



**BID SPECIFICATION
FOR
REMOTE VILLAGE ELECTRIFICATION**



SECTION – 2A

**Technical Specification for
Solar Home Lighting System**

1.0 DEFINITION

A Solar Home Lighting System (SHLS) aims at providing solar electricity for operating lights and/or fan or energizing a DC operated portable TV sets for specified hours of operation per day.

2.0 SCOPE OF WORK

The scope of work for includes:

Manufacture/assemble, shop testing, packing & forwarding, transportation, transit insurance, supply, installation, testing & commissioning including 5 years Comprehensive Maintenance Contract (CMC) of SHLS system complete in all respects on turnkey basis 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. List of villages will be given before start of dispatch by JREDA.

The solar home lighting shall be supplied as per the following specification.

3.0 TECHNICAL SPECIFICATION

The solar home lighting shall be Indigenous make should conform to the following model:-

Type of SHLS	Components	Specification
Model 2 Two Lights	PV Module	1x37 Wp under STC
	Lamp	2xCFL, 4-Pin 9W, Base up configuration housed in assembly suitable for indoor use, with reflector in its back.
	Battery	1x12V, 40AH, Tubular Plate, low maintenance type Lead Acid Battery,
	Other Components	Control electronics – Module mounting hardware, Battery box, Inter connecting wires/cables, Switches, Operation, Instruction and Maintenance Manual.

All models shall have a socket to provide power for a 12V DC TV set, which is purchased separately.

Small white LED shall be provided as an optional feature, with an independent switch.

3.1 DUTY CYCLE

Model No	Average Hours of Operation Per Day
Model 2	2 Light, 3-4 Hours



**BID SPECIFICATION
FOR
REMOTE VILLAGE ELECTRIFICATION**



3.2 LAMPS

- (a) The lamps shall be compact fluorescent (CFL) type, 4-Pin, with rating of 9 W. A suitable pre-heating circuit must be provided.
- (b) The light output from the lamps should be around 600 \pm 5% lumens. No blackening or reduction in the lumen output by more than 10% should be observed after 1000 ON/OFF cycles (two minutes ON followed by four minutes OFF is one cycle).
- (c) The lamps should be housed in an assembly suitable for indoor use, with a reflector on its back. While fixing the assembly, the lamp should be held preferably in a base up configuration.

3.3 BATTERY

- (a) The battery shall be of flooded electrolyte type, positive tubular plate, and maintenance free lead acid battery conforming to relevant BIS standards
- (b) The battery will have a minimum rating of 12V, 40Ah (at C/10) discharge rate
- (c) 75% of the rated capacity of the battery should be between fully charged and load cut off

3.4 ELECTRONICS

- (a) The inverter will be of quasi sine wave/sine wave type with a frequency in the range of 20-35 KHz. Half-wave operation is not acceptable.
- (b) The total electronic efficiency shall be at least 80%
- (c) No blackening or reduction in the lumen output by more than 10% should be observed after 1000 ON/OFF cycles (two minutes ON followed by four minutes OFF is one cycle).
- (d) The idle current consumption should not be more than 10mA
- (e) Electronics shall be operate at 12 V and should have temperature compensation for proper charging of the battery through out the year.
- (f) Necessary length of wires/cables, switches suitable for DC use and fuses shall be provided.

3.5 PV MODULE(S)

- (a) The PV Module(s) shall contain crystalline silicon solar cells.
- (b) The power output of the module(s) under STC should be a minimum of 37W.
- (c) The operating voltage corresponding to power output mentioned above should be 16.4V.
- (d) The open circuit voltage of the PV module under STC shall be at least 21.0V.
- (e) The terminal box on the module should have a provision for opening for replacing the cable, if required.
- (f) A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side.
 - i. Name of the Manufacturer or distinctive logo.
 - ii. Model or Type No.
 - iii. Serial No.
 - iv. Year of make



**BID SPECIFICATION
FOR
REMOTE VILLAGE ELECTRIFICATION**



- (g) Models of reputed make shall be offered.
- (h) Monogram of JREDA along with following details translated into Hindi language in Devnagari script shall be screen printed in indelible ink or paint on the back side of each PV module.
- Remote Village Electrification Programme 2007- 08
 - Not for sale or transfer
 - Statutory action would be taken by JREDA, if it found sold or transferred.
- (i) Frame of PV module shall be painted with Blue colour.

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, 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.

3.7 MECHANICAL COMPONENTS:

Metallic frame structure (with corrosion resistance paint) to be fixed on the roof of the house to hold the SPV module(s). The frame structure shall 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.

A vented metallic / plastic / wooden box with acid proof corrosion resistance paint for housing the storage battery indoors shall be provided.

3.8 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. The green LED should glow only when the battery is actually being charged.
- (b) The following details should be marked indelibly on the SHLS.
- i. Name of the Manufacturer or distinctive logo.
 - ii. Model or Type No.
 - iii. Serial No.
 - iv. Year of make
- (c) Components and parts used in solar home systems should confirm to the latest BIS specification, whichever such specifications are available and applicable.

3.9 Documentation:

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



**BID SPECIFICATION
FOR
REMOTE VILLAGE ELECTRIFICATION**



- (i) About Photovoltaic
 - (ii) About solar home system – its components and expected performance.
 - (iii) About PV Module.
 - (iv) About CFL
 - (v) About Battery
 - (vi) Clear instructions about mounting of PV module(s)
 - (vii) About electronics
 - (viii) About charging and significance of indicators.
 - (ix) Do's and Don'ts
 - (x) Clear instructions on regular maintenance and trouble shooting of solar home system.
 - (xi) Name and address of the person or service center to be contacted in case of failure or complaint.
- 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 tenderer/supplier within the quoted price.
- 3.11 The Tenderer shall satisfy the purchaser that he possesses the necessary technical experience and has at his disposal suitable facilities and staff to ensure that the contract shall be executed with the best quality material and workmanship within 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 of 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.
- 3.14 All the equipment supplied shall be guaranteed for quality workmanship and compliance with the specified requirements for integrated performance to deliver rated output.



**BID SPECIFICATION
FOR
REMOTE VILLAGE ELECTRIFICATION**



SECTION – 2B

**Technical Specification for
Solar Street Lighting System**

1.0 DEFINITION

A stand alone solar photo voltaic street lighting system comprises a compact fluorescent lamp, lead acid battery, a PV module(s), control electronics, inter connecting wires/cable, module mounting hardware, battery box, operation, instruction and maintenance manual.

2.0 SCOPE OF WORK

The scope of work for includes:

Manufacture/assemble, shop testing, packing & forwarding, transportation, transit insurance, supply, installation, testing & commissioning including 5 years Comprehensive Maintenance Contract (CMC) of SSLS system complete in all respects on turnkey basis 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. List of villages will be given before start of dispatch by JREDA.

The solar streetlight shall be supplied as per the following specification.

3.0 TECHNICAL SPECIFICATION

The solar street light shall be Indigenous make should conform to the following specification:

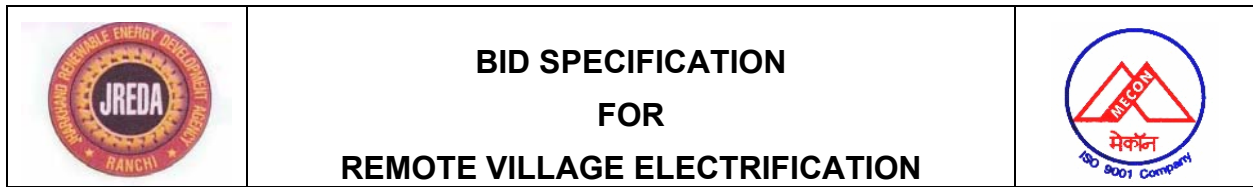
Components	Specification
PV Module	1x74Wp or 2x37 Wp under STC
Lamp	1xCFL (11W), 4-Pin
Battery	1x12V, 75AH, Tubular Plate, low maintenance type Lead Acid Battery,
Other Components	Control electronics – Module mounting hardware, Battery box, Inter connecting wires/cables, Switches, Operation, Instruction and Maintenance Manual.

3.1 DUTY CYCLE

The system shall be designed to automatically switch ON at dusk, operate throughout the night and automatically switch OFF at the dawn, under average daily insolation of 5 kWh/sq.m on a horizontal surface.

3.2 LAMPS

- (a) The lamps shall be compact fluorescent (CFL) type, 4 – Pin, with rating of 11 W. A suitable pre-heating circuit must be provided.
- (b) The light output from the lamps should be around 900±5% lumens. No blackening or reduction in the lumen output by more than 10% should be observed after 1000 ON/OFF cycles (two minutes ON followed by four minutes OFF is one cycle).



- (c) The lamps should be housed in a weather proof assembly suitable for outdoor use, with a reflector on its back. While fixing the assembly, the lamp should be held in a base up configuration.

3.3 BATTERY

- (a) The battery shall be of flooded electrolyte type, positive tubular plate, and low maintenance lead acid battery conforming to relevant BIS standards.
- (b) The battery will have a minimum rating of 12V, 75Ah (at C/10) discharge rate
- (c) 75% of the rated capacity of the battery should be between fully charged and load cut off

3.4 ELECTRONICS

- (a) The inverter will be of quasi sine wave/sine wave type with a frequency in the range of 20-35 KHz. Half-wave operation is not acceptable.
- (b) The total electronic efficiency shall be at least 80%
- (c) No blackening or reduction in the lumen output by more than 10% should be observed after 1000 ON/OFF cycles (two minutes ON followed by four minutes OFF is one cycle).
- (d) The idle current consumption should not be more than 10mA
- (e) Electronics shall be operating at 12 V and should have temperature compensation for proper charging of the battery through out the year.
- (f) Necessary length of wires/cables, switches suitable for DC use and fuses shall be provided.
- (g) The PV module shall be used to sense the ambient light level for switching ON and OFF the lamp

3.5 PV MODULE (S)

- (a) The PV Module(s) shall contain crystalline silicon solar cells
- (b) The power output of the module(s) under STC should be a minimum of 74W. Either two modules of minimum 37W output each or one module of 74w output shall be used.
- (c) The operating voltage corresponding to power output mentioned above should be 16.4V
- (d) The open circuit voltage of the PV module under STC shall be at least 21.0V
- (e) The terminal box on the module should have a provision for opening for replacing the cable, if required.
- (f) A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side.
- i. Name of the Manufacturer or distinctive logo.
 - ii. Model or Type No.
 - iii. Serial No.
 - iv. Year of make
- (g) Models of reputed make shall be offered.



**BID SPECIFICATION
FOR
REMOTE VILLAGE ELECTRIFICATION**



(h) Monogram of JREDA along with following details translated into Hindi language in Devnagari script shall be screen printed in indelible ink or paint on the back side of each PV module.

- Remote Village Electrification Programme 2007- 08
- Not for sale or transfer
- Statutory action would be taken by JREDA, if it found sold or transferred.

(i) Frame of PV module shall be painted with Blue colour.

3.6 ELECTRONIC PROTECTION

(a) Adequate protection is to be incorporated under no load conditions (e.g. when the lamp is removed and the system is switched ON).

(b) Battery cut offs & reconnects should be provided to protect it against overcharge and deep discharge condition.

(c) Fuses should be provided to protect against short circuit conditions.

(d) A blocking diode, diode, should be provided as part of the 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.

3.7 MECHANICAL COMPONENTS

i. A Metallic frame structure (with corrosion resistance paint) to be fixed on the pole to hold the SPV module(s). The frame structure shall have provision to adjust its angle of inclination to the horizontal between 0 and 45, so that it can be oriented at the specified tilt angle.

ii. The pole should be made of mild steel pipe with a height of 4 meter above the ground level, after grouting and final installation. The pole should have the provision to hold the weatherproof lamp housing. It should be painted with a corrosion resistant paint.

iii. A vented acid proof and corrosion resistant painted metallic box for outdoor use should be provided for housing the battery.

3.8 OTHER FEATURES

1. 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. The green LED should glow only when the battery is actually being charged.

2. The following details should be marked indelibly on the SSLs.

- i. Name of the Manufacturer or distinctive logo.
- ii. Model or Type No.
- iii. Serial No.
- iv. Year of make

3. Components and parts used in solar home systems should confirm to the latest BIS specification, whichever such specifications are available and applicable.



**BID SPECIFICATION
FOR
REMOTE VILLAGE ELECTRIFICATION**



3.9 Documentation:

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

- (i) About Photovoltaic
 - (ii) About solar home system – its components and expected performance.
 - (iii) About PV Module.
 - (iv) About CFL
 - (v) About Battery
 - (vi) Clear instructions about mounting of PV module(s)
 - (vii) About electronics
 - (viii) About charging and significance of indicators.
 - (ix) Do's and Don'ts
 - (x) Clear instructions on regular maintenance and trouble shooting of solar home system.
 - (xi) Name and address of the person or service center to be contacted in case of failure or complaint.
- 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 tenderer/supplier within the quoted price.
- 3.11 The Tenderer shall satisfy the purchaser that he possesses the necessary technical experience and has at his disposal suitable facilities and staff to ensure that the contract shall be executed with the best quality material and workmanship within 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 of 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 plants already supplied shall be attached with the offer.
- 3.14 All the equipment supplied shall be guaranteed for quality workmanship and compliance with the specified requirements for integrated performance to deliver rated output.



**BID SPECIFICATION
FOR
REMOTE VILLAGE ELECTRIFICATION**



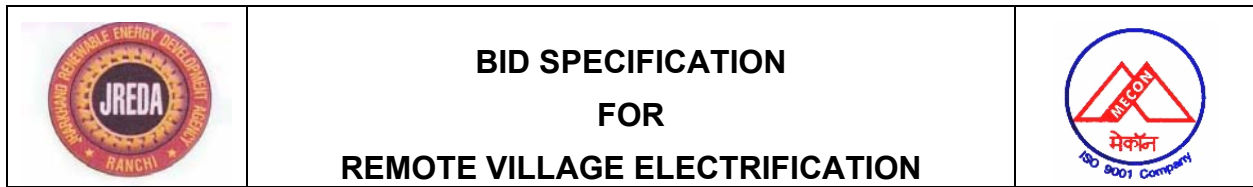
SECTION – 2C

Specification for

FIVE YEAR COMPREHENSIVE CONTRACT (CMC)

The Comprehensive Maintenance Contract shall include servicing & replacement guarantee for parts and components (such as battery, electronics, lamps etc) of solar home lighting system and Solar Street Lighting System for five years. For PV modules, the replacement guarantee is for ten years. The maintenance service provided shall ensure proper functioning of the SPV system as a whole. All preventive / routine maintenance and breakdown / corrective maintenance required for ensuring maximum uptime shall have to be provided. Accordingly, the Comprehensive Maintenance Contract (CMC) shall have two distinct components as described below:

1. **Preventive / Routine Maintenance** – This shall be done by the company at least once in a every four/ six months and shall include activities such as cleaning and checking the health of the SPV system, cleaning of module surface, topping up of batteries, tightening of all electrical connections, changing of tilt angle of module mounting structure, cleaning & greasing of battery terminals and any other activity that may be required for proper functioning of the SPV system as a whole.
2. **Breakdown / Corrective Maintenance** – Whenever a complaint is lodged by the user, the bidder shall attend to the same within a reasonable period of time and in any case the breakdown shall be corrected within a period not exceeding ten days from the date of complaint. **If more than 10 days are taken after registering of complaint, then supplier has to pay Rs. 20/- for each system for each month till the problem is rectified.** This money shall be deposited to the account of Village Energy Committee.
3. For carrying out the CMC effectively, the Bidder supplier shall establish at least one service center for every 500 Solar PV Systems, deployed within a specified geographical area.
4. The bidder shall maintain following facilities at the local Service Centre for ensuring highest level of services to the end user:
 - a. Adequate trained manpower specifically trained by the bidder for carrying out the service activities.
 - b. Adequate provisions for record keeping, which shall inter-alia, include the following.
 - Details of system supplied within the command area of the service station including full name and address of end user, system and sub-system serial numbers and records of routine maintenance carried out (duly signed by the end user). These records shall include voltage, current, specific gravity, indicator charge, CFL full glow; charge controller operation, electronics etc.
 - History record sheets of maintenance done.
 - c. Adequate spares for ensuring least down time of an individual system.
 - d. The service center shall send summary service reports to State Nodal Agency on half yearly basis. These reports shall include the following information.
 - Number of systems covered by the service station
 - Number of systems working satisfactorily on the reporting date
 - Number of complaint received during the period of reporting
 - Number of complaint attend during period of reporting



- Major cause of failure, as observed.
- Major replacement made during the reporting period.

Separate report shall be submitted for each type of systems manufacture wise in case the service center caters to the requirement of more than one manufacture.

- e. The bidder shall ensure adequate insurance of SPV systems against robbery, theft, burglary and acts of God such as natural calamities, flood etc.
- f. The records maintained at the service center shall be available for scrutiny of authorized representatives of the concerned State Nodal Agencies or MNRE.
- g. The date of CMC maintenance period shall begin on the date of actual commissioning of the SPV systems.
- h. Bidder shall furnished details of infrastructure that they have presently available for establishing of repair shop.
- i. The supplier should pay Re. 1 (One) to the agent (appointed by Village Energy Committee) per light/month for the services of topping up and general maintenance during CMC. The agent will also carry out the liaisoning activity amongst supplier, VEC and beneficiary.

The quality / level of service provided by the bidder would form the basis for determining eligibility of the bidder to participate in the subsequent programmes of JREDA.