

**Rate Contract**  
Government of India  
Directorate General of Supplies & Disposals  
Jeevan Tara Building, 5 Sansad Marg  
New Delhi-110001  
Tel Number 23360610/23360537

Rate Contract no. Solarlight/IT-2/RC-D3020000-1010-82-OA092-774  
Dated 05-NOV-09

To,

✓  
AVFCO ELECTRONICS PVT.LTD.,  
4th Floor,SURYA TOWERS,104 ,S.P. ROAD,SECUNDERABAD,  
HYDERABAD- AP  
Toll Free No- 1-800-425-2919  
HYDERABAD

Sub: Rate Contract for supply of Solar Lighting System  
Validity: From 05-NOV-09 To 31-OCT-10 .

~  
Ref:(1) This Office Tender Enquiry No. Solarlight/IT-2/RC-D3020000-1010-82  
Opened on 29-JUL-09.  
(2) Your Quotation No. nil And Dated  
27-JUL-09.


Dear Sir,

You are hereby informed that your above referred tender read with subsequent letters mentioned above for the Stores specified in the Schedules annexed has been accepted. This rate contract will be governed by the terms and conditions brought in the Form no. DGS&D 1001 available from dgs&d sales counter on payment of Rs. 50/- .The Rate Contract and the schedules annexed here to shall be the sole repository of this Rate Contract/Transaction.

**SCHEDULES ANNEXED**

- 1.Schedule "A" Description of stores,prices,duties/taxes.
- 2.Schedule "B" special conditions of contract / Other information.
- 3.Schedule "C" Information to DDOs about parallel rate contracts.
- 4.Annexure - Technical Specification

Yours Faithfully,

  
Assistant Director(S) Section Officer/Dy. Director  
For and on behalf of the purchaser named in the Form DGS&D 1001.

COPY TO:

- 1.The Chief Controller of Accounts,Department of commerce,New Delhi/  
COA Mumbai/COA Kolkata,COA Chennai.  
(Through authentication cell) This issues with the approval of competent authority.
- 2.Deputy Director General of Supplies & Disposals,Chennai -10 copies each
- 3.Deputy Director General of Supplies & Disposals,Kolkata -10 copies each
- 4.Deputy Director General of Supplies & Disposals,Mumbai -10 copies each
- 5.Deputy Director General (QA),Kolkata -10 copies each
- 6.Deputy Director General (QA),Chennai -10 copies each
- 7.Deputy Director General (QA),Mumbai -10 copies each
- 8.Deputy Director General (QA),DGS&D -10 copies each
- 9.Inspection Authority ADG(QA) DGS&D New Delhi - 110001.
- 10.Quality assurance Officer Director (QA) Delhi Directorate/ Mumbai,Chennai/Kolkata.
- 11.Concurrent Audit
- 12.MIS Cell
- 13.Ledger clerk
- 14.O.L.Section
- 15.All Direct Demanding Officers as per mailing list maintained by DGS&D.

( )  
Assistant Director (S) / Section Officer / Deputy Director  
FOR DIRECTOR GENERAL OF SUPPLIES & DISPOSALS

**SCHEDULE - A**

1. Rate Contract No.: - Solarlight/IT-2/RC-D3020000-1010-82/OA092-774  
 Dated 05-NOV-09 For the Supply of Solar Lighting System

2. Advance Rate Contract No.: - Nil  
 Dated

3.(a) Name and Full Address of the Firm

AVECO ELECTRONICS PVT.LTD.,  
 4th Floor.SURYA TOWERS.104 .S.P.  
 ROAD,SECUNDERABAD. HYDERABAD- AP  
 Toll Free No- 1 -800-425-2919  
 HYDERABAD  
 ANDHRA PRADESH - 500003  
 Tel. No. - 040-27811032  
 Fax - 040-27840279  
 Email - vinodb@avecoindia.com

(b) Name and Full Address of Manufacturer :-

Surana Telecom & Power Limited  
 floor.Surya Towers , S P Road,  
 Secunderabad-500003

(c) Brand: Surana

4. Validity of Rate Contract: 05-NOV-09 To 31-OCT-10

5. Description of Item, Specification, Unit, Rate

Item No.	Model No.	Store Description	Model Number:	HA.CFL Lamp Rating:	NOS.	Unit	Rate (in Rs.)
6	SURANA	Solar Lantern ( MNES Specification)	7W.Battery Capacity: 7.00 AH	12 V.			3288 Rs. THREE THOUSAN D TWO HUNDRED EIGHTY-EIGHT ONLY

- 6-Terms of Delivery: Free Delivery at Consignees Premises including Installation
- 7-Excise Duty: Not Applicable
- 8-Sales Tax: CST/VAT Extra @4%
- 9-Delivery Period: 6 to 8 weeks from the date of receipt of confirmed order.
- 10-Annual Turnover Monetary Limit: 2006-07 1247 Lakhs
- 11-Payment Terms: As per Schedule B

- 13-Prices: FIXED
- 14-Quantity Offered: Without Limit
- 15-Minimum Quantity in Single Supply Order: 100000
- 16-Minimum order Value in Single Supply Order: 100000
- 17-Status of the RC Holding Firm: LSI
- 18-Paying Authority: The Deputy Controller of Accounts, Deptt. of Supply  
Shastri Bhawan, 26, Haddows Road  
Chennai 600006
- 19-Inspection Authority: For Civil and Defence  
ADG(QA),Jeevan Tara Building,Parliament Street  
New Delhi
- 20-Quality Assurance Officer: For Civil and Defence  
Office of the Director of Quality Assurance,  
Kendriya Sadan,Sultan Bazar,  
Hyderabad  
ANDHRA PRADESH -500195
- 21-Place where the Stores are to be Tendered  
for Inspection: Surana Telecom & Power Limited , 2nd floor,Surya Towers , S  
P Road,Secunderabad-500003
- 22-R/C is DDOs Operated: Yes

With effect from First October two thousand eight ( 01-10-2008 ),all supply order(s) against this Rate Contract must be placed by Direct Demanding Officer(s) on-line through D.C.S&D web site ([www.dgsnd.gov.in](http://www.dgsnd.gov.in)) (indenter's page) only. Supply order(s) in any other form placed on or after 01-10-2008 shall not be valid and shall not be acted upon by the contractor or any other concerned agencies.

DDO shall download the supply order and send an ink signed copy to the concerned paying authority specified in the rate contract through Registered / speed post immediately after on-line placement of Supply Order(s).

23-Packing & Specification : see annexure

( )  
Asstt. Director (S) / Section Officer / Dy. Director  
For and behalf of the purchaser named in the Form DGS&D 1001.

All the R/C particulars including prices in respect of individual R/Cs are available on DGS&D website which can be accessed by all. The DGS&D website is <http://dgsnd.gov.in>

## SCHEDULE - B

RC Specification: 1. Monetary Limit : Without Limit

### 2. GUARANTEE/WARRANTY CLAUSE.

a. Solar Lantern, Solar Home Lighting System & Solar Street Lighting System ( incl. Battery ) 24 months from the date of delivery, Installation, whichever is later.

b. PV Module: 10 years (min.) from the date of delivery / installation, whichever is later.

### 3. Payment terms:-

a. For Solar Lantern and Spare PV Module: 98% against inspection and delivery to the consignee and balance 2% after acceptance of stores by the consignee and submission of BG for the same amount valid for 2 years and 2 months from the date of acceptance of store by consignee.

b. For Solar Home & Street Lighting System: 90% against inspection and delivery to the consignee and balance 10% after installation commissioning & final acceptance of stores by the consignee and submission of BG for the same amount valid for 2 years and 2 months from the date of acceptance of store by consignee.

Terms of delivery: Stores will be delivered free at consignee's premises including freight, forwarding under DGS&D standard transit insurance clause. The purchaser will not pay separately for the insurance charges and it will be contractor's responsibility for the safe arrival of goods in full & good condition.

5. All the item shall be as per latest MNES specification and tenderer shall possess satisfactory test certificate issued by Solar Energy Centre or any other approved testing centre by MNES and same shall also be furnished to the concerned D(QA) at the time of inspection.

### 6. Octroi Duty and Local Taxes:

Normally materials to be supplied to Government Department against Govt. Contracts are exempted from levy of town duty, Octroi duty, terminal tax and other levies of local bodies. The local Town/Municipal Body regulations at times, however, provide for such exemption only on production of such exemption certificate from any authorized officer. Contractors should ensure that stores ordered against contracts placed by this office are exempted from levy of Town duty / Octroi duty, Terminal tax or other local taxes and duties. Wherever, required, they should obtain the exemption certificate from the purchase officer or indenter concerned, to avoid payment of such local taxes or duties. Octroi, entry tax etc on the buyers account in the absence of relevant exemption certificate.

7. Road permit, Waybill to be provided by DDO along with the order.

In all such cases where the requirement of Road Permit, Way Bills for entry of goods into a particular State is mandatory, the following provisions shall be strictly followed: -

(a) The supplier shall request the indenter/consignee for providing Road permit/ Waybill within 10 days of the receipt of the Supply order. The supplier shall furnish all the necessary information and documents in this regard to Indenter/consignee.

(b) On receipt of the above request from the supplier, the indenter /consignee concerned shall arrange to provide the Road permit/Way Bill in the prescribed form to the supplier within a maximum period of two weeks so that the same reaches the supplier before the dispatch of the stores. However, in cases where the Road permit/Way Bill is issued on proof of actual invoice of the material, the consignee shall arrange to provide the Road permit/Way Bill from appropriate authorities within a maximum period of 5 days from the receipt of invoice.

(c) The supplier shall not be held responsible for any delay in supply due to non- supply/delayed supply of Road permit/Way bill

by the indenter/consignee.

(d) All cases of abnormal delay in providing requisite details/ documents by the supplier or issue of Road permit/Way bill by indenter / consignee, the same shall be reported by them to DGS&D.

The details of the Road permits presently applicable in different States are as under:-

Sr.No. States Road Permit

- 1 Andhra Pradesh: -
- 2 Arunachal Pradesh: Form DG-01
- 3 Assam: Form 62
- 4 Bihar: Form 28
- 5 Chhattisgarh: Form 59A
- 6 Goa: -
- 7 Gujarat: Form 403
- 8 Haryana: Form 38 if value is Rs. 25,000 or more.
- 9 Himachal Pradesh: -
- 10 Jammu & Kashmir: -
- 11 Jharkhand: Form 28B
- 12 Karnataka: -
- 13 Kerala: -
- 14 Madhya Pradesh: Form 88/89
- 15 Maharashtra: -
- 16 Manipur: Form 27
- 17 Meghalaya: Form 14
- 18 Mizoram: Form 33
- 19 Nagaland: Form 16
- 20 Orissa: Form 28
- 21 Punjab: -
- 22 Rajasthan: Form 18
- 23 Sikkim: Form 20
- 24 Tamil Nadu: -
- 25 Tripura: Form 26
- 26 Uttar Pradesh: Form 32
- 27 Uttaranchal: Form 17
- 28 West Bengal: Form 50

#### SPECIAL INSTRUCTIONS - TO RC HOLDERS

1. Rate Contract holders are advised that before entertaining the supply order(s) they should ensure the availability of following certificates from DDOs.

- a) They are Central Government Department drawing funds from Consolidated Fund of India.
- b) The expenditure involved for the purchase has received the sanction of the competent financial authority.
- c) The funds are available under the proper head in the sanctioned budget allotment for the year.
- d) They have been fully authorized by the Department to sign the supply order and incur the liability in respect of the stores being ordered.

2. Undertaking of Authenticity for IT Products supplies :

The tendering firms should confirm the following undertaking, which will also form the part of the Rate Contract and shall be binding on them.

With reference to the IT products being supplied / quoted to you vide our invoice no. / Quotation no. / order no. Cited above...

We hereby undertake that all the components / parts / assembly / software under in the IT Products under the above like Hard d  
Monitors, Memory etc shall be original new components / parts / assembly / software only, from respective OEMs of the produ  
and that no refurbished / duplicate / second hand components / parts / assembly / software are being used or shall be used.

We also undertake that in respect licensed operating system, if asked for by you in the purchase order, the same shall be supplied  
along with the authorised license certificate ( eg Product Keys on Certification of Authenticity in case of Microsoft Windows  
Operating System ) and also that it shall be sourced from the authorised source (eg Authorised Microsoft Channel in case of  
Microsoft Operating Systems).

Should you require, we hereby undertake to produce the certificate from our OEM supplier in support of above undertaking at th  
time of delivery / installation. It will be our responsibility to produce such letters from our OEM suppliers at the time of delive  
or within a reasonable time.

In case of default and we are unable to comply with above at the time of delivery or during installation for the IT Hardware /  
Software already billed, we agree to take back the IT Products without demur, if already supplied and return the money if any pa  
to us by you in this regard.

We ( system OEM name ) also take full responsibility of both Parts & Service SLA as per the content even if there is any defect  
by our authorized Service Centre / Reseller / SI etc.

Authorised Signatory

( RAJ SINGH )

Section Officer

For and on behalf of the purchaser named in the form DGS&D-1001

## ANNEXURE

1. Spare PV Module shall be supplied with appropriate cable, connectors and soldering terminals.
2. Solar Lantern shall comprise of lead acid battery , PV module, battery box, compact fluorescent lamp and shall be complete with luminaire, control electronics, interconnecting cables/ wires and operating instruction / maintenance manual.
3. Solar Home Lighting System shall comprise of lead acid battery , PV module, module mounting hardware , battery box, compact fluorescent lamp and fan (where specified) and complete with luminaire, control electronics, interconnecting cables/ wires and operating instruction / maintenance manual.
4. Solar Street Lighting System shall comprise of lead acid battery , PV module, pole, module mounting hardware , battery box, compact fluorescent lamp and complete with luminaire, control electronics, interconnecting cables/ wires and operating instruction / maintenance manual.
5. All the item shall be as per MNES specifications of 2006-2007 except Solar Lantern under Schedule 2 which shall be as per MNES specifications of 2005-2006 and tenderer shall possess satisfactory test certificate issued by Solar Energy Centre or any other approved testing centre of MNES and same shall also be furnished to the concerned D(QA) at the time of inspection. However, item No. 2 & 3, under schedule 4, shall generally conforming to MNES specifications of 2006-2007 for all features, except for following:
  - (i) The battery will have a minimum rating of 12V, 100 AH at C/10 discharge rate.
  - (ii) The power output of the module(s) under STC should be a minimum of 120 W.
6. Thickness of Battery Box for Home Light System and Street Lighting System shall be minimum 0.70 mm made up of MS Sheet or minimum 2.25 mm made of injection moulded Polymer.
7. For Street Lighting System, module mounting hardware shall be adjustable for sun orientation . The pole shall be either in one piece with uniform diameter of 76 mm OD or swaged type with 76 mm OD in lower portion and 60 mm OD in upper portion or 76 mm OD throughout, made up of MS duly primered (2 coats) and painted in silver ash hammertone colour (or as chosen by DDO). The pole shall have suitable arrangement for grouting and length of the pole above ground shall not be less than 4.0 meters.
8. PV Modules manufacturer should be MNES approved.
9. They shall have a testing facility to check the power output of PV module, calibrated modules with set up for measuring sun intensity, voltmeter, ammeter, D.C power supplies, multimeter, loading facility for charge controller, H.V & I.R tester etc.
10. The Battery shall be of standard makes of Panasonic, Exide Base, Yuasa, Prestolite, HBL nife, Amarraja, Hitachi, CSB, Kamatsu, Okaya or DGS&D registered battery. Supplier are at liberty to also use their label/logo /monograph for easy identification, in addition to the make of manufacturer.
11. CFL Lamps shall be of standard makes of Osram, Philips, Bajaj, Phonix, Havells, Anchor, Surya or DGS&D registered make.

SPECIFICATION FOR SOLAR PHOTOVOLTAIC SYSTEM  
(MNES 2005-2006 SPV PROGRAMME)

SOLAR LANTERN

1. 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 fiber glass 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 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. Duty Cycle:

The solar lantern should provide a minimum of three 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. Models:

The solar lantern should conform to one of the following 12V models .

(a) Model IIA

Lamp ----- CFL 7W ,  
Battery Capacity At C/20 Rate---- 12V, 7.00AH,  
PV Module Rating----- 10.0 TO 11.9 Wp

(b) Model IIB

Lamp ----- CFL 7W ,  
Battery Capacity At C/20 Rate --- 12V, 7.00AH,  
PV Module Rating ----- 12.0 TO 14.0 Wp

4. Lamp:

- (a) The lamp will be of compact fluorescent (CFL) type with a rating of 7W.
- (b) For 4-Pin type CFLs, a suitable pre-heating circuit must be provided.
- (c) The lamp should preferably be mounted in a base up configuration.
- (d) The light output should be 370 +/- 5% lumen for a 7W lamp (see also (c) of 6.

5. Battery:

- (a) The battery will be sealed maintenance free lead acid type.
- (b) The capacity of the battery will be a minimum of 7.0 AH at 12 V at C/20 discharge rate at 20C.
- (c) Eighty percent of the rated battery capacity should be between the low voltage and high voltage cut/off points.

6. Electronics:

- (a) The inverter will be of quasi sine wave/sine wave type with a crest factor less than 1.7 and the frequency in the range of 20-35 KHz. Half-wave operation is not acceptable.
- (b) The overall efficiency of the control electronics 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 and four minutes OFF is one cycle).
- (d) The idle current (i.e. the current consumed when the lamp is switched OFF and no charging is in progress) should not be more than 1 mA.
- (e) The PCB containing the electronics should be capable of solder free installation and placement.

(f) Electronics should operate at 12 V and should have temperature compensation for proper charging of the battery through out the year.

7. PV Module:

- (a) The wattage range of the PV modules will be 10.0-11.9 Wp for Model IIA & 12.0-14.0 Wp for Model IIB & it should be at 16.40 Volts for both the Models (under standard test conditions (STC)). The open circuit voltage of the PV modules under STC should be at least 21.0 Volts for all 12 V Models.
- (b) The module should preferably have an arrangement (stand) for mounting at the optimum angle in the direction facing the sun.
- (c) In case of thin film solar cell modules, the specified values refer to the power output after the initial degradation.
- (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 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

8. Electronic Protections:

- (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 & reconnections should be provided to protect it against overcharge and deep discharge conditions.
- (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 in case such a diode is not provided with module itself.
- (e) Full protection against open circuit, accidental short circuit and reverse polarity should be provided.

9. Other features:

- (a) The lantern 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 when the battery is actually being charged.
- (b) A good reliable switch suitable for DC use is to be provided on the lantern. A cable at least 5 meters long should be provided for inter-connection between the module and the lantern.
- (c) The following details should be marked indelibly on the lantern:
  - (i) Name of the Manufacturer or Distinctive Logo.
  - (ii) Model Number (this refers to Models indicated below.)
  - (iii) Serial Number.
- (d) An Operation, instruction and Maintenance Manual in English and the local language should be provided with the solar lantern. The following minimum details must be provided in the Manual.
  - (i) About Photovoltaics
  - (ii) About solar lantern.
  - (iii) About PV module.
  - (iv) About CFL
  - (v) About battery.
  - (vi) Clear instructions about mounting of PV module.
  - (vii) About electronics.
  - (viii) About charging and significance of indicators.
  - (ix) DO's and DON'T's.
  - (x) Clear instructions on regular maintenance and trouble shooting of the lantern.
  - (xi) Name and address of the person or service Centre to be contacted

- in case of failure or complaint.
- (e) Components and parts used in the solar lantern should conform to the latest BIS specifications, wherever such specifications are available and applicable.
  - (f) The PV module will be warranted for a minimum period of 10 years from the date of supply and the lantern (including the battery) will be warranted for a minimum period of two years from the date of supply. The Warranty Card to be supplied with the system must contain the details of the system supplied, as given in ANNEXURE "A". The manufacturers can also provide additional information about the system and conditions of warranty as necessary.
  - (g) Additional features such as a small white LED which function as a night lamp or a socket for powering another appliance such as a fan or radio may be provided in the lantern. These are however purely optional. If such features are provided, they should not interfere with the independent switching on and off of the lantern.

SPECIFICATION FOR SOLAR PHOTOVOLTAIC SYSTEM  
(MNES 2006-2007 SPV PROGRAMME)  
SOLAR HOME LIGHT SYSTEM

1. Definition:

A solar home 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.

2. Models:

(a) Model 1 (1 Light Point)

PV Module -----	1 X 18Wp under STC
Lamp -----	1 X CFL (9W or 11W)
Battery -----	1 X 12 V, 20 AH 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.

(b) Model 2 (2 Lights)

PV Module -----	1 X 37Wp under STC
Lamp -----	2 X CFL (9W or 11W)
Battery -----	1 X 12 V, 40 AH 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.

(c) Model 3 (1 Light and 1 Fan)

PV Module -----	1 X 37Wp under STC
Lamp -----	1 X CFL (9W or 11W)
Fan -----	1 X DC Fan ( with wattage less than 20 W)
Battery -----	1 X 12 V, 40 AH 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.

(d) Model 4 (2 Lights and 1 Fan)

PV Module ----- 2 X 37Wp or 1 X 74Wp under STC  
Lamp ----- 2 X CFL (9W or 11W)  
Fan ----- 1 X DC Fan ( with wattage less than 20 W)  
Battery ----- 1 X 12 V, 75 AH 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.

(e) Model--5 (4 Lights )

PV Module ----- 2 X 37 Wp or 1 X 74 Wp under STC  
Lamp ----- 4 X CFLs (9W or 11W)  
Battery ----- 1 X 12 V, 75 AH 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.

Note :

- (a) All models will have a socket to provide power for a 12V DC TV set which is purchased separately.
- (b) A small white LED may be provided as an optional feature with an independent switch.

### 3. Duty Cycle:

Model	Average Hours of Operation/Day
Model 1	1 Light 3-4 Hours.
Model 2	2 Lights, 3-4 Hours.
Model 3	1 Light, 1-2 hours, 1 Fan- 1-2 hours.
Model 4	2 Lights, 2-3 hours, 1 Fan- 2-3 hours.
Model 5	4 Lights, 3-4 hours.

### 4. Lamps:

- (a) The lamps will be of compact fluorescent (CFL) type, either 4-Pin or 2 Pin types with rating of 11W. For the 4-Pin type CFLs a suitable pre-heating circuit must be provided.
- (b) The light output from the lamps should be around 600 +/- 5% lumens (for 9W CFL) and 900 +/- 5% lumens (for 11W CFL). Also please see (c) of 6 below.
- (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.

### 5. Battery:

- (a) The battery will be of flooded electrolyte type, positive tubular plate, low ,maintenance lead acid battery.
- (b) The battery will have a minimum rating of 12V, 20 or 40 or 75 Ah at C/10 discharge rate depending on Model.
- (c) 75% of the rated capacity of the battery should be between fully charged & load cut off conditions.

### 6. Electronics:

- (a) The inverter should be of quasi sine or full sine wave type with frequency in the range of 20-35 KHz. Half wave operation is not acceptable.

- (b) The total electronic 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 10 mA.
- (e) Electronics should operate at 12 V and should have temperature compensation for proper charging of the battery through out the year.
- (f) Necessary lengths of wires/cables, switches suitable for DC use and fuses should be provided.

7. 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 18W or 37W or 74W. In case of Model 4 & 5 either two modules of minimum 60 W output each or one module of minimum 120W should be used.
- (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 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

8. DC Fan:

The wattage of the fan should not be more than 20 Watts and it should operate at 12V DC.

9. Electronic Protections:

- (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 overcharge and deep discharge conditions.
- (c) Fuses should be provided to protect against short circuit conditions.
- (d) A blocking diode should be provided as a part of the electronics to prevent reverse flow of current throughout the PV module(s), in case such diode is not provided with the solar module(s).
- (e) Full protection against open circuit accidental short circuit and reverse polarity should be provided.

10. 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 45, so that it can be installed at the specified tilt angle.
- (b) A vented metallic box with acid proof and corrosion resistance paint for housing the storage battery indoors should be provided. The box can be of injection moulded polymer.

11. 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 and Distinctive Logo.
  - (ii) Serial Number.
- (c) Components and parts used in solar home systems should conform to the latest BIS specifications, wherever such specifications are available and applicable.
- (d) The PV module(s) will be warranted for a minimum period of 10 years from the date of supply and the solar home system (including the battery) will be warranted for a period of two years from the date of supply. The Warranty Card to be supplied with the system must contain the details of the system supplied, as given in the ANNEXURE "A". The manufacturers can also provide additional information about the system and conditions of warranty as necessary.
- (e) An Operation, Instructions and Maintenance Manual in English and the local language should be provided with the solar home system:
 

The following minimum details must be provided in the Manual :

  - (i) About Photovoltaics.
  - (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 DONT's.
  - (x) Clear instructions on regular maintenance and trouble shooting of solar home system.
  - (xi) Name and address of the person or service centre to be contacted in case of failure of components.

SPECIFICATION FOR SOLAR PHOTOVOLTAIC SYSTEM  
(MNES 2006-2007 SEV PROGRAMME)  
SOLAR STREET LIGHTING SYSTEM

1. Definition:

A stand alone solar photovoltaic street lighting system comprises a compact fluorescent lamp lead acid battery, PV module(s), control electronics, inter-connecting wires/cables, Module mounting hardware, Battery box, Operation instruction and maintenance manual.

2. Duty Cycle:

The system should 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.

- (a) The lamp will be of compact fluorescent (CFL) type, either 4-Pin or 2 Pin type, with a rating of 11W. For the 4-Pin CFL, adequate pre-heating circuit must be provided.
- (b) The light output from the lamp should be around 900+/- 5% lumens. Also please see (c) of 5 given below.
- (c) The lamp 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.

4. Battery:

- (a) Flooded electrolyte type positive tubular plate, low maintenance lead acid battery.
- (b) The battery will have a minimum rating of 12V 75 AH (at C/10) discharge rate. However, for item no. 2 & 3 of schedule 4 , the battery will have a minimum rating of 12V 100 AH (at C/10) discharge rate.
- (c) 75% of the rated capacity of the battery should be between fully charged

& load cut off conditions.

5. Electronics:

- (a) The inverter should be of quasi sine wave or full sine wave type with frequency in the range of 20-35 KHz. Half wave operation is not acceptable.
- (b) The total electronic 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 10 mA.
- (e) Electronics should 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 and fuses should be provided.
- (g) The PV module will be used to sense the ambient light level for switching ON and OFF the lamp.

6. 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 74 W. Either two modules of minimum 37W output each or one module of 74W output should be used. However, for item 2 & 3 either two modules of minimum 60 W output each or one module of minimum 120W should be used.
- (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 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

7. Electronic Protections:

- (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 battery overcharge and deep discharge conditions.
- (d) A blocking diode should be provided as a part of the electronics to prevent reverse flow of current throughout the PV module(s), in case such diode is not provided with the solar module(s).
- (e) Full protection against open circuit accidental short circuit and reverse polarity should be provided.

8. Mechanical Hardware::

- (a) A metallic frame structure (with corrosion resistance paint) to be fixed on the pole to hold the SPV module(s). The frame structure should have provision to adjust its angle of inclination to the horizontal between 0 and 45 so that the module(s) can be oriented at the specified tilt angle.
- (b) The pole should be made of mild steel pipe with a height of 4 meters above the ground level, after grouting and final installation. The pole should have the provision to hold the weather proof lamp housing. It should be painted with a corrosion resistant paint.
- (c) A vented acid proof and corrosion resistant painted metallic box for outdoor use should be provided for housing the battery.

9. 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) Serial Number.
- (c) Components and part used in the solar street lighting systems should conform to the latest BIS specification. Wherever such specifications are available and applicable.
- (d) The PV module(s) will be warranted for a minimum period 10 years from the date of supply and the street lighting system (including the battery) will be warranted for a period of two years from the date of supply. The Warranty Card to be supplied with the system must contain the details of the system supplied as given in the ANNEXURE "A" . The manufacturers can also provide additional information about the system and conditions of warranty as necessary.
- (e) 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 :
  - (i) About Photovoltaics
  - (ii) About solar street lighting system-its components and expected performance.
  - (iii) About PV module.
  - (iv) About CFL.
  - (v) About battery.
  - (vi) Clear instructions about erection of pole and mounting of PV module and lamp housing assembly on the pole.
  - (vii) About electronics.
  - (viii) About charging and significance of indicators.
  - (ix) DO's and DONT's.
  - (x) Clear instructions on regular maintenance and trouble shooting of the solar street lighting system.
  - (xi) Name and address of the contact person in case of non-functionality of the solar street lighting system.

ANNEXURE- " A"

FORMAT FOR WARRANTY CARD TO BE SUPPLIED WITH EACH SOLAR LANTER,  
SOLAR HOME SYSTEM & STREET LIGHTING SYSTEM.

1. Name & Address of the Manufacturer/Supplier of the system.
2. Name & Address of the Purchasing Agencies.
3. Date of supply of the system.
4. Details of PV Module(s) supplied in the system:
  - Make (Name of the manufacturer)
  - Model
  - Serial No(s)
  - Wattage of the PV Module(s) under STC
  - Warranty valid upto.
5. Details of Battery
  - Make(Name of the manufacturer)
  - Model
  - Batch/Serial No(s)
  - Rated V & AH capacity at C/20/C/10 rate at 20C

Warranty valid upto.

6. Details of Electronics & other BOS items  
Make(Name of the manufacturer)  
Model  
Serial No(s)  
Warranty valid upto

7. Designation & Address of the person to be contacted for claiming Warranty obligations.

( Signature )

Name & Designation

Name & Address of Manufacturer/Supplier  
(SEAL)

Place & Date

(During the warranty period MNES/State Agencies/users reserve the right to cross check the performance of the systems with the minimum performance levels specified in the MNES specifications)

Solar Lantern ( MNES Specification)

As per General Technical Requirements.

LIST OF ALL AMENDMENTS

For RC No. Solarlight/IT-2/RC-D3020000/1010/82/OA092/774

*NOTE: No Amendments issued till date 06-NOV-09*

NOV 11 2009

**Government of India**  
**Directorate General of Supplies & Disposals**  
**Jeevan Tara Building, 5 Sansad Marg**  
**New Delhi-110001**  
**Tel Number 23360610/23360537**

Digitally signed by:  
Gurinder Pal Singh  
Email Id:  
gpsingh\_bhatia@yahoo.co.in

**Amendment No.** Solarlight/IT-2/RC-D3020000-1010-82-OA092774-27219

**Dated:** 01-DEC-09

**Effective Date:** 25-NOV-09

To  
M/S AVECO ELECTRONICS PVT.LTD.,  
4th Floor.SURYA TOWERS.104 S.P. ROAD.SECUNDERABAD  
HYDERABAD  
ANDHRA PRADESH-500003.

Sub : This office R/C No. Solarlight IT-2/RC-D3020000-1010-82-OA092774  
Dated 05-NOV-09 for the Supply of Solar Lighting System.

Ref : Your Letter No. - Dated 11-NOV-09.

Dear Sir,

The following amendments to the schedule to subject rate contract in terms of rate are hereby authorised:-

UNDER SCHEDULE-A

<b>Item:</b>	<b>Spare PV Module For Solar Lighting System as per MNES Specification</b>	<b>Revised Rate</b>
	<b>Item Description</b>	
1	Suitable for: Home lighting & Street lighting,PV module Rating: 37 NOS. Wp,Cable Length in mtrs.: 3	Rs. 5337 Rs. FIVE THOUSAND THREE HUNDRED THIRTY-SEVEN ONLY
2	Suitable for: Home lighting & Street lighting,PV module Rating: 74 NOS. Wp,Cable Length in mtrs.: 3	Rs. 10673 Rs. TEN THOUSAND SIX HUNDRED SEVENTY-THREE ONLY
3	Suitable for: Home lighting & Street lighting,PV module Rating: 18 NOS. Wp,Cable Length in mtrs.: 5	Rs. 2596 Rs. TWO THOUSAND FIVE HUNDRED

Item:	Spare PV Module For Solar Lighting System as per MNES Specification			Revised Rate
	Item Description			
4	Suitable for: Solar Lantern, PV module Rating: 10.0-11.9 Wp, Cable Length in mtrs.: 5		NOS.	Rs. 1731 Rs. ONE THOUSAND SEVEN HUNDRED THIRTY ONE ONLY
Item:	Solar Home Light System With Structure ( MNES Specification)			Revised Rate
	Item Description			
8	Model Number: 1.No. of CFL Lamps of 9 or 11W Rating: 1,DC Fan Rating: - ,Battery Voltage and Capacity: 12 V, 20 AH		NOS.	Rs. 7356 Rs. SEVEN THOUSAND THREE HUNDRED FIFTY- SIX ONLY
Item:	Solar Home Light System With Structure ( MNES Specification)			Revised Rate
	Item Description			
9	Model Number: 2.No. of CFL Lamps of 9 or 11W Rating: 2,DC Fan Rating: - ,Battery Voltage and Capacity: 12 V, 40 AH		NOS.	Rs. 12500 Rs. TWELVE THOUSAND FIVE HUNDRED ONLY
Item:	Solar Home Light System With Structure ( MNES Specification)			Revised Rate
	Item Description			
10	Model Number: 3.No. of CFL Lamps of 9 or 11W Rating: 1,DC Fan Rating: less than 20 W, Battery Voltage and Capacity: 12 V, 40 AH		NOS.	Rs. 12644 Rs. TWELVE THOUSAND SIX HUNDRED FORTY- FOUR ONLY
Item:	Solar Home Light System With Structure ( MNES Specification)			Revised Rate
	Item Description			
11	Model Number: 4.No. of CFL Lamps of 9 or 11W Rating: 2,DC Fan Rating: less than 20 W, Battery Voltage and Capacity: 12 V, 75 AH		NOS.	Rs. 21937 Rs. TWENTY-ONE THOUSAND NINE HUNDRED THIRTY-SEVEN ONLY
Item:	Solar Home Light System With Structure ( MNES Specification)			Revised Rate
	Item Description			
12	Model Number: 5.No. of CFL Lamps of 9 or 11W Rating: 4,DC Fan Rating: - ,Battery Voltage and Capacity: 12 V, 75 AH		NOS.	Rs. 22024 Rs. TWENTY-TWO THOUSAND TWENTY-FOUR

ONLY

**Item: Solar Street Light System With Mounting Structure & Pole ( MNES Specification)**

**Item Description**

**Revised Rate**

13	Description of item: 1 X 11 W CFL PV Module: 74 W. Battery Capacity: 12 V, 75 AH	NOS.	Rs. 24209 Rs. TWENTY-FOUR THOUSAND TWO HUNDRED NINE ONLY
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All other terms and conditions of the R C Shall remain unaltered.  
Please ack. receipt.

Yours faithfully,

(Section Officer/A.D./D.D.)

For & on behalf of Purchaser named in DGS&D-1001

Copy to :-

1. The Controller of Accounts, Department of Commerce (supply division), Chennai (Through Authentication Cell). This is issued with the approval of Competent Authority.
2. Inspection Authority: ADG (QA), DGS&D, New Delhi
3. Quality Assurance Officer: Director of Quality Assurance : Director (QA), Hyderabad
4. MIS Cell
5. Ledger Clerk
6. O.L. Section
7. R.L.O



( RAJ SINGH )  
SECTION OFFICER  
FOR DIRECTOR GENERAL OF SUPPLIES & DISPOSALS