



# BID SPECIFICATION FOR SOLAR LANTERN



**ANNEXURE – I**

## **SECTION – 2B**

### **Technical Specification for LED based Solar Lantern**

#### **1.0 DEFINITION**

A Solar Photovoltaic Lantern is a lighting system consisting of a lamp, battery and electronics, all placed in a suitable housing, made of metal, plastic or fiberglass, and a PV module. The battery is charged by electricity generated through the PV module. The lantern is basically a portable lighting device suitable for either indoor or outdoor lighting, covering a full range of 360 degrees. A lighting device, which provides only unidirectional lighting, will not be classified as a solar lantern in the present context.

#### **2.0 SCOPE OF WORK**

The scope of work includes Manufacture, shop testing, packing & forwarding, transportation & supply of LED based solar lantern system complete in all respects along with one set of operation instruction-cum- maintenance manual (both English and 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. The solar lantern shall be supplied as per the following specification.

#### **3.0 TECHNICAL SPECIFICATION**

The LED based solar lantern shall be Indigenous make should conform to the following specification:

##### **ELECTRICAL**

- ❖ Input Voltage: 6.00V (Nominal)
- ❖ Input Current: < 450 mA
- ❖ Input Power: < 2.5 W
- ❖ Output power: > 2.0 W
- ❖ Efficiency:  $\geq 72\%$
- ❖ Load disconnect battery voltage:  $5.30 \pm 0.1V$
- ❖ Load reconnect battery voltage:  $6.50 \pm 0.1V$

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## ILLUMINANCE

Sl. No	Measurement from a distance away from the centre point of bottom of lantern in the same plane of horizontal.	Illuminance required	
		When detector is in Horizontal	When detector is at right angle
1	1 feet	14.00 Lux	55 Lux
2	2 feet	3.00 Lux	20 Lux
3	3 feet	2.00 Lux	12 Lux
4	4 feet	1.5Lux	8 Lux

### 3.1 Duty Cycle

The Solar lantern should provide a minimum of 3/4 hours of lighting per day under average daily solar radiation conditions of 5 kWh/sq.m. on a horizontal surface. The actual duration of lighting may vary depending on the location, season etc.

### 3.2 Lamps

- The lamp will be White Light Emitting Diode (W-LED) diffused and soothing to eyes.
- The luminous performance of LEDs used should not be less than 30 lumen watt.
- Use of LEDs, which emit ultraviolet light, shall be avoided.
- The light output from the light source should be constant during the specified duration.
- The lamp should be held preferably in a base up configuration.
- The make, model number and technical characteristic of lamp shall be furnished.

### 3.3 Battery

- The battery shall be sealed maintenance free (SMF) make or equivalent confirming to latest BIS standard or international standard. A copy of the test certificate should be furnished along with offer.
- The capacity of the battery will be a minimum of 4.0 AH at 6V at C/20 discharge rate at 27°C.
- 75% of the rated capacity of the battery should be between fully charged & load cut off condition.

### 3.4 Electronics

- The total electronic efficiency should be at least 72%.
- The idle current consumption in the charge controller should not be more than 1 mA.
- Electronics should operate at 6.0V and should have temperature compensation for proper charging of the battery through out the year.
- The light output should remain constant with variation of the battery voltage.
- Necessary lengths of wire/cables (5 meters), switches suitable for DC use and fuses should be provided.

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## 3.5 PV Module(s)

- a) The PV module shall contain crystalline silicon solar cells or thin film solar cell modules. In case of thin film solar cell modules the specified values refer to stabilized power output after initial degradation.
- b) Should be more than 2.5W at 8.80 V
- c) The module should preferably have an arrangement (stand) for mounting at the optimum angle in the direction facing the sun.
- d) The terminal box on the module should have a provision for opening it for replacing the cables, if required.
- e) A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side.

- Name of the Manufacturer or distinctive logo.
- Model or Type No.
- Serial No.
- Year of make

(f) 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 the front of each PV module.
  - ❖ SPV 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 with golden yellow.
- c) A strip containing the following details should be mentioned in Hindi and pasted in permanent manner at the back of the module:
  - (i) Cost of the System – Rs. 1590/- (Rs. One Thousand Five Hundred Ninety Only)
  - (ii) State subsidy to different categories viz. SC/ST/primitive.
  - (iii) Beneficiary contribution.

## 3.6 Electronic Protection

- (a) Adequate protection is to be incorporated under no load conditions (e.g. when the lamp is removed and the lantern is switched ON).
- (b) Battery cut offs & reconnects should be provided to protect it against overcharge and deep discharge condition.
- (c) A fuse should be provided to protect against short circuit conditions.
- (d) A blocking diode, preferably a Schottky diode, should be provided as part of the lantern electronics to prevent reverse flow of current through the PV module, if such a diode is not provided with the module itself.
- (e) Full protection against open circuit, accidental short circuit and reverse polarity should be provided.

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## 3.7 Other Features

- a) Two LED indicators one for a green light to indicate charging in progress, and another red LED to indicate deep discharge conditions of the battery suggesting that load should be switched off and the battery must be charged immediately should be provided on the body of the lantern. The green LED should glow only when the battery is actually being charged.
- b) The On/Off switch used in the lantern must be suitable for use in DC circuits and be reliable with long life. Use of electronic switch is allowed. A cable (2 core × 1.5 sq mm )of suitable length(at least 5 meters) should be provided for inter-connection between the module and the lantern.
- c) The following details should be marked indelibly on the lantern;
  - Name of the Manufacturer or Distinctive Logo.
  - Model Number
  - Serial Number
  - Make and serial number of the PV module used with the lantern.

## 3.8 Documentation

An operation, Instruction Maintenance Manual in English & in the local language should be provided with the solar lantern. The following minimum details must be provided in the manual:

- (ii) About Photovoltaic
- (iii) About LED Solar Lantern – its components and expected performance.
- (iv) About PV Module. — In case of imported modules it is mandatory to provide a copy of the international product qualification certificates.
- (v) About LED lights, the make model no, country of origin and technical characteristic of LEDs should be stated
- (vi) About Battery
- (vii) Clear instructions about mounting of PV module(s)
- (viii) About electronics
- (ix) About charging and significance of indicators.
- (x) Do's and Don'ts
- (xi) Clear instructions on regular maintenance and trouble shooting of solar lantern.
- (xii) Name and address of the person or service center to be contacted in case of failure or complaint.

## 3.9 Quality and warranty:

- (i) Components and parts used in LED solar lantern should confirm to the latest BIS/ International specification, wherever such specification are available and applicable. A copy of the test report/certificate stating conformity of BIS / International standard must be submitted to the test centre.



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(ii) The PV module will be warranted for a minimum period of 10 years from the date of supply and the LED solar lantern including battery shall be warranted for a period of at least 2 years from the date of supply.

3.10 Any minor equipment and material which may not be specifically mentioned in this specification but are required to make the system complete in every respect in accordance with technical specification and guaranteed performance of the equipment shall be deemed to have been covered under the scope of this specification and shall be provided by the tender/ supplier within the quoted price.

3.11 The tender shall satisfy the purchaser that he possesses the necessary technical experience and has at disposal suitable facilities and staff to ensure that the contract shall be executed with the best quality material and workmanship with the stipulated time. Necessary particulars in this regard shall be furnished with the tender.

3.12 The equipment supplied shall be new and best of their kind and latest technology on the date. All materials and equipment shall comply with the MNRE Standard.

3.13 The equipment shall be designed to have maximum reliability and ease of operation and maintenance as primary consideration. The equipment offered shall be of a family having basic design as per which other equipment have already been supplied and which have operated efficiently and reliably elsewhere at least three years under similar climatic and operating condition. Operation feed back for such equipment already supplied shall be attached with the offer.

All the equipment supplied shall be guaranteed for quality workmanship and compliance with the specified requirements for integrated performance.