TECHNICAL SPECIFICATION & SCOPE OF WORK

SOLAR HOME SYSTEMS

Definition: A solar home light system aims at providing solar electricity for operating lights and/or fan or energizing a DC operated portable TV set for specified hours of operation per day.

Scope of Wok: The scope of work includes the supply, installation and maintenance of complete solar photovoltaic Home System(s) as per the following specification.

Technical Specifications:

General Specifications:

Model	Component	Specifications
Model-IV	PV Module	2 x 37 W or 1 x 74 W under STC
2 Lights & 1 Fan	Lamp	2 x CFL (9W/11W)
	Battery	1 x 12V, 75AH. Tubular Plate low maintenance type Lead Acid Battery.
	Others Components	Control electronics. Module mounting hardware, Battery box, inter connecting wires/cables, Switches, Operation, Instruction and maintenance manual.
Model-V	PV Module	2 x 37 W or 1 x 74 W under STC
4 Lights	Lamp	4 x CFL (9W/11W)
	Battery	1 x 12V, 75AH. Tubular Plate low maintenance type Lead Acid Battery.
	Others Components	Control electronics. Module mounting hardware, Battery box, inter connecting wires/cables, Switches, Operation, Instruction and maintenance manual.

Notes:

1. All models will have a socket to provide power for a 12V DC TV set, which is purchase separately.
2. Small white LED may be provided as an optional feature, with an independent switch.
3. **Duty Cycle**:

Models	Average Hours of Operation/Day
Model-IV	2 Lights, 2-3 Hours, 1 Fan, 1-2 Hours
Model-V	4 Lights, 3-4 Hours

4. Lamps

(a) The lamps shall be compact fluorescent (CFL) type, 4 – Pin 9 W with a suitable pre-heating circuit must be provided.

(b) The light output from the lamps should be around 600 ±5% lumens (for 9W CFL). No blackening should be observed after 1000 ON / OFF cycles.

(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 in a base up configuration.

(d) Maximum DC current consumption for a 9W CFL at 12V should not exceed 0.8 Amp.

(e) The lamps should conform to relevant BIS standards.

5. Battery

(a) The battery will be of flooded electrolyte type, positive tubular plate, low maintenance lead acid rechargeable battery, conforming to relevant BIS standards. The energy generated is stored in the battery and is available to power the solar home lighting system for a predetermined duty cycle.

(b) The battery will have a minimum rating of 12V, 40Ah (at C/10) discharge rate at 20°C.

(c) 75% of the rated capacity of the battery should be between fully charged and load cut off conditions.

(d) The battery shall have following features

- Wide operating temperature range (0 deg.C to 50 deg C)
- Protection against reverse connection of battery/panel, overcharge & deep discharge
- Safety vent to prevent gas build up
- Life up to minimum 300 full cycles at 100% discharge capacity
- Very low self discharge rates
- Operate at any orientation

(e) The Battery should have approval of ETDC/ERTL/Railway/Telecom/DRDO/ CECRI.

6. Electronics

(a) The inverter should be of quasi sine wave/sine wave type with frequency in the rage of 20- 35 KHz to drive 4-pin 9W CFL with preheat technique to avoid the blackening of ends. Half – wave operation is not acceptable.

(b) The total electronics efficiency should 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 should operate at 12 V and should have temperature compensation for proper charging of the battery throughout the year.

(f) Necessary lengths of wires/cables, switches suitable for DC use and fuses should be provided.

(g) Entire Electronics shall be housed on a single PCB with connectors for easy replacement without any need of disordering.

(h) Only copper wires of appropriate gauge & dimensions as per BIS standards should be used.

7. PV Module(s)

(a) The PV module (s) shall contain crystalline silicon solar cells and shall be protected from hail storm, worst climatic condition.

(b) The power output of the module(s) under STC should be a minimum of 37W.

(c) The operating voltage corresponding to the power output mentioned above should be 16.4 V.

(d) The open circuit voltage of the PV modules under STC should be at least 21.0 volts.

(e) The terminal box on the module should have a provision for opening for replacing the cables, if required. Plug in type connection shall be provided in the PV terminal box as well as in the charge controller.

(f) Weatherproof enclosure shall be provided.

(g) A strip containing the following details should be laminated inside the module (on the right hand top corner) 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

8. 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) The system should have protection against battery overcharge and deep discharge conditions.

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

(d) A blocking diode preferably a Schottky type, should be provided as part of the electronics to prevent reverse flow of current through the PV module (s), in case such diode is not provided with the PV module (s).

(e) Full protection against open circuit, accidental short circuit, reverse polarity and lightning should be provided.

9. Mechanical Components

(a) 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 should have provision to adjust its angle of inclination to the Horizontal between 0 and 55°, so that it can be installed at the specified tilt angle. However, in case of thatched roof, the module should be pole mounted. The length of the pole should be minimum 3 m above the ground level after grouting & final installation and the diameter of the pole should be 5 cm. The pole should be medium duty GI pipe directly fixed into the ground.

(b) A vented acid proof and corrosion resistance (Galvanized) metallic box for housing the storage battery indoors should be provided.

10. 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 LED should glow only when the battery is actually being charged.

(b) There will be a Name Plate on the system which will give:

(I) Name of the Manufacturer or distinctive logo.

(II) Model or Type No.

(III) JREDA 2006-07

(c) Components and parts used in solar home system should confirm to the latest BIS specifications, wherever such specifications are available and applicable.