MEGHALAYA NON-CONVENTIONAL AND RURAL ENERGY DEVELOPMENT AGENCY

Near BSF Camp Mawpat, Shillong-793012.
Phone No.0364-2537343/2536138## Fax No.0364-2537611
E-Mail mnreda @ bsnl.in ## Website www.mnreda.Gov.in

1. Work Order : MNREDA/1096/06/844

2. Name of Work : Design, supply, installation, testing and commissioning of 5 Kw SPV Power Plant at Upper Shillong.

3. Date of submission : The 9th July, 2009 at 12.00 hours

4. Date opening of tender: The 9th July, 2009 at 13.00 hours.

5. Tender issue to : M/s._____
_____against payment of Rs.500/- (Rupees five hundred)only vide/B.C.
Demand Draft No._____ Dated_____of
_____Bank towards cost of Tender Document.

Issued by :_____
For Member Secretary-cum-Director,
Meghalaya Non-Conventional and Rural Energy
Development Agency, Shillong.

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NOTICE INVITING TENDER

Sealed Tender with 120 (one hundred and twenty) days are invited from the Govt. of India, Ministry of New & Renewable Energy approved Manufacturer and Supplier or from any experience contractor or Consultants to undertake the below mentioned work as details below :-

Sl. No.	Work number	Name of work	Cost of tender paper (Rs.)	Date of issue of tender	Date of submission of tender	Date of opening of tender.
1.	No.MNREDA/1286/ 2008-09/P&C/8	Supply, installation and commissioning of 1000 Nos. of 74 wp SPV Street Lighting System including AMC under MNRE SPV programme during 2008-2009.	2000.00	4.6.09 To 25.6.09	29.6.09 Upto 12.00 hours	29.6.09 at 13.00 hours for Technical Bid & Commercial terms & Conditions.
2.	No.MNREDA/1201/08/ Sr.PO/102	Design, supply, Installation, Testing & Commissioning of 10 Nos. of Wind Solar Hybrid Power Plant i.e. 4 Nos. of 10 Kw and 6 Nos. of 5 Kw in different location in Meghalaya.	2000.00	10.6.09 To 3.7.09	8.7.09 Upto 12.00 hours	8.7.09 at 13.00 hours for Technical Bid and Commercial Terms & Conditions.

3.	No.MNREDA/1206/08/ Sr.PO/145	Design, supply, installation, Testing & commissioning of various capacity solar water heating system (100 LPD to 2500 LPD unit capacity) in different Institutions in Meghalaya.	2000.00	8.6.09 To 30.6.09	8.7.09 Upto 13.00 hours	8.7.09 At 14.00 hours for Technical Bid & Commercial terms & conditions.
4.	No.MNREDA/1096/06/844	Design, supply, installation, testing and commissioning of 5 Kw SPV Power Plant at Upper Shillong.	500.00	8.6.09 To 30.6.09	9.7.09 Upto 12.00 hours	9.7.09 at 13.00 hours.
5.	No.MNREDA/1242/2008-09/Prog.Officer/16	Survey, Investigation & Preparation of Pre Feasibility Project for 7 Nos. of Micro Hydel Projects.	200.00	10.6.09 To 3.7.09	9.7.09 Upto 13.00 hours	9.7.09 At 14.00 hours
6.	No.MNREDA/1258/2009/ PO(BE)/13	Survey, Investigation & Preparation DPR with Technical Recommendation for 10 Nos. of Biomass Gasifier in 5 Nos. of District in Meghalaya.	200.00	10.6.09 To 3.7.09	10.7.09 Upto 12.00 hours	10.7.09 At 13.00 hours
7.	No.MNREDA/1305/2009/ Sr.PO/68	Evaluation, Monitoring & Preparation of Report on 70 Nos. of Remote Village Electrification in Meghalaya in 6(six) Districts in Meghalaya.	200.00	15.6.09 To 10.7.09	13.7.09 Upto 12.00 hours	13.7.09 At 13.00 hours

INSTRUCTIONS :-

1. Cost of Tender Paper or document should in the form of Banker's Cheque/Demand Draft(Non-Refundable) drawn in favour of Member-Secretary-cum-Director, Meghalaya Non-Conventional and Rural Energy Development Agency.

2. While requesting for issuing Tender paper/document an application form in plain paper must be stated clearly Tender Notice with work No. and proof for qualification for the work must be submitted along, without which no Tender will be issued.

3. Tender paper/document will be issued by courier/speed post on request but extra payment of Rs.200/- (Rupees two hundred) only for each work No. should be made by Demand Draft in favour of the undersigned towards cost of speed post/courier.

4. Local Dealer of any Firm/Manufacturer/Supplier will be issued Tender paper but on furnish of their Dealership Certificate and tender paper issued will be in their Principle's name.

5. In the event of postal delayed, the undersigned shall not be held responsible.

6. Tender paper/document shall be issued on any working day within the specified date.

7. Earnest Money deposit of either 1% or 2% as the case may should be accompany the offer.

8. Tenderer are to see by themselves that for each work No. nature of work are qualified or not, issuing of tender paper by the office to those non qualified firm/supplier/manufacturer are not the responsibility of this office.

9. In case the opening date is declared as holiday, tender shall be opened in the next working day at the same time and hour.

10. Tender document may be download from our website www.mnreda.Gov.in and bid may be submitted on downloaded but cost of tender shall have to be submitted before submission of tender.

The undersigned reserves the right not to accept the lowest tenderer and may reject any or all the tenderers without assigning any reasons whatsoever.

Member Secretary-cum-Director,
Meghalaya Non-Conventional and Rural
Energy Development Agency,
Shillong.

Memo.No.MNREDA/1286/2008-09/P&C/8 Dated Shillong, the 1st June, 2009.

Copy to :

(i) The Principal Secretary
to the Govt.of Meghalaya,
Power Department.

(ii) Shri Sudhir Mohan,
Adviser (RVE Division)
Ministry of New & Renewable Energy
Block No.14, CGO Complex,
Lodi Road, New Delhi-110003.

(iii) Dr. R.Raman,
Director (Hybrid Division)
Ministry of New & Renewable Energy
Block No.14, CGO Complex,
Lodi Road, New Delhi-110003.

(iv) Dr.R..P.Goswami (Solar Thermal Division)
Principal Scientific Officer,
Ministry of New & Renewable Energy
Block No.14, CGO Complex,
Lodi Road, New Delhi-110003.

(v) Shri H.R.Khan,
Director, (SPV Division),
Ministry of New & Renewable Energy
Block No.14, CGO Complex,
Lodi Road, New Delhi-110003.

(vi) M/s. Impact INC
Glorys Plaza, 2nd Floor,
Police Bazar, Shillong.
} With a request to Publish in one issue of the Shillong Times and in Business Standard covering in 12 cities Bill along with published material should submitted for payment.

(vii) The Directorate of Information
& Public Relation Department,
Meghalaya, Shillong.
} For information.

(viii) The State Public Information Officer
National Informatic Centre
Meghalaya, Shillong.
} With a request to put in the State Website.

(ix) All Registered & Recognized MNRE Manufacturer & Suplier.

(x) Notice Board.

Sd/-
Member Secretary-cum-Director,
Meghalaya Non-Conventional and Rural Energy Development Agency,
Shillong.

2. **INSTRUCTION TO TENDERER :**

i) Tenderer are to furnish their offer in a sealed cover enveloped and should marked on the cover of enveloped NIT No. date and time of opening.

ii) Offer should contains Earnest Money, Experience Certificate, Registered Certificate Income Tax Certificate General terms and conditions and the price bid quoted on the tender paper supplied by the office and any other experience paper during the last five financial years should be submitted in a separate sheet of paper.

iii) The cost of tender paper is non-refundable of Member-Secretary-cum-Director, Meghalaya Non-Conventional and Rural Energy Development Agency.

iv) Earnest Money Deposit is 1% for SC/ST/OBC or 2% General Category and should be in the form of FDR/Call Deposit/BG from any Nationalized or Scheduled Bank duly pledged in favour of the Member Secretary-cum-Director, Meghalaya Non-Conventional and Rural Energy Development Agency.

v) Any delayed in post, the undersigned shall not be held responsible.

vi) In case the date of submission and opening of tender is declared as holiday, Tender shall be opened in the not working day at the same time and hour.

vii) The Tenderer should produce a valid certification of from the Concerned Authority.

viii) The Tenderer having local Dealership, tender paper will be issued only on producing of their Dealership Certificate.

ix) Work order shall be placed directly to the Concerned Institution/Firm/Consultant.

x) The rate quoted in the format provided should be inclusive of any Taxes and Duties or any other expenses.

xi) In the bidding scheduled in which transportation, installation and commissioning charges, and the AMC charges, the tenderer are required to furnish the rate as per format required.

xii) All papers and documents submitted with the offer has to be duly attested by any Govt. Official not belong to the rank of magistrate, without attestation Tender/offer shall be automatically rejected.

xiii) Each and every page of tender paper and document issued by the office has to be duly signed and sealed by the authorized persons of the Institute/Consultants/Firm signing of tender paper and document shall be viewed as acceptance of each and every terms and conditions laid therein. Tender paper and document without signed and sealed by the Institute/Consultant./Firm will not be considered for bidding and stand automatically cancelled.

xiv) Any discrepancies observed by the tenderer in the tender paper/document, the tender should bring to the notice of the undersigned prior to tendering.

xv) The write up about the system, operation and maintenance manual in English should be furnished once the system installed and commissioned.

3. **GENERAL TERMS AND CONDITIONS:**

i) **Agreement** : The successful bidder shall have to sign an Agreement within 7(seven) days of issue of work order to be prepared in a stamp paper by the Purchaser.

ii) **VAT** : Latest VAT certificate should be submitted the tenderer are required to submit the last financial year Incomes along with the offer.

iii) **Time of Supply** : Supply of Systems should be completed within 90(ninety) days of issue of the work order and installation and commissioning should be completed within 30(thirty) days of furnishing of the list of site for installation by the Purchaser.

iv) **Guarantee and Warranty period** : The warranty period of the system is for 2(two) years for the complete system including the battery and for modules the warranty period is 10(ten) years from the date of completion of installation and commissioning of the system.

iv) **Replacement of defective parts and component of system** : During the warranty period the suppliers are required to replace any defective parts or components or the whole systems in case if it is required to do so free of cost without any financial involvement to the Purchaser

v) **Court of Competent Jurisdiction** : The Court of Guwahati High Court, Shillong Bench will have a Jurisdiction in this case.

vi) **Detail Drawing and Installation of System** : The details drawing indicating the size of angle for Modules post for frame and luminaire of system and grouting of post should be submitted along with the offer. This will be approved by the undersigned before starting of the work.

vii) **Trading License** : Non- Tribal Contractor/Supplier/Manufacturer should produce Trading License from the proper authority.

viii) **Payment Terms and Conditions** :

a) 30% will be paid as Mobilization Advance in lieu of Bank Guarantee of like amount valid for 60(sixty) days from any Nationalized Bank.

b. 40% will be paid on receiving of system and equipments at Shillong or respective sites. Subject to availability of fund.

c. 20% shall be paid on expiry of 2(two) years warranty period or on complete installation and commissioning but in lieu of Bank Guarantee of like amount with a validity period of 2(two) years.

d. 10% shall be paid on expiry of 2(two) year warranty period or on complete installation and commissioning but in lieu of Bank Guarantee of like amount with a validity period of 2(two) years.

4. SCOPE OF WORK & SPECIFICATION DESIGN GUIDELINES:

4.1 The scope of work shall include.

4.1.1. The entire work shall be executed on turnkey basis. Any minor item(s) not included in the specification but required for completion of the work shall have to be supplied without any extra cost.

4.1.2. The contractor must submit the drawing related to the power plants and equipments of the project for approval before starting the work as mentioned below:-

a) General layout of the power plant
b) PV Modules & Array structure including foundation
c) Control room building including and sanitary system
d) Array field including security fencing
e) Inverter and controller
f) Control power cable layout
g) Battery and battery bank and rack
h) Any other design and drawing if necessary

4.1.3. **Major components of Solar PV Power Plants are** :-

a) Solar PV Modules
b) Mounting structure for PV Modules
c) Junction Boxes
d) Power conditioning unit
e) Battery and battery bank
f) DC & AC distribution board
g) Cables Interconnecting & Distribution
h) Installation accessories
i) Electrical safety
j) Distillation plants
k) In house structure of plant.
l) 20 indoor lighting and 15 Nos. street lighting system

4.2. **Solar PV Modules & Array** :

4.2.1. Solar Modules shall consists of redundantly interconnected 36 photovoltaic cell and the peak power rating shall not be less than 80 watts.

4.2.2. SPV Modules must be tested and certified by an independent testing laboratory that is accredited with ISO guide 25. The Module type must be qualified as per IEC 61215 or IE 1662 or CCEC 503 for mono crystalline silicon and IEC 616464 or CEC 503 or IEC 61646 or IEEE 12 62 or multi crystalline silicon. Modules has to be tested and certified by SEC, MNRE, Govt.of India.

4.2.3. Photo electrical conduction efficiency of SPV modules should be greater than 12% modules shall be made of high transitivity glass front surface giving high encapsulation gain and silicon rubber edge sealant for modules protection and mechanical support.

4.2.4. Modules shall perform satisfactorily in relative humidity upto 100% with temperature between 10°C and 60°C and to withstand a gust upto 200 km/hr. from back side of the modules. Modules shall be of crystalline type employing lamination technology using established polymer and Tedlar laminate.

4.2.5. The rated power output of modules shall not vary more than 55 from the average power rating.

4.2.6. A minimum warranty of 10 years is available with degradation of power generated not exceeding 10% over the entire 10 years period.

4.2.7. The fill factor of modules shall not be less than 0.70

4.2.8. The module should be provided with a junction for provision of external screw terminal connection and with an arrangement for low voltage drop bypass/Blocking diode.

4.2.9. Date sheet should be furnished as follows :-

a) Module Type :----------

b) Module dimension :----------

c) No.of cell & Wattage :----------

d) Solar cell manufacturer type :----------

e) Make of solar module :----------

f) Solar Module frame material :----------

g) Nominal voltage :----------

h) Operating voltage of solar Module:----------

i) Peak power voltage(Vmp)at 50°c:----------

j) Peak power current(Imp) at 50°c:----------

k) Open circuit voltage (Voc)at 50°c:----------

l) Short circuit (Ioc) at 50°c :----------

m) Maximum temperature rise of solar cell under severe working conditions over maximum ambient temperature. :----------

n) Operating temperature conditions of modules. :----------

o) Weight of each module :----------

4.2.10 Array combination of modules in series and parallel should be design and indicate properly and an array diagram has to be furnished.

4.3. **MOUNTING STRUCTURE, ORIENTATION AND TILT OF PV MODULES:**

4.3.1. The Array mounting structure of modules shall be made of hot dip galvanized MS angle of size not less than 50 mm x 50 mm x 5mm. Al nuts and bolts shall be made of very good quality stainless steel SS-304.

4.3.2. The structure shall be designed to allow easy replacement of any modules.

4.3.3. Super structure design and foundation of fixation of mounting arrangement shall withstand minimum horizontal wind speed of 200 km/hour.

4.3.4. Modules alignment and title angle shall have to be calculated to provided the maximum annual energy output and solar array will be tilted at appropriate angle from 20°c to 50°c in step 50°c in order to get maximum output from SPV panel. Each leg of supporting structure shall be fixed on RCC concrete foundation structure.

4.3.5. All fastner shall be of stainless steel SS-304.

4.3.6. The foundation for module mounting structure shall be 1:2:4 PCC construction.

4.3.7. Clearance between ground level and bottom edge of SPV module array of modules should not be less than 1 meter.

4.4. **JUNCTION BOXES :**

4.4.1. The junction boxes shall be made of FRP with dust, water and vermin proof (IP55)

4.4.2. The terminals shall be of copper bus bar arrangement of appropriate size shall have fuses, in such a way where it shall be possible to isolate a single array from the system by removing the fuse without disturbing the system operation.

4.4.3. All cables passing into junctions boxes shall be terminated correctly.

4.4.4. Suitable arrangement shall have to be provided for connecting 'Reverse Blocking diode" in the array junction Boxes.

4.4.5. The required number of junction in each type of power plant should be indicated in the array diagram.

4.5. **D.C.DISTRIBUTION BOARD:**

4.5.1. An D.C.D.B. shall provided between array and PCU

4.5.2. It shall have MCCB of suitable rating for each capacity of plant for connection and disconnection of array section.

4.5.3. It shall have measuring instruments for measuring array voltage and array current.

4.6.1. An ACDB shall be provided in between PCU and load.

4.6.2. It shall have MCCB of suitable rating for each capacity of plant for connection and disconnection of PCU from the load.

4.6.3. It shall have energy meter i.e. volt meter and ammeter.

4.7. **CHARGE CONTROLLER AND BATTERY CHARGER** :

4.7.1. The charge controller shall be dual input type, while under normal condition the input if fed from SPV panel and during emergency and external single/three phase A.C. sources i.e. D.G. set can be used for battery charging. A selector switch shall have to be provided from choosing between two modes. When battery are charged from A.C. sources, the charging current should be set manually, depending on the capacity of the sources and charging requirement of the battery as per capacity of plant.

4.7.2. Maximum point power tracker shall be Integrated in the charge controller to maximum energy drawn from solar PV array. The MPPT should be Micro processor/Micro controller based to minimize power loss. The efficiency should not be less than 94% and should be designed to meet solar array capacity as per different type of power plants.

4.7.3. Charging sequence from SPV array :-

i) The battery shall be charged at the maximum rate depending on solar radiation till the battery terminal voltage is 2.4 volts per cell.

ii) The battery charging should be automatically terminate when the rate of increase of battery voltage is steady or when battery terminal voltage reaches 2.75 volts per cells.

iii) The charger shall switch on the 'trickle charge' after this.

4.7.4. **Specification (to be furnished) should enclosed the following details** :-

(a) Switching elements
(b) Type of charge
(c) Input voltage from PV
(d) Output voltage
(e) Protection i.e. short circuit, deep discharge, input surge voltage, over current, battery reverse polarity, solar array reverse polarity.
(f) Indication i.e. string 'ON', Main 'ON', input 'ON' charge 'ON', charger overload, battery on trickle, battery disconnected/fault, battery reverse polarity, low solar irradiance, system fault, charge over temperature.
(g) Dielectric strength
(h) Cooling type
(i) Ambient temperature
(j) Operating Humidity
(k) Assembly/Mounting
(l) Cable entry
(m) Enclosure construction
(n) Front panel control details

4.7.5. The controller must be fully sheathed and prevent access of rodents, termites or other insects from the bottom of the controller in the from of detachable gland plate.

4.8. **INVERTER** :

4.8.1. The Inverter shall be continuously monitor and control the output interface within a stipulated range by means of suitable of software and should be compatible with the charge controller and distribution panel and may be Integral design.

4.8.2. The Inverter should be design for continuous, reliable and prime power supply.

4.8.3. The Inverter shall have high conversion efficiency from 25% load to the full rated load. The conversion efficiency at 25% load shall not be less than 90% of the full rated load. The efficiency of the inverter shall be more than 92% at full rated load.

4.8.4. The inverter shall have high over load capacity. The overload capacity of the inverter shall be minimum of 200% at full rated load output for 30 seconds and 300% of full rated load output for 10 seconds. During overload conditions, the inverter shall be capable of maintaining the rated voltage and frequency as per specification. The overload capacity should be specified.

4.8.5. The inverter should have automatic restart facility after overload triggered shut down.

4.8.6. Technical data sheet/specification are (should be submitted with the bid):

a) D.C.Input voltage
b) Output voltage
c) Output voltage regulation
d) Overload capacity
e) Continuous power rating
f) Peak output current
g) Output wave shape
h) Efficiency at ambient temperature
i) Ambient temperature
j) Ambient humidity range
k) Short Circuit protection
l) Cooling type
m) Enclosure construction
n) Front Panel control
o) Dimension
p) Weight
q) Mounting arrangement
r) Other detail protection
s) Other details indications

4.9. **BATTERY & BATTERY BANK** :

4.9.1. The batteries should be of flooded electrolyte type, positive tubular plate, low maintenance lead acid batteries and shall confirm of ISI 651.

4.9.2. The battery shall be of 2V cells with end cell cut off voltage 1.8 V per cell and battery terminal should be provided with covers.

4.9.3. Design voltage of system should be 48/96V with 250 AH capacity.

4.9.4. Battery capacity should be designed taken as a full rated capacity available from the solar array with two days autonomy taking into consideration.

4.9.5. Batteries should be provided with Micro porous vent lugs with floats and suitable handle.

4.9.6. A suitable battery rack with interconnection and end connector shall be provided to in between the batteries in the bank. The features and dimensions of the battery rack shall have to be provided along with the bid document.

4.9.7. The batteries shall be suitable for recharging by means of solar modules via incremental/open circuit regulator.

4.9.8. Bidder shall mention the design cycle life of batteries at 80% depth of discharge at 25 deg. C. Details for 20% and 40% DOD shall be provided.

4.9.9. The batteries shall be designed for operating in ambient temperature of site.

4.9.10. The battery container shall be made of hard rubber.

4.9.11. The self discharge of batteries shall be less than 3% per month at 20 deg. C and less than 6% per month at 30 deg. C.

4.9.12. The charge efficiency shall be more than 90% upto 70% state of charge.

4.9.13. The topping up of batteries shall be 18-24 months.

4.9.14. The batteries shall consist of individual cells, which can be carried separately with case while transporting.

4.9.15. Bidders to specify capacity and end cell voltage at different discharge rates.

4.9.16. Battery Rack & Accessories.

Battery interconnecting links shall be provided for interconnecting the cells in series and in parallel as need. Connectors for inter cell connection (series/parallel) shall be maintained free screws. Insulated terminal covers shall be provided.

4.9.17. **Specification should consist of** :-

a) Manufacturer
b) Type of battery
c) Nominal voltage
d) End cell voltage
e) Capacity of battery system
f) Depth of discharge
g) Efficiency of battery
h) Duty cycle
i) Combination of battery series and parallel
j) Structural details
k) Battery guarantee

4.10. **CABLES INTERCONNECTING:**

4.10.1. All cables shall be supplied confirming to IS 1554/694-1990 and shall be of 650V/1.1 KV grade and PVC insulted.

4.10.2. Cable in the array yard shall be laid directly in ground at a depth of 500mm in the excavated trenches along with the approve route and cover with sand cushion. A continuous single brick protective layer of first class brick shall be placed on the entire length of the underground cable before refilling the trench with loose soil.

4.10.3 Cable inside the control room shall be laid in trenches duly covered with RCC slab.

4.10.4 Copper terminations shall be made with suitable cable lungs and sockets etc. crimped properly and passed through proper cable glands at the entry and exit point of the cubicle.

4.10.5 Cable terminations shall be made with suitable cable lugs and sockets etc. crimped properly and passed through proper cable glands at the entry and exit point of the cubicle.

4.10.6 All cables/wire shall be marked with good quality ferrite of proper sizes so that cables can be identified easily.

4.10.7 Interconnection cable size of modules to modules, array to array/junction boxes. Junction Box to controller, controller to DCDB, DCDB to ACDB, DCDB to Main distribution should be indicated. The size and type of PVC copper cables are of (i) 2Cx2.5 sq.mm (ii) 2Cx6 sq.mm (iii) 2Cx10 sq.mm (iv) ICx25 sq.mm (v) IC x 50 sq.mm.

4.11. **DISTILLATION PLANT** :

Distillation Plant 3-4 LPD should be provided for each plant along with complete accessories i.e. two Nos. of plastic & funnel, specification of distillation should be :-

(a) Capacity
(b) Make
(c) Fibre of material
(d) Thickness of glass panes

(e) Back cover material
(f) Support structure
(g) Capacity of outlet container
(h) Coating materials

4.12. LIGHTING & OVER VOLTAGE PROTECTION :

4.12.1. The SPV power plant should be provided with lighting and over voltage protection. The main aim of over voltage protection is to reduce the over voltage to a tolerable level before it reaches the PV modules and other sub-system component as Hilly areas prone to lighting and other atmospheric disturbances.

4.12.2 The lighting conductor shall be made of 25mm diameter & 4000mm long G.I. spike as per provision of IS-2309-1969. The lighting conductor shall be earthed through 20mmx3mm thick G.I. flat plate with earth pit. Necessary concrete foundation for holding the lighting conductor in position to be made.

4.12.3 The earth pit shall be made with G.I.pipe, 4.5 m long 40mm diameter including accessories watering pipe using charcoal and salt as required as per provision of IS:3043.

4.12.4 Metal oxide varistors shall be provided inside the array junction boxes.

4.13 EARTHING :

4.13.1 Each array structure of the SPV yard shall be grounded properly. Adequate number of lighting conductor shall be provided inside the array field to the provided an acceptable degree of protection as per IS:1309.

4.13.2 All non-current metal parts must be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode as per Rule 33 and 61 of IE Rules 1956.

4.14 POWER HOUSE & SECURITY FENCING :

4.14.1 Power house should consists of one room for battery, one room for controller and inverted switch yard and one room for operators in built with one toilet block.

4.14.2. Size of power house should be specified clearly for each room and different type of power plant.

4.14.3. Flooring of power house should be RCC, walling should 1st class brick and roofing should be made of C.G.I. sheet of good quality and ceiling by the 4mm thick plywood.

4.14.4 Security fencing of power house and switch yard modules array shall be provided with cross jar fencing mounted in an angle iron of 2m height with a 300 mm long portion bend at 30°c incline outside as per required length of each type of power plant.

4.14.5 Detail construction drawing should be furnished for approval by MNREDA before going a head with the civil work structure of power house and security fencing of switch yard.

4.15 **YARD LIGHTING SYSTEM** :

4.15.1 Inside a power house for each room and outside main door should be provided with a 9 watt CFL lamp fixture luminar properly wiring by make used of PVC conduit pipe.

4.15.2. Two Nos. of outdoor lighting system with weather proof lighting fixture suitable for 2x11 watts CFL lamp to be fitted on 5m long, 40mm diameter GI pipe support embedded in a concrete cement foundation. Suitable arrangement shall be made for isolating any light fixture from respectively pole.

4.16 **SPARE PARTS & REPAIRING TOOLS & KITS** :
The supplier shall provide spare required during warrantee period free of cost.. Beyond warrantee period the supplier shall ensure that spare are made available to MNREDA at reasonable charges. Repairing tools and kits i.e. multimeter, screw driver sets, spanners etc. should be supplied for each plant.

4.17 **PACKAGING, SHIPPING AND MARKING** :
The supplier shall be responsible for assuring that all commodities shipped are properly packed and protected to prevent damage or deterioration during shipment. Packaging and shipping costs shall be borne by the supplier. Customs clearance and all costs and actions associated with import duties taxes and processing of documents within India are borne by the bidder.

4.18. **INSTALLATION & COMMISSIONING** :

4.18.1 The offer should include provision for installation of the entire system.

4.18.2 the supplier is responsible for the supply of instruments required to commission and installation. The plant will be commissioned in the presence of authorized personnel or its nominated representative. A commissioning protocol should be provided in the offer and an acceptance report will be prepared and signed by all participating parties.

4.19. **AFTER SALES SERVICE** :

The offer should include the terms and conditions for after sales service. The detailed content of the service proposed, and its duration should be clearly stated. Bidders having own/authorized service centers in Shillong or N.E. Region shall be given preference.

4.20 **TRAINING AND AFTER SALES SERVICE** :

Training and after sales service is an importance component of supply. The terms and conditions for training and after sales supply and service are to be presented clearly in the bit and the extent and duration of after sales support clearly defined. An explanation of preventative maintenance schedule, plan of operation, scope and implementation of the sale service is to be defined.

4.21 **EXPERIENCE** :

A comprehensive list of past projects implemented, by the bidder/bidder group company/collaborator in India or abroad, including clients, dates size of projects and any other relevant material should be included in the offer. Companies having experience in execution and operation of similar solar power plants shall be given preference.

4.22 **DOCUMENTATION :**

One set of installation manual/user manual shall be supplied along with the system. Assembly of the complete system shall be shown with computer aided design and drawing form. Step by step maintenance procedures shall be given in the manuals.

4.23 **GUARANTEE PERFORMANCE AGREEMENT :**

An agreement listed system and sub systems of the offer for each component guarantee has to be signed between supplier and MNREDA along with the performance guarantee as listed in section 3.4.

4.24 **DEVIATION OF THE TENDER** :

In case of deviation the below format should be observes.

4.24.1 **General condition of contract.**

Sl. No.	Specification clause	Deviation by the tender	Justification by the tender

4.24.2 **Technical specification of contract** :

Sl. No.	Specification clause	Deviation by the tender	Justification by the tender

4.25 **TECHNICAL OFFER :**

The technical offer should be inclusive of technical parameter as per the date sheet of section 4.2.9,4.7.4, 4.8.6,4.9.17, 4.11.3, 4.12, and other calculation design along with Bill of materials for different types of power plants with required quantity as per describe at section 4.2 to 4.14 (without bill of materials attached along technical offer will be considered as in valid).

4.26. **MARKING OF MNREDA NAME IN SOLAR PHOTOVOLTAIC MODULE:**

It is to be noted that in the distinctive logo of the firm in the photovoltaic module it is required to print also the name of the purchaser marked as "MNREDA". This is to avoid the frequent theft of modules.

5. **Bidding scheduled :**

Sl. No.	Description	Quantity	Unit	Unit price (Rs.)	Total price (Rs.)
1.	Solar Modules				
2.	Module mounting structure				
3.	Array junction				
4.	D.C. distribution Board				
5.	Main junction box				
6.	Power conditioning unit				
7.	Tubular battery				
8.	Battery bank accessories				
9.	A.C.Distribution Board				
10.	Interconnecting cable				
	i) ii) iii) iv) v)				
11.	Earthing kit				
12.	Lighting kit				
13.	Installation kit				
14.	Distillation plant				
15.	i) Indore lighting 20 Nos. ii)Outdoor/street lighting system 15 Nos. iii)Cable, post etc. for item (i) & (ii)				
	Total price of system				
16.	Control room civil work				
17.	Fencing or modules/power house station				
18.	Freight, Insurance etc.				
	Grand total				

Note : (i) Interconnecting cable size and quantity should be provided and indicated clearly.
(ii) Attachment of separate sheet is allowed but format as above should be maintained.

Seal & Signature of Authorized
Person of the Firm.