

h) Inter-panel/ inter-row distances with allowed tolerances; and

i) Lightning protection for PV array.

j) Safety precautions to be taken.

- The array structure shall support SPV modules at a given orientation and absorb and transfer the mechanical loads to the rooftop column properly. Detailed design and drawing shall be submitted to CSL for acceptance and approval before execution of work.

### **SURGE PROTECTION AND EARTHING**

- The system should have installed with Surge Protection Device (SPD) for higher withstand of the continuous PV-DC voltage during earth fault condition. SPD shall have safe disconnection and short circuit interruption arrangements through integrated DC in-built bypass fuse (parallel) which should get tripped during failure mode of MOV, extinguishing DC arc safely in order to protect the installation against fire hazards. The SPD should be provided in the AC Distribution Box as well.

#### **Earthing for PV Array:**

- The PV module, BOS and other components of power plants require adequate Earthing for protecting against any serious fault.
- The Earthing for array and LT power shall be made as per the provisions of IS:3043.
- Necessary provision shall be made for bolted isolating joints of each Earthing pit for periodic checking of earth resistance.
- Each String/Array and MMS of the plant shall be grounded properly. The array structure has to be connected to earth pit as per IS standards. Necessary provisions shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
- The complete earthing system shall be mechanically & electrically connected to provide independent return to earth.
- For each earth pit, a necessary test point shall be provided.
- The bidder shall submit the detailed specification for the Earthing arrangements.

### **LIGHTNING PROTECTION FOR PV ARRAY**

- Lightning protection system meets necessary standards should be installed to protect PV array from Lightning.
- Grounding (earthing) of lightning protector should be as per relevant IS standards.
- If necessary, more numbers of lightning conductors may be provided.
- The bidder shall submit the drawing and detailed specifications of the PV Array lightning protection system.

## **AC DISTRIBUTION PANEL BOARD**

AC Distribution Panel Board (DPB) shall control the AC power from inverter and should have necessary surge arrestors.

An ACDB panel shall be provided in between PCU and Utility grid. It shall have MCB/MCCB/ACB or circuit breaker of suitable rating for connection and disconnection of PCU from grid.

The connection between ACDB and Utility grid shall be of standard cable/ Conductor with suitable termination. It shall have provision to measure grid voltage, current and power.

The ACDB incomer shall be four (4) pole MCCB with thermal over current and earth fault releases. The incomer shall be selected at required rating.

## **DC DISTRIBUTION BOARD**

- DC bus/ cable which can handle the current and the voltage of inverter output safely with necessary surge arrester as per the relevant IS standards.
- DC panel should be equipped with an adequate capacity indoor DC circuit breaker along with control circuit, protection relays, fuses, annunciations and remote operating and controlling facility from the main control facility.
- DCDB shall have sheet from enclosure of dust and vermin proof, the busbar/ cables are to be made of copper of desired size. DCDB shall be fabricated to comply with IP 65 protection.

## **CABLES, SWITCHES AND GENERAL REQUIREMENTS**

- PVC insulated copper cables with current rating suitable for AC and DC as per the National Electric Code, and meeting:
  - a) General Test and Measuring Method as per IEC 60189/ IS 694
  - b) PVC insulated cables for working voltages up to 1100 V and UV resistant for outdoor installation as per IEC 60502/ IS 1554 (Pt. I & II)
- Cable Marking: All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified.
- Switches/ circuit breakers/ connectors meeting general requirements and safety measurements as per IS 60947 Part I, II, III and EN 50521 for AC/DC.
- Junction boxes, enclosures for inverters/ charge controllers shall meet IP 54 (for outdoor)/ IP 21 (for indoor) as per IEC 529.

## **AC/DC WIRING**

- Before submitting the tender, actual measurement of cables required for wiring from AC output of inverter/PCU to load point should be calculated and this work is also included in the tender. The actual cable required from module to DC distribution board and DC distribution board to inverter input should be calculated and this work should be done as a part of Solar Power Plant installation. Separate drawings for exclusively for the AC/DC Wiring should be provided.

## **NET METERING AND UTILITY INTERCONNECTION**

- Net metering equipment (an Import-Export Energy Meter) approved and tested by the electrical utility based on the accuracy class required for the proposed capacity of the system must be provided with the necessary data cables if required.
- Net Metering and Utility Interconnection should be accomplished according the Kerala State Electricity Regulatory Commission (Grid Interactive Distributed Solar Energy Systems) Regulations 2014 Clauses (8) & (9) (Notification No. 2096/KSERC/CT/2014 dt. 10<sup>th</sup> June 2014)

## **INTER CONNECTION OF INVERTER OUTPUT WITH UTILITY GRID**

- The interconnection of load with inverter output should be done after obtaining permission from Electrical Inspectorate if required and KSEBL.
- The plan scheme and drawing related to interconnection details should be submitted to Electrical Inspectorate through a licensed Electrical contractor if required.
- Licensed contractor has to be engaged for preparation of plan scheme to be submitted to the Kerala State Electricity Board and necessary fee should be remitted for Energisation of Solar Power Plant and same will be reimbursed by CSL by producing the original invoice.
- The panel board and distribution board required for AC interconnection should be done as per specification/ instruction from Engineer in charge.
- All the electrical works required for the interconnection of load with inverter output should be done by the successful bidder as a part of the Solar Power Plant installation.
- Bidder should visit the actual site and ensure the exact place for providing Solar Modules and Inverter etc. in presence of technical representative from the CSL.
- Net Metering Equipment shall be installed and maintained in accordance with the provisions of The Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 as amended from time to time. The Contractor shall maintain the Metering System as per metering code and CEA guidelines. The defective meter shall be immediately tested and calibrated.
- The accuracy class of the Net Metering Equipment will be selected so that all levels of energy produced or taken by the Solar Power Plant will be measured accurately, and

this equipment has applicable accuracy class. Net Metering Equipment shall be microprocessor based conforming to the relevant IEC standards with Advanced Metering Infrastructure (AMI) with RS232 cable facility.

- Net Metering Equipment shall measure active energy (both import and export) and reactive energy (import) by 3 ph, 4 wire principle suitable for balanced / un-balanced 3 phase load (With KVAR, KWh, KVA measuring registers). Tri-vector based energy meter shall have an accuracy class of energy measurement of at least Class 0.2 for active energy and at least 0.5 Class for reactive energy according to IEC 60687.
- Display parameters: LCD test, KWH import, KWH export, MD in KW export, MD in KW import, Date & Time, AC current and voltages and power factor (Cumulative KWH will be indicated continuously by default)

## **WARRANTY**

- 5 years warranty should be provided by the supplier for the system and components or part of the system has to be provided as per the special conditions of the contract.
- PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90 % at the end of 10 years and 80% at the end of 25 years
- The Warranty Card to be supplied with the system must contain the details of the system supplied.

## **OPERATION MANUAL**

An Operation, Instruction and Maintenance Manual, in English and Malayalam should be provided with the system.

The following minimum details must be provided in the manual:

- a) About solar power plant – its components and expected performance.
- b) About PV module
- c) About electronics
- d) About charging and significance of indicators
- e) DO's and DON'T's
- f) Clear instructions on regular maintenance and troubleshooting of solar power plant
- g) Name and address of the contract person in case of non-functionality of the solar power plant.

## **BILL OF MATERIAL**

The bidder should provide the bill of material mentioning the quantity of each of the item consisting in the system, along with the offer.

## **DISPLAY BOARD**

The logo of CSL and details of the scheme as specified in the work order.



## SITE INSPECTION

It is recommended that the bidders visit the site for the physical verification and for correctly estimating the quantity, especially related to structure and cabling, before submitting the bids. **Bidder must include all the AC/DC wiring cost only after visiting the proposed site.**

## ENGINEERING DRAWINGS

The bidder should submit and get the necessary approval of the following detailed Engineering Drawings before execution of the project:

- Single Line Diagram of the PV Power Plant.
- Detailed Plot Plan for the Deployment of PV Array.
- Schematic Diagram.
- Module Mounting Structure (Plan & Elevation).

## LIST OF APPROVED MAKES OF EQUIPMENTS AND MATERIALS

Sl No.	Item	Makes Of Equipments And Materials
1	SPV Panel	Emmvee/Tata power solar/Vikram solar/Warrie/BHEL/BEL/CEL/Adani solar only
2	Power Conditioning Unit (PCU)	SMA/ABB/Schneider/ Reffusol/Solar Edge/Delta Power solutions/Power one micro systems/Fronius/Growatt make only
4	Array Junction Boxes	Hensell/Spellsberg or equivalent of reputed make only
5	1.1 KV XLPE Cable	DC side cable: Lapp/ Hellukabel/ TKD only AC side cable: Lapp/ Hellukabel/ TKD/ Finolex/ Havells/ Polycab/Gloster only
6	Earthing & Lightning Protection	Cape, Erico, Furse, OBO, make only

For Cochin Shipyard Limited

  
Assistant General Manager (U&M)  
सेफुदीन ए एस/SAIFUDEEN A S  
वरिष्ठ प्रबन्धक/ Senior Manager  
कोचीन शिपयार्ड लिमिटेड  
Cochin Shipyard Ltd.  
कोच्ची / Kochi - 682 015

Signature and Seal of the Contractor(s)



## U&M DEPARTMENT

Annexure - 4

Tender No.: U&M/MRS/T/012/20-21

Date: 14.08.2020

### **SPECIAL TERMS & CONDITIONS**

1. **Validity:** The offer should be valid for a minimum period of 3 months from the date of tender opening.
2. **Earnest Money Deposited:** Rs. 10,500 (Rupees Ten Thousand Five hundred only)
3. **Tender Cost:** The quotation should be accompanied by Tender cost of Rs. 112/- (inclusive of GST). **The tender cost should not be combined with EMD and can be remitted in the form of demand draft.**
4. The quotations received without the required tender cost and EMD will not be considered at all.
5. **Completion Period:** The entire work should be completed and commissioning the system within 45 days after the mobilization period
6. **Mobilization Period:** 7 Days from the receipt and acceptance of work order
7. **Payment terms:** Payment will be released in three parts against submission of invoice in triplicate as follows:
  - a) 60% of the work order value will be released after receipt and acceptance of the entire quantity of materials at Samudrika, Panampilly Nagar .
  - b) Balance 40% of the work order value will be released only after energizing the solar plant and executing necessary agreements with KSEBL and completion of liaison works with CEA/ KSEBL/ Electrical Inspectorate.
8. **Security Deposit:** The successful bidder has to furnish a security deposit equal to 10% of the contract value within 15 days of receipt of the work order. This can be furnished in the form of Bank Guarantee from a nationalized bank as per CSL format/Demand draft drawn/ FDR endorsed in favour of Cochin Shipyard Ltd. The EMD can be adjusted towards security deposit at the request of the contractor.
9. **Performance Guarantee:** The contractor has to guarantee the work for satisfactory performance against defective workmanship/inferior quality of materials used for a minimum period of **TWO YEARS** from the date of commissioning of the system. Any defect developed during this period has to be rectified by the contractor at his own expenses. Towards the above guarantee, 10% of the order value (rounded off to next fifty rupees) deducted from the payment. The SD furnished by the contractor can be converted as performance guarantee on request
10. **Liquidated Damages:** In case any delay in works beyond the stipulated completion period, the contractor has to pay Liquidated Damage (LD) a sum equivalent to ½ % (half percentage) per

week or part of the week of the order value subjected to maximum of 10% of the order value. In case of reasons attributed to CSL, ie. Delay associated with KSEBL/CEA, site non readiness, non availability of power shutdown etc. LD can be waived proportionately.

11. Any violation of Safety rules by the contractor, Safety department will impose penalty of Rs 1000/- to Rs 5000/- depending on the gravity of violation. Action for debarring the contractor also will be taken in case of repeated violation. Any accident caused due to safety violation and any damage to the company property suitable penalty will be imposed by CSL including termination of contract, if required
12. **Transportation (to and fro)& storage clause** To and fro all materials under the scope of contractor. Loading, unloading and storage of all the material for the successful completion of all the materials is under the scope of the contractor.
13. **Quantity:** Quantities mentioned in the schedule of work are only approximate for arriving at LI value. The quantity may vary based on the actual quantity erected and commissioned at site.
14. **Agreement:**
  - a) The contractor has to execute an agreement in a stamp paper worth Rs.200/- within 10 days of receipt of work order for execution of work.
  - b) The contractor has to execute an agreement in a stamp paper worth Rs.200/- within 10 days after the successful commissioning of the solar power plants valid for five years warranty period as per CSL prevailing format.
15. Obtaining necessary approval from CEA/ Electrical inspectorate is under the scope of the contractor as applicable.
16. Late tenders, tenders with conditions and conditional rebates/discounts will be summarily rejected.
17. CSL reserves the right to reject any or all bids without assigning any reasons whatsoever and or based on the past unsatisfactory performance by the bidders at CSL/other PSE's/Government Departments. After issuing the work order, CSL reserves the right to terminate the contractor if the performance of the contractor is not found satisfactory. The decision of CSL regarding the same shall be final and conclusive.
18. Price bid (cover 3) of those contractors who have qualified technically and submitted EMD and the undertaking that Cover 3 does not contain any conditions (Annexure 13) shall only be opened on a later date after giving notice to the qualified bidders. Contractor should ensure that his quoted amount as per cover 3 is not mentioned anywhere in other documents, directly or indirectly. If any such mention is made the tender will become invalid and shall become liable for rejection.
19. All relevant points of the General Terms and Conditions of Contract Rules of Cochin Shipyard Ltd. are applicable to this contract in addition to General HSE Guidelines, Security Instructions & IMS Guidelines.



20. The contractors are to be strictly follow the make and model number specified in the tender. However CSL has the right to make minor changes in the specification/make/model number based on the improvement in the technology.
21. The contractors are to be strictly followed the make and technical details specified in the tender. However CSL has the right to make minor changes in the specification/make/model number based on the improvement in the technology.
22. The security of the items supplied is the responsibility of the contractor. Contractor has to make his own arrangement for keeping the items under safe custody. No storage space will be given by CSL.
23. Commissioning will be considered as completed when 9 kWp SPV power plant has been interconnected to the LT bus of the local grid & duly tested and proven.
24. Contractor shall indicate duration of all activities in activity chart in conformity with the overall schedule of project completion. Contractor shall submit the activity chart in form of Bar Chart which shall be discussed and finalized with CSL and same shall form part of order for progress monitoring.
25. During execution of work, contractor shall ensure that a responsible person with authority to take decisions is available at site. Such person deputed by contractor shall report to CSL Officer - in-charge for smooth execution and timely completion of work. Contractor shall be responsible for any misconduct / indiscipline by his employees or sub contractor. Contractor shall abide by instructions of CSL Officer - in-charge as given in this regard. Contractor shall submit the manpower chart with hierarchy that would be deployed at site for daily progress monitoring.
26. Utmost care shall be taken by contractor during installation of supporting structure. Contractor has to ensure that under any circumstances no water leakage occurs inside the workshop due to puncturing of roof sheets.
27. Contractor should take all necessary safety precautions while working on roof top during installation & other work. Contractor should provide proper personal protective equipment & other safety equipment to his work team. Contractor should ensure that safety gear such as safety belts, roof/ safety ladder/s, safety helmets etc., are used by his work team at all times during execution of work.
28. **Language:** All documents, instructions, catalogues, brochures, pamphlets, design data, norms and calculations, drawings, operation, maintenance and safety manuals, reports, labels, on deliveries and any other data shall be in English Language.
29. **Termination of Services of Contractor's Personnel:** In the event any of the contractor or his sub-contractors, personnel, agents, sub-agents, assistants, or other employees shall be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties or it is undesirable for any administrative reasons for such person to be employed, the contractor, if so directed, shall immediately remove' such person or persons from employment for this project thereon. Any person or persons so removed shall not again be employed in connection with this contract without the written permission of CSL. Any person so removed shall immediately be replaced by a qualified and competent substitute at the



contractor's cost and expenses. Should the contractor be requested to repatriate any person he shall do so and shall bear all costs and charges in connection therewith.

30. Bidders shall produce a Pre contract integrity pact in 200 Rs. stamp paper along with the tender in this regard as indicated in the **Annexure – 10**.
31. **Secrecy, Titles:** Maps, layouts and photographs of the unit/plant including its surrounding regions showing vital installation for national security of CSL country shall not be published or disclosed to the third parties or taken out of the country without prior written approval of the CSL and upon execution of confidentiality agreements satisfactory to the CSL with such third parties prior to disclosure.
32. The contractors shall have to sign in each page of the tender documents with official stamp as a token of his acceptance of the conditions stated therein.
33. The normal working time of the CSL is from 8.15 A.M. to 5.00 P.M on all weekdays and Saturdays with half an hour interval from 12.15 noon to 12.45 P.M. All Sundays, second Saturday and fourth Saturday are holidays. If the Contractor wishes to carry out the work beyond normal working hours and or on holidays, he should get specific approval from the Engineer-in-Charge for the same. Necessary supervision will be arranged by the department.
34. The Contractor must perform the work so that it meets the requirements of the project and applicable design, construction and other standards of Indian Electricity Rules, Electricity Acts of Central and State Governments and good modern International & Indian engineering principles and practices, which are defined as those practices, methods, and equipment, in effect at the time of performance of the work that are commonly used in electrical utility engineering.
35. **Customs Clearance:** Customs clearance, if any, of imported equipment shall be the sole responsibility of the contractor and no documentation shall be provided by CSL in this regard. All costs and expenses including port rent, demurrage, and warfare charges are deemed to be included in the contract price.
36. All the materials used shall be got approved by the Engineer in Charge deputed for the work before being used for the timely completion of the project.
37. The work should conform to relevant IEA and CEA regulation wherever necessary/applicable.

**Note: Bidder shall see the General Terms and Conditions pertaining to above aspects for full clarity**

**For Cochin Shipyard Limited**



**Assistant General Manager (U&M)**

सेफुदीन ए एस/SAIFUDEEN A S  
वरिष्ठ प्रबंधक/ Senior Manager  
कोचीन शिपयार्ड लिमिटेड  
कोचीन, केरल-682 015

**Signature and Seal of the Contractor (s)**

## **U&M DEPARTMENT**

### **GENERAL CONDITIONS**

1. Bid shall be submitted in the prescribed form in the tender at the office of the Assistant General Manager (U&M), Utilities & Maintenance Department, Cochin Shipyard Limited, Perumanoor P.O, Kochi – 682 015, Kerala at the designated tender box.
2. In the case of tenders floated in news papers, all corrigenda, addenda, amendments and clarifications to tender specifications will be hosted in the website [www.cochinshipyard.com](http://www.cochinshipyard.com) and not in the newspaper. Bidder shall keep themselves updated with all such developments from CSL web site till the last date and time of submission of tender. However it is advised to contact the officer-in-charge of the work for any clarifications before the due date of the tender.
3. The bidders are expected to inspect the site to know the nature of work and site condition with prior intimation to the officer in charge. Bidders can contact officer-in-charge of the work which is indicated in the tender document for any clarification before submitting the offer.
4. The bidders are expected to familiarise himself, labour situation, wages and benefits applicable to labours, working hours, prior to quoting the rates. The submission of a bid by bidder implies that he has made himself aware of all the above situations and conditions. Any subsequent claim on this account will not be entertained.
5. All taxes, duties, transportation and insurance etc applicable should be included in the rate quoted, unless specified otherwise. CSL reserves the right for the deduction of taxes and duties as applicable from the bill or invoice.
6. Bidders to note that no advance payment will be made by CSL against work order/ supply order issued.
7. Tender documents issued are not transferable. Tender documents issued/downloaded shall be submitted wholly without altering any part.
8. The bidder shall not have been debarred / black listed by CSL or by any of the Public Sector Undertaking or Government department etc. Bidders shall produce a self declaration in this regard as indicated in the annexure 11.
9. Cost of Tender Form: Rs. 100/- + GST (12%)
10. Cost of the tender form shall be in the form of DD drawn in favour of Cochin Shipyard Ltd and shall be submitted along with the bid.  
Price bid of only those contractors, who have submitted the proof of remittance of EMD, Cost of Tender documents shall only be opened. The tender cost should not be combined with EMD.
11. Order dated 23<sup>rd</sup> March 2012, from Ministry of MSME, pertaining to Public Procurement Policy is applicable for this Tender. MSME bidders have the following benefits:
  - A. For all the Firms who are registered with District Industries Centre and come under the category of Micro & Small Enterprises holding a valid EM Part II certificate or Udyog Adhaar certificate, the following benefits are extended.
    - i. Tender forms shall be issued free of cost.
    - ii. Payment of Earnest Money Deposit (EMD) is exempted.



- B. For all the Firms who are registered with NSIC and come under Micro & Small Enterprises holding a valid NSIC certificate, the below benefit is also extended in addition to 'A' above.
- C. Waiver of Security Deposit (SD) for the performance of the contract (10% of the order Value by the way of Bank Guarantee till the supplies are completed). However to ensure performance of the item during the guarantee period a Performance Bank Guarantee (PBG) (10% of the Order Value by the way of Bank Guarantee) to be submitted by the firm as applicable.
12. Bidders are to carefully go through the tender documents and shall agree to CSL terms and conditions, specifications, scope of work etc and quote their offer accordingly. All the pages of tender documents shall be signed and duly sealed by the bidder as a token of the acceptance of conditions stated therein.
13. Bidders shall quote total amount in figures and in words. Corrections and additions if any must be attested/ duly signed by the bidder. In the case of error in multiplication/addition in amount calculated, the rate quoted will be considered as correct and the amount will be calculated accordingly. Conditional rebates & discounts, incomplete/ambiguous offers are likely to be rejected.
14. Late bid will be rejected and CSL will not be responsible for any postal delay / non receipt of bid on any account of loss in transit.
15. In case bidders are not in a position to quote for this work, the bidders are instructed to forward regret letter stating reasons. CSL reserve the right for not issuing future enquires for the firms who has neither quoted nor submitted the regret letter.
16. Tender opening shall be carried out at the designated date and time as specified in the Notice Inviting Tender, in the case of single bid system. (Also refer clause 16). It may please be noted that, if any of the dates indicated in the tender notice is declared a public holiday, the dates shall be extended to the next working day.
17. In case of two bid system, the techno commercial part alone will be opened initially on the due date of opening the tender. Bidders shall not be allowed to attend the techno commercial bid opening. The price part will be opened only after evaluation of the techno commercial part. Firms, whose techno commercial bids are acceptable, will be intimated regarding the date of opening of price part, so that they can be present during the price bid opening.
18. Bids shall be submitted in two separate sealed covers.
- In case of *single bid system*, the first cover shall contain Earnest Money Deposit and the second cover shall contain the tender documents. EMD, Tender reference and the cost of tender documents should be clearly indicated on the top of the respective covers.
  - In case of *two bid system*, the first cover shall contain the techno commercial bid part of the tender along with EMD, cost of tender form and supporting documents and second cover shall contain only the price bid part of the tender. Tender reference details shall be indicated on top of respective envelopes.
19. Bids submitted without EMD (Except MSME firms having valid NSIC registration and certificate) will be rejected, if EMD is insisted in the tender. The EMD can be remitted either in the form of DD/Bankers Cheque /FDR drawn/ NSC in favour of Cochin Shipyard Ltd (with a minimum validity of 3 months from the date of tender opening). Cheques are not acceptable.
20. No interest shall be paid for the EMD, Security Deposit or Performance guarantee.
21. The price bids will be evaluated based on the lowest offer on the total amount excluding all taxes obtained from eligible and qualified as valid bids for opening the price bids. However the Officer-in- charge reserves all the rights to reject any or all tenders without assigning any reason.