET LIGHTING SYSTEM

ANNEXURE -I

SECTION – 2B
Technical Specification for LED based SSLS

1.0DEFINITION

Light Emitting Diode (LED) is a device, which emits light when an electric current passes through it. A LED based solar street lighting systems aims at providing solar electricity for operating LED for dusk to dawn operation per day.

2.0 SCOPE OF WORK

The scope of work includes:

Manufacture, testing, packing & forwarding, transportation, supply, installation & commissioning of LED based SSLS system complete in all respects along with one set of operation instruction cum maintenance manual (Hindi) for each set and delivery on FOR destination/site (door delivery) basis across the State of Jharkhand including, demonstration of performance and training at all sites located within the state of Jharkhand as per direction of JREDA. List of villages will be given before start of dispatch by JREDA.

3.0 BROAD PERFORMANCE PARAMETERS

The broad performance specification of a White Light Emitting Diode (W-LED) light source based Solar Street Lighting System are given below:

Light Source	White Light Emitting Diode (W-LED)
Light Output	White colour, minimum 15 lux when measured from a height of about 8 ft and illuminated over an area of at least 8 ft diameter. Higher light output will be preferred.
Mounting of Light	15 ft high pole with an extended arm to hold the luminaries.
PV Module	37 Wp under STC, measured at 16.4 V as V_{load} module, Voc minimum of 21.0V.
Battery	Flooded lead acid tubular plate, 12 V-40AH @ C/10, 75% of the rated capacity of the battery should be between fully charged and load cut off.
Electronics	Min 72% total efficiency.
Average Duty Cycle	Dusk to dawn
Autonomy	Minimum of 3 days.

OTHER DETAILS

3.1 DUTY CYCLE

The LED solar street lighting system should be designed to operate from dusk to dawn, under average daily insolation of 5KWh/ sq. m. on a horizontal surface.

3.2 LIGHT SOURCE:

a) The light source will be of white LED type. Single LED or multiple LED's can be used. Wider view angles preferred. The luminous performance of LEDs used should not be less than 30 lumen/watt. Use of LEDs, which emit ultraviolet light, must be avoided.

b) The light output should remain constant with variations in the battery voltages.

c) The lamps should be housed in an assembly suitable for outdoor use. While fixing the assembly the lamp should be held preferably in a base up configuration.

d) The make, model number, and technical characteristics of LEDs should be furnished.

3.3 PV MODULE

a) The PV module shall contain crystalline silicon solar cells.
b) The operating voltage corresponding to the power output mentioned above should be 16.4 V.
c) The open circuit voltage of the PV modules under STC should be at least 21.0 Volts.
d) The terminal box on the module should have a provision for opening for replacing the cable, if required.
e) A strip containing the following details
f) Name of the Manufacturer or distinctive logo
   (i) Model or type number.
   (ii) Serial no.
   (iii) Year of make.
(g) Models of reputed make shall be offered.

JREDA SPECIFICATION

(a) Monogram of JREDA along with following details translated into Hindi language shall be laminated in Devnagari script on the left hand top corner in front of each PV Module.

- General Programme 2007-08
- Not for sale or transfer
- Statutory action would be taken by JREDA, if it found sold or transferred, under different sections of IPC.

(b) Frame of PV Module shall be painted golden yellow colour.

(c) A strip containing the following detail should be mentioned in Hindi language and pasted in permanent manner at the back of the module:

(i) Cost of the system – Rs. 16191/-(Rs. Sixteen Thousand One Hundred Ninety One Only)
(ii) State subsidy to different categories viz. SC/ST/primitive/General.
(iii) Beneficiary contribution.

3.4 BATTERY

(a) Flooded lead acid maintenance free battery. Battery should confirm to latest BIS standards or International standards. A copy of the test certificate should be provided.
(b) 75% of the rated capacity of the battery should be between fully charged & load cut off conditions.

3.5 ELECTRONICS

a. The total electronic efficiency should be at least 72%.
b. Electronics should operate at 12V and should have temperature compensation for proper charging of the battery through out the year.
c. The light output should remain constant with variations in the battery voltages.
d. Necessary length of wires /cables (2 core x 1.5 sq.mm), switches suitable for DC use and fuses should be provided.

3.6 ELECTRONIC PROTECTION

a. Adequate protection is to be incorporated under no load conditions, e.g. when the lamps are removed and the system is switched ON.
b. The system should have protection against battery overcharged and deep discharge conditions. The numerical values of the cut off limits must be specified, while submitting the samples for the testing purposes.
c. Fuses should be provided to protect against short circuit conditions.
d. A blocking diode should be provided as part of the electronics, to prevent reverse flow of current through the PV module(s), incase such a diode is not provided with the PV module(s).
e. Full protection against open circuit, accidental short circuit and reverse polarity should be provided.

3.7 MECHANICAL COMPONENTS

a) Metallic frame structure (with corrosion resistance paint) to be fixed on the top of the pole to hold the SPV module. The frame structure should have provision to adjust its angle of inclination to the horizontal between 0 and 45, so that it can be installed at the specified tilt angle.
b) It should be possible to mount the light source on metallic arm attached to the pole. The metallic arm for holding the light assembly will be extended at least 4 ft from the pole and set at a suitable tilt angle to provide uniform illumination over the specified area.
c) A vented metallic box of M.S. (0.7 mm minimum thickness and should be acid proof and painted with corrosion resistance paint as per relevant BIS standard) for housing the storage battery indoors shall be provided. The box can also be of Plastic/PVC/Acrylic of suitable size of 2.5mm minimum thickness which should be 100% acid proof, rust proof and electrically insulated. It should have grid structure at the base for proper strength and should have the provision to be bolted/welded with the pole.

3.8 OTHER FEATURES

a. 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 LEDs should glow only when the battery is actually being charged.

b. The following details should be marked indelibly on the body of SSLS:
   (i) Name of the Manufacturer or Distinctive Logo.
   (ii) Model No.
   (iii) Serial No.
   (iv) Make and Serial No. of the PV module used.

3.9 DOCUMENTATION

An operation, instruction and Maintenance Manual, in Hindi should be provided with the solar home system. The following minimum details must be provided in the manual:

a. About Photovoltaic
b. About LED solar system - its components and expected performances.
c. About PV module: Incase of imported modules it is mandatory to provide a copy of the international product qualification certificate
d. About LED lights: The make, modal number, country of origin and technical characteristics of LEDs should be stated in the product data sheet.
e. About battery.
f. Clear instructions about mounting of PV module.
g. About electronics.
h. About charging and significance of indicators.
i. Do's and Don'ts
j. Clear instructions on regular maintenance and trouble shooting of solar home system.
k. Name and address of the person or service center to be contacted incase of failure or complaint

3.10 QUALITY AND WARRANTY

(a) Components and parts used in LED Solar Street Lighting System should confirm to the latest BIS/ international specifications, wherever such specifications are available and applicable. A copy of the test report / certificate stating conformity of BIS/ international standards must be submitted.

(b) The PV module will be warranted for a minimum period of 10 years from the date of supply and the LED Solar Street Lighting System including the battery, will be warranted for a period of at least 2 years from the date of supply.

