

ZORAM ENERGY DEVELOPMENT AGENCY (ZEDA)
ZEDABUILDING, ABOVE 132KV SUB-STATION,
ZUANGTUI, AIZAWL
P.O. ZEMABAWK - 796017

TENDER DOCUMENT
Tender No 3 of 2024 Dated 13th December 2024

**Tender Document for Supply, installation
& commissioning of 3 numbers of 10kWp
off-grid solar power plants at Mizoram
New Secretariat Building, New Capital
Complex, Mizoram**

Rs. 500.00



(Govt. of Mizoram undertaking)

ZORAM ENERGY DEVELOPMENT AGENCY

State Nodal Agency of Ministry of New & Renewable Energy (MNRE)
ZEDA building, Above 132 KV Sub-Station,
Zuanguit, P.O. Zemabawk - 796 017,
AIZAWL, MIZORAM

Contact


Director : 0389-2350664 (Tele-Fax)
Project Director : 0389-2350665
Society Registration No. SB/ MZ-91 of 2001-2002
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NOTICE INVITING TENDER

Dated Aizawl, the 13th December 2024

No.T.12094/1/2022-ZEDA/24: Zoram Energy Development Agency (ZEDA) hereby invites Sealed Tenders, for installation of 3 numbers of 10kWp off-grid solar power plants at Mizoram Secretariat Building from reputed manufacturers and system integrators, having experience in the relevant fields. Sealed Tenders may be submitted to the Office of the Director, ZEDA on or before 17th January 2025 till 12:00PM. Tenders will be opened on 17th January 2025 at 1:00 PM in the presence of the bidders. Tender Documents may be obtained from ZEDA Office on payment of Rs 500.00 (Rupees Five Hundred) only or downloaded from ZEDA website i.e., www.zeda.mizoram.gov.in.

ofr

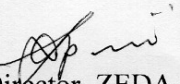

(LALNUNPUII)
Director, ZEDA u

Memo No.T.12094/1/2022-ZEDA/24

Dated Aizawl, the 13th December 2024

Copy to :

1. The P.S. to the Hon'ble Minister, Power & Electricity Department and Chairman, ZEDA Governing Board for favour of information please.
2. The Secretary to the Government of Mizoram, Power & Electricity Department, and Chairman, ZEDA Managing Committee for favour of information please.
3. The Director, Information & Public Relation Department with a request to publish the NIT in two leading Mizo Daily News Papers in one issues each only.
4. Notice Board.


Director, ZEDA u

UNDERTAKING OF THE TENDERER

I/We have read carefully and examined the notice inviting tender, schedule, General Rules and terms and conditions of the contract, special conditions, Schedule of Rates and other documents and Rules referred to in the tender document for the supply.

I/We hereby tender my rates for the execution of the work for ZEDA as specified within the time stipulated in the schedule in accordance with all aspects with the specifications, designs, drawings and instructions with such conditions so far as applicable.

I/We agree to keep the tender open for 365 days from the due date of submission thereof and not to make any modifications in its terms and conditions. A sum of Rs..... (in Words) is hereby forwarded as earnest money in the form of crossed demand draft payable to ZEDA at Aizawl. If I/We, fail to commence or complete the work ordered in specified time I/We agree that the ZEDA shall, without prejudice to any other right or remedy, be at liberty to forfeit the said Earnest Money absolutely. The said Earnest Money shall be retained by ZEDA towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be required by ZEDA.

I/We hereby declare that I/We shall treat the tender documents, specifications and other records connected with the work as secret/confidential and shall not communicate information derived there-from to any person other than a person to whom I/We have authorized to communicate the same or use the information in any manner prejudicial to the safety of ZEDA/the State Govt.

I/We shall abide to all the laws and shall be responsible for making payments of all the taxes, duties, levies and other Govt. dues etc. to the appropriate Govt. Departments.

Our state sales tax registration TIN No. is _____ and CST registration No. _____. The PAN No. under the Income Tax Act is _____. I/We shall be responsible for the payment of the respective taxes to the appropriate authorities and should I/we fail to do so, I/we hereby authorize ZEDA to recover the taxes due from us and deposit the same with the appropriate authorities on their demand.

Dated: Signature

Place: Name of Tenderer with seal

Witness

Signature:

Name:

Postal Address:

SECTION – I

INSTRUCTIONS TO BIDDERS

1. Sealed Tender must reach the office of the Director (ZEDA), latest by 12:00 P.M. on 17/01/2025. Tenders received after the time and date shall not be considered. The tenders should be submitted using three Envelopes.
 - (i) Envelope No.(1) should contain only (i) EMD (ii) Tender Fees in the form of Demand Draft payable to ZEDA, Aizawl / Money receipt of the tender fees (iii) TENDER DOCUMENT: This should contain the original tender document, duly signed & seal on each page of the document. This envelope should be super scribed as 'Eligibility Documents'. **This envelope should also contain the technical proposal of the Solar Power Plants to be installed.** All rest of the documents excluding rate sheets (price bids) should be placed in this Envelope No.(1) marked as 'Eligibility Documents'.
 - (ii) The Envelope No.(2) should contain the completely filled price bids only, marked as PRICE BIDS
 - (iii) Both these two sealed envelopes should be placed in the Envelope No.(3) {bigger one} which should invariably be super-scribed “NIT No.T.2094/1/2022-ZEDA/24, Dated 13th December 2024 – “Tender for Installation and commissioning of 3 number of 10kWp off-grid solar power plants at Mizoram New Secretariat Building”. Tenderer should put their name & address on each of the three envelopes. The tenders will be opened at 1:00 P.M. on 17/01/2025. Tenders not submitted in the above manner shall be subject to rejection.
2. The Tenderer must have credential of satisfactory execution for design, supply, installation and commissioning of SPV power plants in Mizoram. Copy of work orders along with satisfactorily working certificate for the project executed must be submitted along with the tender.
3. The Tenderer must establish their Office/Service Centre in Mizoram for proper peration and maintenance of the systems.
4. Existing SPV Modules should be used for the solar power plants, and PCU / Batteries should be of required specification and warranties as per the technical specifications of the tender documents.
5. Bidder shall submit copies of GST registration number, TIN, PAN and service tax registration numbers issued by the appropriate authority.
6. The documentary evidence for meeting the eligibility criteria must be mandatorily submitted along with tender in **envelope no. 1**.
7. Tenderers must enclose the organization chart of the company clearly showing the details of Technical Personnel, Installation & Commissioning Capability, Training set up etc.
8. **VALIDITY:**
Tender or the approved rates shall be valid for a period of One year (365 days) from the date of opening the tender.

9. The terms, conditions and specifications mentioned in tender document shall be binding on the tenderers and no condition or stipulation contrary to the conditions shall be acceptable. It may please be noted that the tenderers who do not accept terms and conditions stipulated in this tender documents, their offers shall be liable to be rejected out rightly without assigning any reason thereof.
10. Each page of tender document & enclosures shall be signed by the tenderer and seal affixed. All the pages of the documents issued must be submitted along with the offer. In case of any corrections / alterations in the tender, the tenderer should attest the same; otherwise tenders may not be considered.
11. ZEDA reserves the right to reject or accept any or all tenders wholly or partly without assigning any reason on the grounds considered advantageous to ZEDA, whether it is the lowest tender or not.
12. ZEDA reserves the right to distribute the works amongst the tenderers, with the approved rate of ZEDA Managing Committee if it is felt necessary for early completion of the work or on the grounds considered advantageous to ZEDA and the Beneficiary.
13. Offers through Telegraph / Fax / Email or Open offers etc. received shall be summarily rejected.
14. All the tenderers shall essentially indicate the break-up of prices as shown in Rate List. In case any of the charges are not included in the quoted prices, the same shall be clearly shown as extra, indicating specifically the rate/scale of such charges. The lowest prices quoted shall be considered. The tenderer who had quoted the lowest price shall be preferred for placing order. ZEDA can place order for part of tender items.
15. **EARNEST MONEY:**
Each tenderer should submit an earnest money of Rs. **50,000.00** (Rupees Fifty Thousand only) in a separate envelope along with the tender. The tenders not accompanied with earnest money or accompanied with inadequate earnest money will summarily be rejected and returned unopened.
16. **FORM OF EARNEST MONEY DEPOSIT:**
The earnest money deposit can be furnished in the form of **Demand Draft** only from any Scheduled Bank made payable to "Director ZEDA" at Aizawl. Cash or Cheque shall not be accepted.
17. **FORFEITURE OF EARNEST MONEY DEPOSIT:**
It should be clearly understood that in the event of tenderer failing to enter into the agreement in the prescribed format on their quoted rates and also fails to execute work ordered, within stipulations, if he is so communicated within the validity period of the offer, the full amount of earnest money will be forfeited and ZEDA's decision in this respect will be final and binding on the tenderer.
18. **PRICE:**
The prices quoted should be firm and F.O.R. destination inclusive of all taxes and duties, packing, forwarding freight, insurance and any other incidental charges.

19. **SAMPLES**
Samples of the components shall be submitted if desired for ZEDA's approval and the consignment shall be delivered/ accepted as per the approved samples only.
20. **TAX OBLIGATIONS:**
TDS shall be recovered under GST/Income Tax Act and deposited to the the appropriate authority.
21. **INSPECTION:**
Inspection of the materials will be carried out by the Director or his representatives at factory/manufacturing plant before dispatch to the destination, and the cost of the inspection will be borne by the contractor.
22. **JURISDICTION OF THE COURT:**
Any dispute arising out of the contract shall be subject to the jurisdiction of Gauhati High Court, Aizawl Bench.

SECTION – II

SCOPE OF THE WORK

1. Supply, installation and commissioning of 3 numbers of 10kWp each Solar Photovoltaic (SPV) off-grid Power Plants Mizoram Secretariat Building, New Capital Complex, Aizawl, with five years operation and maintenance. The project will be executed on turnkey basis.
2. The scope of work shall also includes the followings:
 - Survey, design and tilization of the existing solar PV Module at the site and detailed planning of time bound smooth execution of project.
 - Supply of Power Conditioning Unit (PCU), Battery, and balance of systems including earthing etc required for successful installation and commissioning of solar power plants, excluding solar photovoltaic (SPV) modules
 - Performance testing of the complete system.
 - Warranty of the system for Five year faultless operation for new materials supplied, assure inventory maintenance.
 - After sales service will be done by the contractor, either directly or through local contractual arrangement.
 - Risk liability of all personnel associated with implementation and realization of the project
 - Training of at least two persons each to be nominated by user at every location and ZEDA, on the various aspects of design and maintenance of the offered system after commissioning of the system.
 - The contractor shall maintain sufficient inventory of the spares to ensure that the system can be made functional within seventy two hours from the communication of breakdown of the system during currency of the warrantee period.
3. Comprehensive Annual Operation & Maintenance Contract of the complete system from the day of the commissioning of installed solar power plants has to be performed by the successful bidder. Comprehensive Annual Operation & Maintenance Contract shall be for minimum five consecutive years from the date of commissioning of the power plants, with a provision for further extension on mutual agreement.

SECTION - III

GENERAL CONDITIONS OF CONTRACT

1. **DEFINITIONS:** In writing General Conditions of Contract, the specifications and bill of quantity, the following words shall have the meanings hereby indicated; unless there is something in the subject matter or content inconsistent with the subject.

“ZEDA” shall mean the Zoram Energy Development Agency represented through the Director.

“Work” shall mean any work entrusted to the tenderer as mentioned in the scope of work and work order.

The "Engineer in charge" shall mean the Engineer or Engineers authorized by Director, ZEDA for the purpose of this contract. Inspecting Authority shall mean any Engineering person or personnel authorized by ZEDA to supervise and inspect the erection of the SPV Power Plant.

"The Contractor/Tenderer" shall mean the tenderer awarded with the contract or their successors and permitted assigns. Contract Price shall mean the sum named in or calculated in accordance with the provisions of the contract as the contract price. General Conditions shall mean the General conditions of Contract.

"Specifications" shall mean the specifications annexed to these General Conditions of contract and shall include the schedules and drawings attached thereto or issued to the contractor from time to time, as well as all samples and pattern, if any,

"Month" shall mean calendar month. "Writing" shall include any manuscript, typewritten, printed or other statement reproduced in any visible form whether under seal or written by hand.

2. **CONTRACT DOCUMENT:**

The term "Contract" shall mean and include the General conditions, specifications, schedules, drawings, and work orders etc., issued against the contract schedule of price or their final general conditions, any special conditions applying to the particular contract specification and drawings and agreement to be entered into. Terms and conditions not herein defined shall have the same meaning as are assigned to them in the Indian contract Act or any other Act in vogue or by any person of common knowledge and prudence.

3. **MANNER OF EXECUTION:**

Execution of work shall be carried out in an approved manner as outlined in the technical specifications or where not outlined, in accordance with relevant MNRE/BIS/Indian Standard Specifications, to the reasonable satisfaction of the Engineer.

- i) The contractor shall start work within 20 days after the date of handing over of the site.
- ii) If at any time it should appear to the Engineer that the actual progress of works does not confirm to the programme to which consent has been given under sub-clause 3(i), the contractor shall produce at the advice of the Engineer a revised programme

showing the modification to such programme necessary to ensure completion of the works within the time of completion.

- iii) All the materials required for the installation of SPV Power Plant as per Work Order issued shall be kept at site in the custody of the contractor. ZEDA shall not be responsible for any loss or damage of any material during the installation

4. VARIATIONS, ADDITIONS & OMISSIONS:

ZEDA shall have the right to alter, amend, omit, split or otherwise vary the quantum of work, by notice in writing to the contractor. The contractor shall carry out such variation in accordance with the rates specified in the contract so far as they may apply and where such rates are not available; those will be mutually agreed between ZEDA and the contractor.

5. INSPECTION DURING ERECTION:

The Engineer in Charge or his authorized representative (s) shall be entitled at all reasonable times to inspect and supervise and test during installation and commissioning. Such inspection will not relieve the contractor from their obligations under this contract. Material can be inspected before dispatch by the authorized representatives of ZEDA / beneficiary at the factory at the cost of the contractor, if desired.

6. COMPLETION OF WORK:

Time being the essence of contract, the installation of the SPV Power Plant shall be completed within 6 months time or as prescribed in the Work Order.

7. CONTRACTORS DEFAULT LIABILITY:

ZEDA may by written notice of default to the contractor, terminate the contract in circumstances detailed hereunder:

- (a) If in the opinion of the ZEDA, the contractor fails to complete the work within the time specified in the work order or within the period for which extension has been granted by ZEDA to the contractor.
- (b) If in the opinion of ZEDA, the contractor fails to comply with any of the provisions of this contract
- (c) In the event of ZEDA terminating the contract in whole or in part as provided in paragraph (a) above, ZEDA reserves the right to engage another contractor or agency upon such terms and in such a manner as it may deem appropriate and the contractor shall be liable to ZEDA for any additional costs or any losses caused to
- (d) In the event ZEDA does not terminate the contract as provided in paragraph (a) the contractor shall continue performance of the contract, in which case he shall be liable to ZEDA for penalty for delay as set out in this tender document until the work is completed.

8. FORCE MAJEURE:

The contractor shall not be liable for any penalty for delay or for failure to perform the contract for reasons of FORCE MAJEURE such as, acts of public, enemy, acts of government, cyclone, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes provided that the contract, shall within 10 (ten) days from the beginning of such delay notice the ZEDA in writing of the cause of delay. ZEDA shall verify the facts and

grant such extension as facts justify.

9. REJECTION OF WORKS:

In the event of any of the material supplied/ work done by the contractor is found defective in material or workmanship or otherwise not in conformity with the requirements of this contract specifications, ZEDA shall either reject the materials/work(s) or advise the contractor to rectify the same. The contractor on receipt of such notices shall rectify or replace the defective material and rectify the work, free of cost. If the contractor fails to do so, the following actions may be taken by ZEDA.

- a) At its option, ZEDA may replace or rectify such defective materials or work, and recover the extra cost so involved from the contractor, plus fifteen percent service charges of the cost of such rectification from the contractor and/ or terminate the contract for balance work/ supplies with enforcement of penalty as per contract
- b) Defective materials/ workmanship will not be accepted under any conditions and shall be rejected outright without compensation. The contractor shall be liable for any loss/ damage sustained by ZEDA due to defective work.

10. EXTENSION OF THE TIME:

If the completion of installation is delayed due to any reason beyond the control of the contractor, the contractor shall without delay give notice to the ZEDA in writing of his claim for an extension of time. ZEDA on receipt of such notice may agree to extend the contract/delivery date of the SPV Power Plant as may be reasonable but without prejudice to other terms and conditions of the contract.

11. WARRANTEE PERIOD:

The workmanship shall be warranted for a period of five years from the date of commissioning of the power plants. In case of T-Gel Battery, they must be warranted for a period of five years and in case when Lithium base batteries are supplied they must be warranted for a period of 15 years from the date of commissioning of the solar plants.

Any defect noticed during this period should be rectified by the supplier free of cost upon written notice from ZEDA provided such defects may be due to bad workmanship or bad materials used. The warranty period shall be extended by the period during which the plant remains non operative due to reasons within control of the contractors. Care should necessarily be taken to make the SPV Power plant operational, once the reporting of the fault/non operational status is done, within a week. If the Power Plant is not made operational within fifteen days ZEDA may rectify the same at the cost of tenderer.

12. TERMS OF PAYMENT:

Subject to any deduction which the Purchaser may be authorized to make under this contract, and or to any additions or deductions provided for in this contract, the contractor shall be entitled to payment as follows:

- All payments shall be made in Indian Rupees, and will be governed by the availability of fund from the state government.
- 100% of the contract value shall be paid to the contractor after completion of installation and commissioning.

- An amount equivalent to 5% (five percent) of contract value (excluding O & M charges) minus the earnest money (if already deposited) shall be recovered from each payment which shall be kept as security deposit against performance guarantee.
- Applicable TDS on GST and income tax shall be deducted from each payment as per norms.
- 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, from the contractor from his/its assets/amount due against Performance Guarantee.

13. PENALTY FOR DELAY IN COMPLETION OF CONTRACT:

If the contractor fails to complete the erection, testing and commissioning etc, within the phased time schedule specified in the work order or any extension granted there to, ZEDA will recover from the contractor as penalty a sum of two percent (2.0%) at the contract price of the uncompleted portion of the work for each calendar week of delay or part thereof. For this purpose, the date of taking over shall be reckoned as the date of completion. The total penalty shall not exceed 10% (ten percent) of the contract price.

14. SECURITY DEPOSIT (SD):

5% of the contract value excluding O&M charges shall be retained as SD during the warrantee period. No interest shall be payable on the Security Deposit. The amount deposited as EMD may also be converted into SD after agreement is done with ZEDA. Half of the security deposit for each site will be release after the expiry of two years from the date of commissioning and another half will be release after the completion of O&M period.

15. INSURANCE:

The contractor shall arrange insurance coverage for the materials at his custody for the work under execution as per the conditions laid down in the relevant clause of the technical specification. The contractor shall take up insurance or such other measures for the manpower so as to cover the claim for damage arising under workmen's compensation Act and other applicable State/ Central laws. ZEDA shall not bear any responsibility on this account

16. PENALTY DUE FROM THE CONTRACTOR:

All costs of damages for which the contractor is liable to the ZEDA will be deducted from any money due to the contractor including the security deposit.

17. CONTRACTOR'S RESPONSIBILITY:

Notwithstanding anything mentioned in the specifications of subsequent approval or acceptance of the SPV Power Plant by ZEDA, if any, the ultimate responsibility for satisfactory performance of the entrusted work/ plant shall rest with the contractor.

18. RESPONSIBILITY TO RECTIFY THE LOSS AND DAMAGE:

If any loss or damage occurs to the work or any part thereof or materials/ plant/ equipments

for incorporation therein the period for which the contractor is responsible for the cause thereof or from any cause whatsoever, the contractor shall at his own cost rectify/ replace such loss or damage, so that the permanent work confirms in every respect with the provision of the contract to the satisfaction of the Engineer. The contractor shall also be liable for any loss or damage to the work/equipments occasioned by him in course of any operation carried out to him during performing the contract.

19. RESPONSIBILITY TOWARDS THE WORKMAN OR OUTSIDERS:

ZEDA, will, in no case be responsible for any accident fatal or non-fatal, caused to any workman or outsider in course of transport or execution of work. All the expenditure including treatment or compensation will be entirely borne by the contractors. The contractor shall also be responsible for any claims of the workers including PF, Gratuity, ESI & other legal obligations.

20. NON-ASSIGNMENTS:

The contractor shall not assign or transfer the work orders issued as per this contract or any part thereof without the prior approval of ZEDA.

21. CERTIFICATES NOT TO AFFECT RIGHTS OF ZEDA:

The issuance of any certificate by ZEDA or any extension of time granted by ZEDA shall not prejudice the rights of ZEDA in terms of the contract nor shall they relieve the contractor of his obligations for due performance of the contract.

22. SETTLEMENT OF DISPUTES THROUGH ARBITRATION:

- i. Except as otherwise specifically provided in the contract, all disputes concerning questions of fact arising under the contract shall be decided by the Managing Committee of ZEDA provided a written appeal by the contractor is made to ZEDA. The decision of the Managing Committee, ZEDA shall be final and binding to the all concerns.
- ii. Any dispute or difference including those considered as such by only of the parties arising out of or in connection with the contract shall be to the extent possible be settled amicably between the parties. If amicable settlement cannot be reached then all disputed issues shall be settled by arbitration.

23. LAWS GOVERNING CONTRACT:

The contract shall be constituted according to and subject to the Laws of India and jurisdiction of the Gauhati High Court, Aizawl Bench.

24. LANGUAGE AND MEASURES:

All documents pertaining to the Contract including specifications, schedules, notice correspondences, operating and maintenance instructions, drawings or any other writings shall be written in English OR Mizo language. The metric system of measurement shall be used in this contract.

25. CORRESPONDENCE:

- i. Any notice to the contractor under the terms of the contract shall be served by registered mail to the registered office of the contractor or by hand to the authorized local representative of the contractor and copy by post to the contractor's principal place of business.
- ii. Any notice to ZEDA shall be served to the Director, ZEDA, Aizawl in the same manner.

- 26. SECRECY:**
The contractor shall treat the details of the specifications and other documents as private and confidential and they shall not be reproduced without written authorization from ZEDA.
- 27. AGREEMENT:**
The successful contractor shall have to enter into an agreement with the concerned Engineer in charge in the approved contract agreement form within 7 days of the receipt of call from ZEDA.
- 28. TENDER EVALUATION CRITERIA:**
Offer of only those parties who are found qualifying based on Technical Evaluation Criteria will be taken into further consideration and prices of only those parties qualifying based of these criterion will be opened. Other things being equal, the lowest rates shall normally be preferred.
- 29 COMMERCIAL:**
Earnest Money Deposit and Tender Document Fee (if the tender document is downloaded from website) in the prescribed form should be submitted along with the tender.

SECTION - IV
TECHNICAL SPECIFICATIONS

1. SPV Modules

Existing Solar PV modules on the rooftop of the Secretariat Building are to be utilized for the purpose of installation.

2. Module Mounting Structures (MMS):

Existing Module mounting structures are to be used. Tenderers should visit the site and make design accordingly. However, the strength of the existing MMS should be tested and make modifications as required.

3 Junction Boxes for Cables from Solar Array:

The junction boxes shall be made up of FRP (Hensel or equivalent make)/PP/ABS (with prior approval of ZEDA) with dust, water and vermin proof. It should be provided with proper locking arrangements.

- (a) Array Junction Box (AJB): All the arrays of the modules shall be connected to MJB/DCDB through AJB. AJB shall have terminals of bus bar arrangement of appropriate size Junction boxes shall have suitable cable entry with suitable glanding arrangement for both input and output cables. Suitable markings on the bus bars shall have to be provided to identify the bus bars etc. **suitable ferrules shall also have to be identify interconnections. Every AJB should have suitable arrangement Reverse Blocking diodes(Schottky diode of suitable rating with respect to the capacity of array) connected in such a manner that the diode is mounted on a prpoper heat sink so as to increase the life of diode. Suitable MOV has to be installed in AJB for protection purposes.** If, in any case Schottky diode & MOV are installed in the PCU, then also it should be installed in AJB. Each AJB should preferably not have more than four array inputs. Cable interconnection arrangement shall be within conduit pipe on saddles installed properly as per ZEDA's instructions. Cable connection should be done in such a manner that fault findings if any, can be identified easily. AJB should also be marked as A1, A2, & so on. Wherever conduits are laid on roof or ground, then it should be installed on cable tray or appropriate civil structure which should be at least four inches above roof / ground level.
- (b) Main Junction Box (MJB) (Required in systems of capacity more than 2KW): In MJB the terminals shall be of copper bus-bar arrangement of appropriate size Junction boxes shall have suitable cable entry with suitable glanding arrangement for both input and output cables. Suitable markings on the bus bars shall have to be provided to identify the bus bars etc. **suitable ferrules shall also have to be provided to identify interconnections.** Cable interconnection arrangement shall be such that the faulty array, if any, could be identified easily. MJB shall be installed at suitable place near Array. **Inter connections from AJBs to MJB should be clearly marked, for example "from A1" & so on. Appropriate crimping tools should be used for crimping of lugs/ connectors to the cables.**

4. POWER CONDITIONING UNIT (PCU):

4.1 Main Features of the PCU:

PCU should be a combined unit comprising of inverter, charge controller, visual display and necessary protections.

- It should be Industrial grade bidirectional Inverter
- It should have Integrated P V Charger Controller.
- It should be rated for continuous operation at full load.
- It should have Programmable battery management parameters.
- It should have Temperature compensated battery charging.
- It should have solar priority grid charging.
- It should Automatic restart after over load triggered shutdown.
- It should have Continuous battery life and state of health monitoring.
- It should have Integrated data and fault logging
- It should have Communication with external SCADA/network/PC
- It should All parameters are software configurable
- It should have facilities like Remote diagnostics, monitoring and reporting via Internet and GSM.
- The PCU should be equipped with a data logger for collecting & recording the hourly data of grid status particular voltage & frequency.
- PCU should have provision for PCU bypass arrangement so as to cater load directly through grid, in case of PCU failure.
- There should be emergency stop switch on the front panel of PCU

4.2 Specification:

Switching elements	IGBT (for > 6KVA)/MOSFET(for <16 KVA)
Type of Charger	MPPT
Nominal Inverter Capacity	10 KVA
Nominal Array Capacity	10 kWp
MPPT Range	AS APPLICABLE
Battery nom Volt	Site specific
Inverter Surge Rating @ 40 deg C	105 % > 60 sec
	150 % > 30 sec
	200 % > 5 sec
Inverter Output Voltage	230V +/-2% for single phase / 415V+/-2% for three phase
Inverter Output Frequency	50 +/-0.5%
Grid Voltage	230 V +/-5%
Grid Frequency	50 Hz (Range 48 to 51 Hz)
Inverter THD	<3%
DC Ripple	<3%
Dielectric strength	1.1 KV between input/output and ground with EMI protections removed.
Inverter Efficiency @ 40 deg C, nominal load	>90%

Operating Ambient Temperature	0 to 50 deg C
Humidity	95% max. Non condensing
Enclosure	Free standing, IP 21 , Epoxy powder coated
Cooling	Temperature controlled fan forced

Protections	1. Short Circuit 2. Overload 3. Over Temperature 4. Over Voltage 5. Lightning 6. Phase imbalance (in case of three phase output) 7. Reverse polarity
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4.3 OPERATION

The MPPT Charger should be a PWM DCDC converter which should power the DC bus from the PV array. The microprocessor control circuit should automatically adjust the DC-DC converter to ensure that it should always match to the PV array under varying conditions and transfers the maximum possible power. The battery bank should get charged from this DC bus, the charging rate and other parameters being controlled by the supervisory circuit. A bidirectional inverter should sit between the DC and the AC bus. The DC power should be converted to AC. The PCU should have the provision for connecting to a dedicated load. If the grid is absent or goes out of range the inverter should not interrupt supply. If PV power is available it should be directed to the load and the excess power shall be used for charging the batteries. So the power from the Solar is not wasted. The Inverter should be programmed for solar priority mode of operation. This means that the maximum use be made of the solar energy. Grid power should be used only when the batteries are over discharged or sufficient solar energy is not available from the PV array. If disengaged from the grid battery should keep supplying the power to the dedicated load, ensuring uninterrupted supply. The PCU should have following feature:

- If the load connected to PCU is more than the solar power being generated at any instance, during sunny hours then the load should first consume maximum solar power & balance power required by the connected load should be drawn from the grid power.
- There should be emergency stop switch on front panel.
- There should be provision of bypass arrangement available in PCU. Bypass means that power supply from the grid to the connected load can be bypassed from the PCU, in case PCU goes out of order.

4.4 PROTECTION & SAFETY:

Specifically the inverter should be a single/three phase static solid state type power conditioning unit. Both AC & DC lines shall have suitable MCB/MCCB and contractors to allow safe start up and shut down of the system. PCU should have protections for overload, surge current, high Temperature, over/ under voltage and over/ under frequency & reverse polarity. The complete operation process & safety instructions should printed on the sticker & suitably pasted on the PCU.

The inverter shall have provision for input & output isolation (automatic & manual). Separate price should be quoted for Spare Control Cards (for inverter as well as solar charge controller) & other necessary parts as recommended by the manufacturer which can be purchased for any immediate requirement. Each solid state electronic device shall have to be protected to ensure long life of the inverter as well as smooth functioning of the inverter. Inverter should have safety measures to protect inverter from reverse short circuit current due to lightening or line faults of distribution network.

5. BATTERY BANK:

- (1) The battery bank capacity shall be of different capacities as specified in the price schedule, of T-Gel and Lithium Ferro-phosphate (LiFePO₄) Battery. The general specifications shall be as under:
 - (A) The battery bank shall consist of required number of deep discharge electrochemical storage cells, suitably interconnected as required. Parallel connections of storage cells will be discouraged.
 - (B) The cells shall be capable of deep discharge and frequent cycling with long maintenance intervals and high coulombic efficiency. Automotive or car batteries shall not be accepted.
 - (C) The nominal voltage and capacity of the storage bank shall be selected and specified by the supplier in the bid.
 - (D) The self discharge rate of the battery bank or individual cell shall not exceed four (4) percent per month.
 - (E) The permitted maximum depth of discharge (DOD), shall be specified by the supplier in the bid. Supplier should also specify the expected life of the Battery bank.
 - (F) The cells shall include explosion proof safety events.
 - (G) The cells shall include the required number or corrosion resistant inter-cell required chemicals electrolyte packed in separate containers. Full instructions and technical details shall be provided for electrolyte filling and battery recharging at site for the first time.
 - (H) The cells shall preferably be supplied in dry charged condition, complete with all required chemicals electrolyte packed in separate containers. Full instructions and technical details shall be provided for electrolyte filling and battery recharging at site for the first time.
 - (I) Suitable number of corrosion resistant and acid proof storage racks shall be supplied to accommodate the cells. The rack design shall be such that minimum space is required, without any way obstructing the maintenance requirements. For metallic racks, standards specified for control panel enclosures and other metallic shall govern.
 - (J) All the connectors should be insulated except for the end portions.
 - (K) All technical and other details pertaining to the storage cells shall be supplied

including but not limited to the following:

- (i). Rated voltage and ampere hour capacity of each storage cell as the rated discharge rate.
- (ii). Permitted maximum DOD.
- (iii). Self discharge rate.
- (iv). Cycle life of the storage cell and the anticipated life (in years) of the battery bank.
- (v). Total number of storage cells in use.
- (vi). Details on cell interconnections, if any. All the connectors should be insulated except at both ends from where the connectors are connected to battery terminals.

Every cell should have proper numbering marked clearly for its identification. Only pre-insulated connectors should be used.

- (2) Battery Rack: Battery rack should be of matured treated salwood, single tier or two tier (if required), duly painted. Placement of battery should be such that maintenance of the battery could be carried out easily. **The non reactive acid proof mat should be provided to cover the entire floor space covering the battery rack. Battery rack should compulsorily be placed on the appropriate rubbers pads to avoid the contact of wooden racks with the floor, to protect wooden rack particularly from termite.**

6. **LIGHTNING AND OVER VOLTAGE PROTECTION:**

The SPV Power Plant should be provided with lightning and over voltage protection. The principal aim in this protection is to reduce the over voltage to a tolerable value before it reaches the PV or other subsystems components. The source of over voltage can be lightning or any other atmospheric disturbance. The Lighting Arrestor (LA) is to be made of 1¼" diameter (minimum) and 12 feet long GI spike on the basis of the necessary meteorological data of the location of the projects. Necessary foundation for holding the LA is to be arranged keeping in view the wind speed of the site and flexibility in maintenance in future. Each LA shall have to be earthed through suitable size earth bus with earth pits. The earthing pit shall have to be made as per IS 3043. LA should be installed to protect the array field, all machines and control panels installed in the control rooms. Number of LA shall vary with the capacity of SPV Power Plant & location. The LA installations should be got approved from ZEDA prior to installation.

7. **EARTHING PROTECTION:**

Each array structure of the PV yard should be grounded properly. In addition the lightning arrester/masts should also be provided inside the array field. Provision should be kept for shorting and grounding of the PV array at the time of maintenance work. All metal casing/shielding of the plant should be thoroughly grounded in accordance with Indian Electricity Act/IE rules as amended up to date. Each Resistance should be tested in presence of the representative of ZEDA after earthing by calibrated earth tester. The tenderer shall make testing arrangements.

8. DC DISTRIBUTION BOARD (DCDB):

This shall consist of suitable powder coated metal casting. In this box a separate arrangement which shall consist of MCCBs of suitable specifications & which can withstand respective flow of current, with the purpose of providing the option for isolating the battery bank & SPV arrays should be made. There shall be copper bus bars of suitable rating. Proper rating HRC fuse & MCCB/Isolator for DC application should be suitably installed in DCDB as battery bank isolator. Best quality Ah meter has to be installed to measure the cumulative charging & discharging status of battery bank. In DC circuits AC MCB or MCCB shall not be permitted.

9. AC DISTRIBUTION BOARD (ACDB):

This shall consist of box of suitable powder coated metal casting. One feeder per phase shall be provided in ACDB with MCB of suitable capacity installed at each feeder in the ACDB. One Electronic Energy Meter, ISI make, Single / Three Phase, of good quality shall also be installed in ACDB suitable placed to measure the consumption of power from SPV Power Plant. Proper rating MCB shall be installed at every feeder (in case of single phase output also, there shall be three feeders) to protect feeders from the short circuit current as per the requirement of the site & instructions of ZEDA. A separate dedicated feeder from conventional line to PCU as well as ACDB should also be installed, as per ZEDA's instruction. A separate change over switch of proper rating should also be suitably installed in the ACDB to isolate the existing connected load from the Solar System & cater the power to the existing load from conventional power (Mains), in case of emergency. ACDB should be connected between PCU & Load. Separate Electronic Energy Meters should be installed for incoming and outgoing circuits of ACDB for each of the SPVPPs.

10. BATTERY PROTECTION PANNEL (BPP):

This shall consist of box of suitable powder coated metal casting. BPP should be installed to make provision to isolate the battery bank. Proper rating HRC fuse & MCCB/Isolator for DC application should be suitably installed. BPP should be connected between Battery Bank & DCDB.

11. DANGER BOARDS:

Danger boards should be provided as and where necessary as per IE Act/IE Rules as amended up to date, as per the instructions of ZEDA & affixed at various appropriate locations.

12. CABLES/WIRE:

All cables should be of copper as per IS and should be of 650V/1.1 KV grade as per requirement. All connections should be properly made through suitable lug/terminal crimped with use of suitable proper cable glands. The size of cables/wires should be designed considering the line losses, maximum load on line, keeping voltage drop within permissible limit and other related factors. The cable/wire should be of ISI/ISO mark for overhead distribution, with prior approval of ZEDA. For normal configuration the minimum suggested sizes of cables are:

Module to module/SJB/AJB	4 sq mm (single core)
AJBs to MJBs/DCDB	10/16 sq mm (two cores) wrt current rating
MJBs to DCDB	Minimum 25 sq mm (single core) or as per design and rating
DCDB to PCU	Minimum 25 sq mm (single core) or as per design and rating
Battery to BPP if any	Minimum 25 sq mm (single core) or as per design and rating

BPP to DCDB if any

Minimum 25 sq mm (single core) or as per design and rating

PCU to ACDB

As per design & ratings

13. JUNCTION BOXES:

Junction Boxes (SJB / AJB) shall be mounted on poles of array support structure. The junction boxes should be made of FRP (Hensel or equivalent make, with prior approval of ZEDA). It should be provided with proper locking arrangements.

14. COMPREHENSIVE ANNUAL OPERATION & MAINTENANCE:

Comprehensive Annual Operation & Maintenance contract of SPV Power Plants along with the Power Distribution Network system of solar system installed at various rooms have to be done. Terms & conditions of the rates quoted should be specifically mentioned otherwise the rates quoted shall be considered on the terms & conditions of ZEDA.

SCHEDULE – I

PAST EXPERIENCE

From :
Tenderer's Name & Address –
To,

The Director
ZEDA
Mizoram Aizawl.

Subj : Performance / past experience.

Dear Sir,

We furnish herewith the record of our performance and experience as follows :-

Sl. No.	Purchaser's Name & Address	Order No. & Date	Ordered Quantity	Qty.supplied (Nos)	Value of Order
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PLACE :

SIGNATUR OF TENDERER

DATE :

NAME IN FULL
DISIGNATION / STATUS
FIRM / COMPANY SEAL

NOTE : Photocopy of the orders & performance reports received from other State Agencies / Govt. Undertakings etc. should be produced, if required.

Sl. No.	GENERAL INFORMATION ABOUT THE TENDERER	
1.	Name of the Company/ Firm	
1.a	Postal Address	
1.b	Telephone/Fax no	
1.c	E-mail address & URL	
2.	Type of Company	
	Attached Proof of Company Registration along with a copy of the Partnership Deed / Article of Association and Memorandum of Understanding Proprietorship / Partnership/ Private Limited / Public Limited	
3.	Name and designation of the representative of the tenderer to whom all reference shall be made to expedite technical coordination	
4.	Name and address of the Indian / Foreign Collaborator(s) if any.	
5.a	Details of Technical Staff available	
5.b	Details of workmen on muster roll Skilled / semi-skilled / unskilled.	
6.	List of components sourced from outside / other agencies	
7.	Details of Marketing network of the company	
	* No. of marketing personnel	
	* No. of dealers in the state	
	(A list with contact information be enclosed)	
8	Details of previous work experience with ZEDA, if any	
	* Systems supplied/installed under ZEDA/MNRE scheme	
	* Systems supplied / installed without ZEDA/MNRE Scheme	
	Details be appended with the application)	
9,	Has the company/firm to pay arrear of income tax? If yes up to hat amount	
10.	Has any Govt. Dept./Under-taking ever debarred the company / firm from executing any work?	
11.	Reference of any other information attached by the company (give details of attachment)	

(Sign. & Seal of the Tenderer)

SECTION-V

(A). PRICE BID (With T.Gel Battery)

Sl. No	Item Description	Rate in Rs (Including GST)	Quantity (No/ Lot/ Set/ LS)	Amount in Rs (Including GST)
1	Supply of 10KVA Solar Power Conditioning Unit (PCU)/ Inverter with 120V DC input, Single Phase 230V AC output of pure sine wave with minimum of 98% efficiency with 5 years warranty			
2	Supply of ACDB and DCDB of required sizes with 5 years warranty			
3	Supply of Array Junction Boxes (AJB) and Main Junction Boxes of required sizes and specification with 5 years warranty			
4	Supply of battery bank of 120V 800AH T-Gel Battery (60 numbers 2V 800AH) with 5 years warranty			
5	Lightning Arrestors and earthing along with earthing strips and pits as per site requirement			
6	Interconnecting cables as per site requirements and sizes as per technical specifications			
7	Supply of materials for internal electrification of dedicated solar power lines including pipes/ conduits and cables, switches, plugs etc as per room requirements			
8	Integration, installation and commissioning			
9	Annual maintenance for a period 5 years			

(Rupees in Words)

Signature of the Tenderer/ Bidder

SECTION-V

(B). PRICE BID (With LiFePO₄ Battery)

Sl. No	Item Description	Rate in Rs (Including GST)	Quantity (No/ Lot/ Set/ LS)	Amount in Rs (Including GST)
1	Supply of 10KVA Solar Power Conditioning Unit (PCU)/ Inverter with 120-128V DC input, Single Phase 230V AC output of pure sine wave with minimum of 98% efficiency with 5 years warranty			
2	Supply of ACDB and DCDB of required sizes with 5 years warranty			
3	Supply of Array Junction Boxes (AJB) and Main Junction Boxes of required sizes and specification with 5 years warranty			
4	Supply of battery bank of 120-128V, 400AH LiFePO ₄ with 15 years warranty			
5	Lightning Arrestors and earthing along with earthing strips and pits as per site requirement			
6	Interconnecting cables as per site requirements and sizes as per technical specifications			
7	Supply of materials for internal electrification of dedicated solar power lines including pipes/ conduits and cables, switches, plugs etc as per room requirements			
8	Integration, installation and commissioning			
9	Annual maintenance for a period 5 years			

(Rupees in Words)

Signature of the Tenderer/ Bidder