MEGHALAYA NON-CONVENTIONAL
&
RURAL ENERGY DEVELOPMENT AGENCY

(Near B.S.F. Camp, Mawpat)
P.O. Mawpat, Shillong – 793 012

Tender Document for Design, Manufacture, Supply, Installation, Testing & Commissioning, Operation and Maintenance 50 Nos. of 1 Kw Solar Photovolatic Power Plant Stand Alone Systems at the Area Employment Council Building of South Garo Hills District in Meghalaya.

Tender document issued to M/S _____

_____

_____ against application

vide letter No. _____ dated _____

and against payment of Rs. 5,000/- (Rupees five thousand) only vide Cash/Bank Draft No. _____ dated _____

of _____ Bank towards cost of Tender Document.

PART – 'A'
GENERAL AND COMMERCIAL
TERMS AND CONDITION & TECHNICAL BID
(Page No. 1 to 20)

Issued By :

For Director
Meghalaya Non-Conventional & Rural
Energy Development Agency

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MEGHALAYA NON-CONVENTIONAL AND RURAL ENERGY DEVELOPMENT AGENCY

Near BSF Camp, Mawpat, Shillong – 793012
Phone No. 0364-2537343, E-Mail : mnreda_shg@bsnl.in ## www.mnreda.Gov.in

1. NOTICE INVITING TENDER

No. MNREDA/1530/2012-13/13/1 : Sealed Tender with 90 (ninety) days validity are invited any Approved Supplier/Manufacturers recognized by the Govt. of India, MNRE for "Design, Supply, Testing, Installation and Commissioning and Maintenance for 5 (five) years of 50 (fifty) Nos. of 1 KW SPV Power Plant under South Garo Hills District in Meghalaya".

Tender document/paper will be issued or down loading from website of MNREDA with effect from **02.01.2013 to 25.01.2013** on payment of Tender cost of Rs. 5,000/- (Rupees Five thousand) only either by cash or Bank Draft drawn in favour of Director, MNREDA, Shillong which is non-refundable.

Last date of submission of bids is on **30.01.2013 at 1:00 P.M.** and Commercial and Technical Bid will be opened on the **same date at 2:00 P.M.**

Director

Memo No. MNREDA/1530/2012-13/1-A Dated Shillong, the 20th December, 2012

Copy to :-

1. The Indian Express Ltd. (Financial Express) 23, Dr. S. K. Bhuyan Road Dighoni Pukhuri (East) Guwahati – 781001 (Fax No. 0361-2548751) Power Department.

With request to publish as classified Advertisement in one issue of Delhi, Mumbai, Kolkata & Chennai Edition and submit the Bill in Duplicate along with sample for payment.

2. MNREDA Website
3. Notice Board.

Director

2. **LIST OF AEC OFFICE FOR ELECTRIFICATION UNDER SOUTH GARO HILLS**

Sl. No.	Block	A.E.C. Offices	
1.	Gasuapara	1	Dimapara A
	Gasuapara	2	Dimpara B
	Gasuapara	3	Gasuapara A
	Gasuapara	4	Rugapara B
	Gasuapara	5	Meka Adu A
	Gasuapara	6	Attabenga A
	Gasuapara	7	Attabenga B
	Gasuapara	8	Rongchong A
	Gasuapara	9	Lelekali
	Gasuapara	10	Rangmai A
	Gasuapara	11	Rangmai B
2.	Baghmara	12	Emangre
	Baghmara	13	Eman Gatabil
	Baghmara	14	Jaisrugittim
	Baghmara	15	Watregittim
	Baghmara	16	Sibbari AEC
	Baghmara	17	Rongmatma
	Baghmara	18	Mindikgre
	Baghmara	19	Nelwagre
	Baghmara	20	Lolegre
	Baghmara	21	Siju Duramong
	Baghmara	22	Jakrongsam
	Baghmara	23	Aruak Nokatgre
	Baghmara	24	Namisikgre

Sl. No.	Block	A.E.C. Offices	
3.	Chokpot	25	Rongdi Anchengre
	Chokpot	26	Mondang Redinggre
	Chokpot	27	Jetra
	Chokpot	28	Rongrikkimgre
	Chokpot	29	Balwatgre
	Chokpot	30	Rongmegre
	Chokpot	31	Betagre
	Chokpot	32	Digrangre
	Chokpot	33	Gagagre
	Chokpot	34	Dobagre
	Chokpot	35	Dagal Songgital
	Chokpot	36	Kimdigonggre
	Chokpot	37	Diggangre
4.	D. Rongara	38	Ampangre
	D. Rongara	39	Dallonggittim
	D. Rongara	40	Dambuk Aga
	D. Rongara	41	Gulpani Nokat
	D. Rongara	42	Kanai
	D. Rongara	43	Mahadeo
	D. Rongara	44	Moheskola
	D. Rongara	45	Rongsu Agal
	D. Rongara	46	Panda
	D. Rongara	47	Nengsra
	D. Rongara	48	Rewak
	D. Rongara	49	Dambuk Apal
	D. Rongara	50	Dilsingre

3. SPECIAL CONDITION OF CONTRACT

3.1. Minimum criterion for bidding

The bidder must have following minimum criterion for bidding:

A. COMMERCIAL & EXPERIENCE:

(i) The bidder should be ISO 9001 & ISO 14001 certified

(ii) The bidder must have similar experience of executing order for more than 10 KWp Solar Power Plant in any state Nodal Agency in India of same capacity and above.

(iii) The bidder must have adequate service network for maintenance of the system in North eastern Region.

(iv) The bidder or its principal company must not have any legal case pending against them in North Eastern Region.

(v) The bidder must not black listed by any State Nodal Agency of India.

(vi) The bidder must not have any record of their installation of power plant has suffered any accident like fire etc.

(vii) The bidder must submit the documentary evidence of rendering maintenance service of similar type of project duly certified by any Govt Dept/Customer.

(viii) The bidder must have registered turn over of more than Rs. 1 (one) crore & positive sales growth for last two financial years in India in Solar PV business only.

(ix) The bidder must not have any record of refusing to accept work from any Govt Dept/Customer even after participating in the tendering process

(x) The bidder should not quote with individual solar module capacity less than 12V, 100 Wp

(xi) The bidder must have their solar modules/products approved by MNRE, IEC, CE, DGQA, STQC, CPRI, ETDC, RDSO.

B. THE TECHNO COMMERCIAL BID MUST CONTAIN THE FOLLOWING:

(i) A brief write up about the organization.

(ii) Audited balance sheet for last two financial years

(iii) IT Return of last two financial years

(iv) VAT/Sales Tax Registration Certificate issued by respective State Registered.

(v) Technical Write up about the system

(vi) Technical Write Up or Specification and compliance statement of each major components of the system.

(vii) Detail Single Line Diagram of the system

(viii) Write up on detail methodology of Comprehensive Maintenance Contract for 5 (five) years.

(ix) A work Plan preferably in the form of Bar Chart for completion of supply, installation and commissioning within the stipulated installation schedule mentioned in the tender.

(x) Details of similar contract executed in last two years with contract reference and contract performance certificate of few clients.

3.2 EXPERIENCE OF THE BIDDER

A comprehensive list of past projects implemented, by the bidder/bidders group company/collaborator in India or abroad, indicating clients, dates, size of projects and any other relevant material should be included in the offer.

3.3 DOCUMENTATION

One set of installation manual/user manual shall be supplied along with the system. The manual shall include complete system details such as array lay out, schematic of the system, inverter details, working principle etc. Step by step maintenance and trouble shooting procedures shall be given in the manuals.

4. **INSTRUCTION TO TENDERER :**

4.1 **Distribution of work** :- The Agency (MNREDA) will distribute the work into the 1st three lowest quoted i.e. L1 – 50%, L2 – 30% and L3 – 20% provided L2 & L3 willing to supply at L1 quoted rate.

4.2 **Tender Cost** : The Cost of Tender papers or document should be in the form of Cash/Bankers Cheque No/Demand Draft (Non-refundable) drawn in favour of Member Secretary, Meghalaya Non Conventional and Rural Energy Development Agency, Shillong.

4.3 **Extra Payment for Hard copy Tender Document** : Tender document will be issued by Courier or Speed Post on request but extra payment of Rs. 200/- (Rupees two hundred) only should be made by Demand Draft towards cost of Speed Post or Courier.

4.4 **Local Dealer** : Local dealer of any manufacturer or supplier will be issue Tender document but on furnishing of their dealership Certificate and Tender document will be issued in Principal's name.

4.5 **Postal Delay** : In the event of postal delayed, MNREDA shall not be held responsible.

4.6 **Issue of Tender Document** : Tender document will be issued on any working days within the specified date.

4.7 **Opening of Offer** : In case the opening date is declared as holiday. Tender shall be open in the next working day at the same time and hour.

4.8 **Down Loading of Tender Document** : Tenderers can submit the Tender by down loading form the website but cost of Tender document has to be furnished before casting of Tender.

4.9 **Furnishing of Bids** : Tenderer are to furnish their offer in two seal cover envelope. 1st Envelope marked as "COMMERCIAL AND TECHNICAL BID" should enclosed along with Part A of Tender documents issued in original. And 2nd envelope marked as "FINANCIAL BID" should contain Part – B of Tender issued in original along with EMD.

(a) **"Technical Bid"** should contain only design of plant offer as per Technical Specification or requirement and related paper to Technical support. Clearance Certificate during last two Financial Year work experience or any other supporting paper.

(b) **"Financial Bid"** should contain only EMD and the Price bid quoted on the tender document as supplied by the Agency or in a separate sheet but as per format supplied along with EMD.

4.10 **Deviation** : Any deviations to the terms and conditions stipulated in detailed tender papers including payment terms etc. must be clearly specify if there is any deviation with justification.

4.11 **Basis price quoted –** The price quoted should be Firm and as per the format provided in the tender document. Price break up of various components must be clearly indicated in the format, failing to comply to the above will result in cancellation or rejection of the tender.

4.12 **Additional Information** : Any other particular information, which are required to be furnished as per detailed tender papers but which have not been specifically indicated.

4.13 **Rate Quoted** : The rate should be legible written in English both in figure and in words. In case of any dispute between the figure and words the letter shall be indicated.

4.14 **Opening of Financial Bid** : Date of opening of Financial Bid shall be intimated individually to those firm who is qualified for Commercial and Technical offer.

4.15 **Unsuccessful Bidder** : The Price Bid/offer of all other who are not qualified for Technical Bid shall be returned unopened to such parties under acknowledgement. For other who qualify for Technical Bid due information shall be given through either **Phone or Fax.**

4.16 **Earnest Money Deposit** : Earnest Money Deposit of 1% for Schedule Tribe and Scheduled Caste and backward classes and 2% for general on the amount quoted in the form of Bank Guarantee/Call Deposit/FDR from any Scheduled or Nationalized bank of India pledged in favour of Director, MNREDA, Shillong should be furnished without which Tenders will be rejected.

5. GENERAL/COMMERCIAL TERMS AND CONDITIONS :

5.1 **Signing of Tender Paper :** The Tender Document as issued by MNREDA should be sealed and signed by the Authorized person of the firm and it will be view as acceptance of each and every conditions containing therein.

5.2 **Attestation :** All Xerox supporting papers which is not original should be duly attested by the Government official not below the rank of Magistrate.

5.3 **VAT :** VAT Registration and VAT Clearance Certificate during last Two Financial year upto March 2012 should be furnished alongwith the Bid.

5.4 **Time of Completion :** The work should be completed within 90 (ninety) days from the date of issue of final work order i.e. (a) Supply of equipments to the respective site should be completed within 60 (sixty) days from the date of issue of final work order and (b) Installation and Commissioning of the Power Plant should be completed within 30 (thirty) days from the date of received of material at sites or designated Centre.

5.5 **Supplier :** The Supplier who are not the Module manufacturer are required to produce a letter from the manufacturer of Module for commitment of supplying the Module without which offer will be rejected.

5.6 **Trading License :** The successful bidder has to produce a Trading License from the proper authority before starting of work at sites i.e. from the Garo Hills Autonomous District Council.

5.7 **Agreement :** An Agreement has to be signed within 7(seven) days of issue of final work order. The Agreement shall be prepared by the purchaser on a stamp paper duly signed by the authorize person of the Firm and Purchaser. The Tender Document as issued alongwith the Bid as submitted by the bidders alongwith supporting papers shall be part and parcel of the agreement. The maintenance contract agreement shall be separately signed on completion of installation and commissioning work of the system.

5.8 **Warranty :** The System supplied should be guarantee for a period of 2 years and the Module should be warranted for a period of 10 years. The Warranty period is from the date of complete of Installation and Commissioning of the System.

5.9 **Payment Terms and Conditions :** The Bidders shall be entitled to the following payment terms.

(a) Mobilization Advance : The contractor shall be paid 30% (thirty percent) on equipment cost as mobilization advance against a Bank Guarantee of equivalent / like amount from any Nationalized Bank or Scheduled Bank valid for a period of 90 (ninety) days from the date of acceptance of work.

(b) 40% (forty percent) of the contract value of the plant/equipment shall be paid against receipt of materials at site in good conditions.

(c) 20% (twenty percent) of the contract value of the plant/equipment along with other payments shall be paid on complete Installation and Commissioning.

(d) Balance 10% (ten percent) to be paid at the end of 2 (two) years of warranty period or against submission of Bank Guarantee of equivalent/like amount valid for a period of two years from the date of Commissioning.

(e) The Annual/comprehensive maintenance contract payment shall be made on percentage of 30%, 30% and 40% at the end of 3rd, 4th and 5th years basis.

In the event of contractor not being able to supply or to carry out the work or a part of the work assigned to him in accordance with the terms of this contract, the purchaser shall have the right to recover any sums advanced form the contractor from his/its assets/amount submitted as mobilization advance.

5.10 Experience : The bidders are required to submit the detailed experience during the last 5 years of the work completed in any capacity of Power Plant. A Statement in this respect has to be compiled in a comprehensive form alongwith work orders by furnished column format which should consist of Sl. No., work order, Name of Organisation, No. of Power Plants, Work Value, Status as to date and completion Certificate. Due weightage will be given or considered to the bidders who have any experience especially in North Eastern Region and hilly areas.

5.11 Subletting of Contract : The Contractor shall not without the prior consent in writing of the Purchaser, assign or sublet or transfer his contract, or a substantial part thereof other than raw materials or for any part of the work of which makers are named in the contract provided that any such consent shall not relieved the contractor from any obligation duty or responsibility under the contract.

5.12 Price Quoted : The price quoted as per the bidding Scheduled i.e. cost of the System, Transportation, Installation and Commissioning and Allied Civil Work invoke and maintenance contract should be realistic and practical in nature and conform to the actual work to be done. Any figure which is not practically practicable, offer will be rejected.

5.13 Contractor to Inform Himself fully :

(a) The Contractor shall be deemed to have carefully examined the general conditions, specification and Schedules and also to have satisfied himself as to

the nature and character of the plant and equipment to be supplied and installed under the contract, the site conditions and all relevant matter and detailed.

(b) If he shall have any doubt as to the meaning of any portion of the contract/work order, he shall before signing/accepting it, set forth the particulars thereof and submit them to the Engineer-in-charge in writing in order to remove such doubts.

5.14 Financial Soundless : Documentary evidence in support of Financial Soundness of the Tenderer should be furnished.

5.15 Submission of Bids :

(a) Commercial & Technical Bid should contains the following :

(i) Tender paper (Part - 'A') as issued by the Agency duly signed and seal by the Authorized persons of the firm.

(ii) Technical design of a Power Plant.

(iii) Technical Specification duly filled in as per Tender Document.

(iv) Experience in Similar kind of works.

(v) VAT Registration and clearance Certificate during the last two financial years upto March, 2012

(vi) Any deviation with Justification thereof.

(vii) Any other.

(b) Financial Bid should contains :

(i) Tender Paper Part – 'B' as issued by the Agency duly signed and seal by the Authorized persons of the Firm.

(ii) Price can be quoted on plain paper but it should be in the Format given.

(iii) Earnest Money Deposit.

5.16 Service Centre – It is mandatory that the Manufacturer of Supplier should have a local service centre in the state and preference will be given to those Firm who have the service centre in the State.

5.17 Exemption of EMD – The Manufacturer or Supplier who claim exemption shall have to produce a relevant paper from the proper authority i.e. SSI Registration and NSIC Certificates.

5.18 Breach/cancellation of the contract :-

(a) In case of non-performance in any form or change of the covenants and conditions in this contract by contractor, MNREDA shall have the power to annual, rescind, cancel or terminate the contract and upon its notifying in writing to the contractor that it has so done, this contract shall absolutely

determine. The decision of MNREDA in this regard shall be final and binding.

(b) The purchaser may cancel the contract or a portion thereof and if so purchase or authorized purchase of the plant/equipment not so delivered or order plant equipment of similar description (opinion of the purchaser shall be final) at the risk and cost of contractor. If the contractor had defaulted in the performance of the original contract, the purchaser shall have the right to ignore his tender for risk purchase even though lowest.

5.19 Responsibility of the contractor :

The contractor shall guarantee and be entirely responsible for the execution of the contract in accordance with the specification, schedules and appendices. He shall further guarantee and be responsible for the quality and workmanship of all materials and completed works, correct designs drawings, correct delivery of materials, erection, testing and commissioning, within the guaranteed completion and warranty period of 5 (five) years from the date of commissioning on completion of commissioning a separate agreement shall have to be signed in their respect for comprehensive maintenance contract.

5.20 Tools and Tackles :

The contractor shall provide all tools and trackles conforming to relevant BIS safety and technical standard for proper execution of work, MNREDA shall in no way, he responsible for supply of any tools and tackles for implementation of the work.

5.21 Safety Measures :-

The Contractor shall have to undertake necessary measures for providing adequate safety and precautions to avoid any accident which may cause damage to any equipment/material or injury to workmen. MNREDA shall not responsible for any such accidents.

5.22 Delivery of system :-

(i) The contractor shall deliver the plant/systems in accordance with the terms of the contract at the time/times at the place/places and in the manner specified in the contract. The contractor shall comply with instructions that may be given by the purchaser from time to time regarding the transit of the plant and material.

(ii) Notification of delivery or dispatch in regard to each and every consignment shall be made to the purchaser immediately after dispatch or delivery. The

contractor shall supply to the consignee invoice in duplicate and packing account of all stores delivered or dispatch by him.

(iii) In case of any occurrence of loss or damage in transit upto destination, it shall be liability of the contractor or initiate or pursue the claim with Insurance Company. He should take immediate steps to repair the damaged apparatus or replacement thereto. Any extension of time limit required in such contingency will be considered by the purchaser on merit.

5.23 Arbitration :

(i) Except where otherwise provided if at anytime question dispute or difference whatever shall arise between the contractor and the purchaser upon or in the relation to or 1 (one) connection with this contract either of the parties may give to the other notice in writing of the existence of such a question on rejection of the matter, the dispute or difference shall be referred to the sole arbitration appointed by MNREDA at the time of dispute after ascertaining the terms of reference mutually.

(ii) The Arbitration will preferably be a member of Arbitration Council and arbitration proceeding will take place as per provision or arbitration Act 1940 or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply.

(iii) The contractor will ensure that the work under this contract shall continue during arbitration proceeding and dispute and no payments due from or payment by the purchaser shall be withhold on account of such proceeding except to the extent which may be in dispute.

5.24 Court of Competent Jurisdiction :

The Courts of Gauhati High Courts, Shillong Bench will only have jurisdiction in this case.

6. TECHNICAL DESIGN & REQUIREMENTS.

6.1 INTRODUCTION :

It is proposed to install 1.0 Kwp Solar Power Plant in 50 Nos. of the Area Employment Council (Panchayat) Office under South Garo Hills District of Meghalaya for Computer and lighting load, so that the same can be used for meeting load of the entire office for 6 House daily or regular basis.

6.2 Project Summary :

(i) 1.0 kWp Stand Alone Solar Power Plant to feed the generated solar power to the load.

(ii) **Array Capacity :** 1.0 kWp Standard Solar Panels of 100 Wp at 16 VDC with 36 cells.

(iii) **Battery Capacity :** 24V/48V, 400 AH/240AH @ C10 to provide necessary backup for 1kVA load for 6 hours operation

(iv) **Type of system :** 100% Stand Alone solar PV system with backup facility and grid charging facility.

(v) **Control :** Microprocessor based solar inverter, consisting of MPPT control for maximizing solar input.

6.3 Technical Offer

6.3.1 Scope of Work:

The following section of the document describes the Solar PV Power Plant proposed for computer & lighting load powering.

This job involves by means of the enclosed specification, design, manufacture, supply, installation, commissioning of the Solar PV Power Plant with 2 years warranty period followed by 3 years operation & maintenance.

The Scope of Work shall include the following,

- ✓ Design, manufacture, supply of Solar PV Power Plant
- ✓ Detailed planning of smooth execution of the project
- ✓ Performance testing of the complete system
- ✓ Warranty of the system for 2 year faultless operation. & 5 years operation & maintenance
- ✓ After sales service

- ✓ Risk liability of all personnel associated with implementation and realization of the project
- ⇒ The module layout is proposed on the basis of clear shadow free space available at Site.
- ⇒ The proposed structures fixed facing south at a tilt.
- ⇒ The Solar inverters, Battery Bank & junction boxes are housed inside the Control Room building.

6.3.2 System description

These photovoltaic arrays shall be connected such that maximum energy extraction from available sunlight is possible.

The Photovoltaic (PV) system consists mainly of 3 (Three) components:

- ✓ The PV array with Solar Panels connected in series & parallel
- ✓ MS Structure for PV panels
- ✓ Solar inverter

The PV array converts the light energy in to sunlight to direct current (DC) power.

The Grid connected solar inverter converts the DC solar power in to AC Power and feed to grid. Inter connecting cables are used to interconnect the Solar Modules, Junction Boxes, Solar Inverter and Grid connection.

The PV installation comprises of 100 Wp and above PV panels.

6.3.3 Output distribution:

DC-AC Inverter converts DC energy produced by the solar array to AC energy. The inverter generates 220 - 230VAC, 1-phase, 50Hz output

6.3.4 Earthing and Surge protection:

The array structure of the PV yard shall be grounded properly using adequate number of earthing pits. All metal casing / shielding of the plant shall be thoroughly grounded to ensure safety of the power plant. Surge protection: The SPV system shall be provided with necessary surge protection devices (Inside Array Junction Box & distribution boards) for over voltage protection. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc.

6.4. Main Components of Solar Power System

6.4.1 Solar PV Modules

The module consist of:

1. Solar PV Module :
   a) Bidder should use Solar Module of similar output with +/- 2% tolerance in single string to avoid array mismatch loss.
   b) The PV modules used in the projects will be from crystalline solar cells, 60 cells with minimum 100 Wp capacity duly tested in Solar Energy centre. The PV modules should be manufactured in India, in an ISO:9001 and ISO:14001 certified facility, and conform to IEC:61215 Ed.2, IEC:61730-1 and IEC-61730-2 standards.
   c) 60 carefully matched 156 X 156 mm **multi / mono crystalline** silicon cell laminated between sheet of -Ethylene Vinyl Acetate (EVA) and high transmissivity 4 mm tempered glass.
   d) All solar cells are redundantly interconnected in series to increase integrity.
   e) Back layer of Polyester (clear) Encapsulant – EVA - ensures environmental protection & optimises thermal & electrical performance.
   f) The output is via heavy-duty AWG 12 (4mm2) output cables with polarized weatherproof DC rated connectors, which provide low resistance connections. This eliminates wiring errors and speeds installation. The specification of Models is as below should be furnished :-

Parameters	Specification
Module Capacity	
Module type	
No. of PV cells per Module	
Cable gland at module Junction Box	
Weather resistant Junction Box Manufacturer	
Max. Temperature rise of cells under severe working conditions over Max. Ambient temp.	
Peak power voltage (Vmp)	
Peak Power current (Imp)	
Open circuit voltage (Voc)	
Short circuit current (Isc)	

Mechanical Features	
Toughened, Low iron content & High transmissivity from glass	
Ethyl Vinyl Acetate (EVA) encapsulation	
Clear Tedlar/Polyester tri-laminate back surface	
Resistant to water, abrasion hail impact, humidity & other environment factors for the worst situation at site	
By-pass diode	

6.4.2 Power Conditioning Unit

The PCU consists of in-built 1 (One) KW charge controller and inverter to supply continuous power to the dedicated load with support to the load coming either from the solar array, battery bank, Grid Power in order of preference. The PCU of 1 (one) KW is considered for this project.

The sine wave inverter generates a sinusoidal AC voltage with an exceptionally precise voltage and stabilized frequency. The inverter is protected against overload and short circuit.

PRODUCT SPECIFICATION FOR
INTEGRATED SOLAR POWER CONDITIONING UNIT

INVERTER	
Battery Voltage	
Inverter type	
Inverter power rating	
Operation mode	
Output frequency	
Output waveform	
Total harmonic distortion	
Power factor	
Efficiency	
Over load	
Line & load regulation	
Self consumption	
AC charger rating	
Isolation / Switch	

Protections • Over load / Short circuit • Against lightening & over current • Output under / over voltage • Battery under / over voltage with audible alarm • Over temperature • Grid over/under voltage • Grid low/high frequency • Battery reverse polarity • Over current / surge loads	

6.4.3 BATTERY & BATTERY BANK

(a) The batteries should be of gelled electrolyte type, positive tubular plate, maintenance free lead batteries and shall confirm to IEC/EN 60896-21 & 22.

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

(c) Design voltage of system should by either 24V or 48V Systems.

(d) Battery capacity of each plant should be designed taken as a full rated load capacity available from the solar array with two days autonomy taking into consideration.

(e) Batteries should be provided with explosion proof vent plugs with complete assembled set.

(f) The batteries shall be suitable for recharging by means partial state of charge.

(g) Bidder shall mention the design cycle life of batteries at 80% depth of discharge at 27 degree C. Details for 20% DOD shall be provided.

(h) The batteries shall be designed for operating in ambient temperature of site.

(i) he battery container shall be made of polypropylene.

(j) The self discharge of batteries shall be less than 3% per month at 20 degree C and less than 6% per month at 30 degree C.

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

(l) Bidders to specify capacity & end cell voltage at different discharge rates.

(m) Battery rack & accessories.

Battery interconnecting links shall be provided for interconnecting the cells in series and in parallel as needed. Connectors for inter cell connection (series/parallel) shall be maintenance.

(n) **Specification should consist of** :

(i) Manufacturer :

(ii) Type battery :

(iii) Nominal voltage :

(iv) End cell voltage :

(v) Capacity of battery system :

(vi) Depth of discharge :

(vii) Efficiency of battery :

(viii) Duty cycle :

(ix) Combination of battery series and parallel : Yes.

(x) Structural details : As per product leaflet should be enclosed.

(xi) Battery guarantee :

6.4.4 Junction Boxes

The junction boxes shall be dust, vermin, and waterproof and made of Thermo Plastic. The terminals shall be connected to copper bus-bar arrangement of proper sizes. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and out going cables. The specification as per below parameters are to furnished :-

Parameters	Specifications
Type	
Construction	
Earthing Provision	
Hardware	
Mounting	
Protection	

6.4.5 Cables

The size of the cables between array interconnections, array to junction boxes, junction boxes to Inverters etc shall be selected to keep the voltage drop and losses to the minimum. This drop shall not exceed 5% of system capacity.

The bright annealed 99.97% pure bare copper conductors that offer low conductor resistance, they result in lower heating thereby increase in life and savings in power consumption shall be used. These wires shall be insulated with a special grade PVC compound formulated and manufactured in-house. The skin coloration offers high insulation resistance and long life. The specification as per parameter indicated below are to furnish :-

Parameters	Specifications
Type	
Material	
Working voltage	
Test voltage	
Color	
Temperature	
Standard	

6.4.6 Module Mounting Structure :

The module mounting structure is designed for holding suitable number of modules in series. The frames and leg assemblies of the Module Mounting structure are manufactured using standard Mild Steel sections of angle, channel, tubes and any other sections conforming to IS: 2062. These structures are hot dip galvanized for the long life in external weather conditions. All fasteners used for the structure assembly is of very good quality Stainless Steel (SS304). The Module mounting structure is designed in such a way that it will occupy minimum space without sacrificing the output from solar modules at the same time it will withstand severe wind speed up to maximum 150 KMPH (horizontal wind speed).

6.4.7. ACDB with Energy Meter :

The ACDB shall act as central connection point to all inverters, UPS and Electricity supply. It will have Load Limiter Switch for each channel & type of load

6.4.8. Non-Module Manufacturer :

The Firm who are not the Module manufacturer are required to furnished a Certificate from the Module Manufacturer a letter of support that they are to supply the Module valid for one year from the date of opening of Bid along with relevant Test Report of Modules as desired.

6.5. Bill of Materials

1.0 kWp Solar PV Power Plant			
BILL OF MATERIALS			
Sl. No.	**DESCRIPTION**	**TOTAL QTY.**	**UNIT**
1	**Solar Module ≥100 Wp**		
2	**Module Mounting Structure**		
3	**Array Junction Box**		
4	**1 KW Power Conditioning Unit 24V/ 48V DC I/P, 220-230 V AC, 50 Hz, 1 Phase o/p**		
5	**Battery Bank**		
6	**AC Distribution Board & Battery Protection Panel**		
7	**Cables**		
8	**Earthing**		
9	**Lightning Arrestors**		
10	**Installation kit**		

As per the design provided the quantity should be specify.

6.6 **Allied Civil Work** :- The contractor are to indicate the details drawing mounting Structure of Modules for both ground mounted and Building/roof top mounted modules as per the site condition exist and should be properly grouted and fense around the area. Details dimension indicated the above required and space between modules mounting and fencing should be at least 10 feet away. The power House size and design should accommodate the battery, bank, Energy meters, controlling unit shall have to be design as per requirement of respective sites.

MEGHALAYA NON-CONVENTIONAL
&
RURAL ENERGY DEVELOPMENT AGENCY

(Near B.S.F. Camp, Mawpat)
P.O. Mawpat, Shillong – 793 012

Tender Document for Design, Manufacture, Supply, Installation, Testing & Commissioning, Operation and Maintenance 50 Nos. of 1 KW Solar Photovolatic Power Plant Stand Alone Systems at the Area Employment Council Building of South Garo Hills District in Meghalaya.

Tender document issued to M/S _____

_____

_____ against application

vide letter No. _____ dated _____

and against payment of Rs. 5,000/- (Rupees five thousand) only vide Cash/Bank Draft No.

_____ dated _____ of

_____ Bank towards cost of Tender Document.

PART – 'B'
FINANCIAL BID
(Page No. 21)

Issued By :

For Director
Meghalaya Non-Conventional & Rural
Energy Development Agency

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6. **BIDDING SCHEDULED** : **1 KW SPV POWER PLANT**

Sl. No.	Description	Quantity	Unit	Unit Price (Rs.)	Total Price (Rs.)
A.	**Equipments :-**				
1.	Solar Modules				
2.	Module Mounting Structure				
3.	Array Junction				
4.	Main Junction Box				
5.	D.C. Distribution Board				
6.	Power Conditioning Unit				
7.	Tubular Battery				
8.	Battery Bank Accessories				
9.	A.C. Distribution Board				
10.	Interconnecting Cable				
	(i)				
	(ii)				
	(iii)				
	(iv)				
11.	Earthing Kit				
12.	Lighting Kit				
13.	Installation Kit.				
14.	Manual Toggle Switch				
15.	D. G. Set				
16.	Distillation Plant				
17.	Lighting Provision & Distribution.				
A.	**Equipment Cost**				
B.	Module Mounting Structure				
C.	Fencing or modules and power house station				
D.	Freight, Insurance etc.				
E.	Installation & commissioning				
F.	O & M charges for 3 years.				
	Grand Total				

Note : (i) Interconnectivity cable size & quantity should be provided.
(ii) Quantity of each item of bidding Scheduled should be clearly indicated any Firm who quoted on lumpsum basis their bid shall be rejected.

Dated :

Seal & Sign of Authorised Person of the Firm