

Tender for design, supply, erection, installation, testing and commissioning of Solar Photovoltaic power plant (55 kWp) at rooftop of The Yavatmal Urban Cooperative Bank Ltd.

The Yavatmal Urban Co-operative Bank Ltd, Yavatmal, MS –445001

Website: www.yavatmalurbanbank.com Ph: (07232) 244 241, 243 703

Tender No: 1908 / 13 / 11 / 2018; Date: 19 – 11 - 2018

TENDER DOCUMENT

FOR DESIGN, SUPPLY, ERECTION, INSTALLATION, TESTING AND COMMISSIONING OF SOLAR PHOTOVOLTAIC POWER PLANT (55 kWp) AT ROOF TOP OF THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD., LIC CHOWK, YAVATMAL. 445 001

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ROOF TOP OF
THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD.,
LIC CHOWK, YAVATMAL. 445 001

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1. GENERAL INSTRUCTIONS

The tender bid is invited for and on behalf of The Chief Executive Officer (CEO), The Yavatmal Urban Co-operative Bank Ltd, Yavatmal, Maharashtra-445 001, India for design, supply, erection, installation, testing and commissioning of solar photovoltaic power plant (55 kWp) at rooftop of THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD., LIC Chowk, Yavatmal. 445 001.

- a. The bidder shall specify whether he / she is an Individual/ Association of Persons / Company or Partnership firm.
- b. If bidder is a company CA certified copy of Articles and Memorandum of Association shall be furnished. If the bidder is a partnership firm, copy of CA certified partnership deed shall be furnished.
- c. In case of a company, authorized person who has signed the tender bid document should furnish (CA certified copy of Board Resolution).
- d. Any offer made in response to this tender, if accepted by The Yavatmal Urban Co-operative Bank Ltd, Yavatmal will constitute a contract between the parties.

2. SUBMISSION OF BID

- a. Bid shall be drafted in English. Bid should be free from overwriting. All corrections and iterations should be duly attested by the bidder.
- b. Bid shall be in 2 parts, i.e., Part-I (Technical & Commercial Bid) and Part- II (Price bid & Price bid of additional works envisaged by bidder, (if / any as PDF attachment).
- c. Bids received after the specified time and date will be summarily rejected.
- d. Bids not submitted in the appropriate forms, or if they are not complete in all respects, are likely to be rejected.

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2A. IMPORTANT DATES AND TENDER SCHEDULE

Sr. No.	Particulars	Date
1	Release of tender	19 Nov, 2018
2	Pre-bid meeting	26 Nov, 2018
3	Last date for query response	03 Dec, 2018
4	Last date for bid submission	07 Dec, 2018
5	Date of technical bid opening	10 Dec, 2018
6	Date of price bid opening	10 Dec, 2018
7	Date of post-bid discussion	11 Dec, 2018
8	Probable date of release of purchase & work order	19 Dec, 2018

2B. CONTACT DETAILS

FOR QUERIES RELATED TO TENDER DOCUMENT AND BID SUBMISSION

THE ADMINISTRATIVE OFFICER,
THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD.,
LIC CHOWK, YAVATMAL,
MAHARASHTRA – 445 001

Ph: (07232) 244 241

Email: ho_adm@yavatmalurbanbank.com

3. SCOPE OF WORK

- a) The scope of supply and work includes design, supply, erection, installation testing and commissioning of rooftop Solar PV power plants of 55 kWp capacity at rooftop of building of The Yavatmal Urban Co-Operative Bank. Ltd., LIC Chowk, Yavatmal. 445 001, as per the technical specification and BOQ.
- b) The Scope of supply and work starts from scratch to net-metering connection with DISCOM's power system.
- c) The technical specification and details are recommended by our consultant and are furnished below. The complete project shall be supervised by YUCBL's consultant till completion of

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project work. Any clarification / query related to this project shall be clarified by the consultant with permission of The Yavatmal Urban Co-Operative Bank. Ltd.

- d) All the components and plant equipments shall be procured after getting the final approval from The Yavatmal Urban Co-Operative Bank. Ltd.
- e) Designing and drafting of elevated civil structure, foundation and elevated column drawings of elevated module mounting structure for the solar photovoltaic power plant as per technical specification. Also, the supply of civil items required for the entire construction and installation shall be under the scope of the bidder.
- f) Designing and drafting of elevated solar PV module mounting structure drawings as per the technical specification. Also, the supply, erection, installation and commissioning of elevated solar PV module mounting structure for the 55 kWp capacity solar PV power plant shall be under the scope of the bidder.
- g) Supply, erection, installation and commissioning of suitable ampere rating (with prior approval from YUCBL's consultant) TPN MCCB with sheet steel enclosure and suitable bus bars/copper cables to fix with the existing DB and supply of 4 X 35 sq.mm AYFY cable to connect from inverters to TPN MCCB.
- h) Supply, erection, installation and commissioning of Digital energy meters with suitable CTs and accessories to read kWh, Current, Voltage, power factor, THD and Frequency. The quantity and quality of energy meters must meet the net-metering policy / norms criteria of Maharashtra Govt.
- i) Supply, erection, installation and commissioning of Reverse power flow relay with suitable CTs and accessories to prevent reverse power flow to transformer from inverter during low load conditions.
- j) Supply of any other items for the satisfactory completion of the work shall be under the scope of the bidder.
- k) Independent Earthing for solar plant shall be done as per standards.
- l) Drafting all civil, electrical and mechanical drawings and obtaining approval from Maharashtra State Electrical Inspectorate is under the scope of bidder. The statutory fees required for the same will be paid at actuals against the submission of the bill.
- m) Supply, execution, installation and commissioning of all items needed for solar power connection with DISCOM's power system under Maharashtra Govt.'s net-metering policy.
- n) After-sales service for a period of 5 years, directly (Preferred) or through local contractual arrangement, but in all cases the ultimate responsibility of performance shall remain with the BIDDER.

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- o) BOQ specified is indicative only. Any other items to be in-corporated shall be quoted separately with proper justification and this will be included at the event of order only if customer find it suitable necessity
- p) All the test certificates shall be submitted along with supply items.
- q) The bidder shall submit and seek written consent on all design and detail engineering drawings, calculation and documents from consultant of YUCBL; before procuring any project supply or service item or material.
- r) All kind of approvals (for completing and executing the work) from designated / compliance / jurisdiction authorities (Government or Private) including Net-metering connection with DISCOM's power system shall be in scope of bidder. The applicable fee such as scrutiny fee and inspection fee payable to the statutory bodies will be reimbursed to the contractor at actuals on production of documentary evidence.

4. PRE-QUALIFICATION OF BIDDER

Following are the required experiences for considering responsiveness of the bidders:

To substantiate this, necessary documents, certificates shall have to be attached with the proposal.

(A) Established Contractors / Suppliers:

The Bidder should be either a body incorporated in India under the Companies Act, 1956 or Companies Act, 2013 including any amendment there to and engaged in the business of Solar Power/Renewable Energy.

OR

The Bidder should be either a body incorporated in India under the Limited Liability Partnership Act 2008; A subset of Companies Act, 2003 and engaged in the business of Solar Power/Renewable Energy.

A copy of certificate of Incorporation should be furnished along with the bid in support of above.

OR

The Bidder should be a Firm registered under Partnership Act in India.

A copy of certificate of Form-G/Copy of Registered Partnership Deed should be furnished along with the bid in support of above.

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OR

The Bidder should be a Firm registered as Sole Proprietor under Shop Act.

A copy of certificate of TIN Number should be furnished along with the bid in support of above.

(B) Technical qualification:

- (i) The bidder should have minimum two years' successful track record of installed Grid connected solar PV projects.
The bidder should have installed at least one single Grid connected Solar PV Power Plant under Net metering policy of Maharashtra state; having capacity of not less than 30 kW and should have been commissioned during 2016-17 or 2017-18 or up to date of submission of bid.
- (ii) The bidder should have cumulative experience of executing ≥ 100 kWp Grid connected SPV Power Plants / Systems in Maharashtra, India during 2016-17 and 2017-18 & up to date of submission of bid.
- (iii) The bidder should be registered electrical contractor License holder with "Electrical Inspectorate, Industries, Energy and Labour Department of Maharashtra state" and qualified to work upto 33 kV.
- (iv) The financial turn-over of bidder for last financial year should be more than Rs. 1 Crore.
- (v) The bidders having established service center and experience in District Yavatmal will be preferred.

(C) Consortium:

Bidders can bid in consortium to meet qualification criteria. But,

- a.) Maximum two members are allowed to build a consortium to bid the tender.
- b.) Both consortium members will be Equally, Jointly and severally responsible for all tender obligations.
- c.) The consortium shall have a lead bidder.
- d.) The bid should clearly be highlighted with consortium's lead bidders name and address along with name and address of supporting bidder.

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- e.) The YUCBL will be liable to communicate and discuss all communications and discussions with lead bidder only. However, both consortium members will be Equally, Jointly and severally bound to conclusions and decisions of such communications and discussions along with tender obligations.

SIGNATURE OF AUTHORISED

SIGNATORY WITH STAMP

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5. CONTRACT PRICE

1. The basic price excluding all taxes and duties shall be entered separately in the BOQ.
2. Goods & Service tax (GST), Excise duty, Packing & forwarding, Transportation cost shall be entered separately in the BOQ.
3. The fee such as scrutiny fee and inspection fee payable to the statutory bodies will be reimbursed to the contractor at actuals on production of documentary evidence.
4. The unit rate quoted shall be firm, fixed and not subjected to any escalation/variation till completion of all the work.
5. The quantity mentioned in the schedule is only approximate. If additional quantities are required to complete the work, such quantities should also be supplied / carried out by the contractor at the same accepted rate.
6. Your bill shall contain Serial Number, Name, Address and registration No: of the service provider, Name and Address of the service receiver, Description, Classification and value of taxable service being provided or to be provided and the amount of Goods & Service tax payable(GST and Education Cess should be shown separately).
7. Purchase order will be placed for supply items and Work order will be placed for the execution.

6. SECURITY DEPOSIT

- a. Successful bidder(s) will be required to execute a Bid (bank) guarantee equivalent to project's total order value (excluding taxes /Duties) within 10 working days from issue of purchase / work order; towards Security Deposit securing successful in time execution of contracted scope of work and till final hand over the complete and contracted solar plant to YUCBL.
- b. Successful bidder(s) will be required to execute Performance bank guarantee before starting project execution in all respect, equivalent to 30% of total order value for a period of 5 years from date of commissioning as adherence to guaranteed parameters like Performance ratio (PR), plant Uptime etc.
- c. Any kind of charges or fee or reimbursement or compensation will be provided to bidder, in lieu of execution of any kind of bank guarantee.
- d. Failure to furnish security bank guarantee in accordance with the conditions of the tender will be considered as breach of contract, which would entitle YUCBL to terminate the contract in addition to the right of enforcing risk purchase at the cost of bidders.

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- e. The bank guarantees should be made from any Nationalized / Scheduled Bank of Indian Origin in the proforma supplied by The Yavatmal Urban Co-Operative Bank. Ltd. favoring “The Yavatmal Urban Co-Operative Bank. Ltd.”.
- f. THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. is empowered to encash in part or full bank guarantee against any outstanding amount any sum that may be fixed by YUCBL as being the amount of losses or damages suffered by it due to delay in performance or non-performance of any of the condition of the tender/contract.

7. NON-PERFORMANCE OF CONTRACT/CANCELLATION OF CONTRACT/ RIGHTS OF THE YUCBL

The YUCBL reserves the right to cancel the contract if the works are not made in accordance with the schedule, as indicated/accepted by THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD.. In the event of cancellation of the contract as mentioned above, the bidder will be blacklisted. The YUCBL also reserves its right to carry out the work at bidder’s risk and cost forfeiting all amounts due to bidder in such a circumstance. The decision of the YUCBL in this regard shall be final and binding on the contractor.

8. OPENING OF BID

- a. On the due date of opening viz. 10/12/2018 at 11:00 AM, Part-I of the offer (i.e. Technical Bid) will be opened.
- b. The Part-II of the offer (i.e. Price Bids) of only those bidders who are qualified as per the tender conditions will be opened.

9. CLEAR UNDERSTANDING

When a bidder submits his bid in response to this document, he will be deemed to have understood fully about the requirements of the terms and conditions of the tender.

10. NEGOTIATION

- a. The accepted bidder will be required to attend the negotiation, if YUCBL so desires, at our Office at LIC Chowk, Yavatmal. The date of negotiation as fixed by THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. will be final and binding on the bidder.

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- b. Bidders are advised to quote lowest price as the negotiation on price will be carried out, only if required.

11. VALIDITY OF OFFER

The bidder shall keep the offer FIRM for a period of up to 3 months from the date of opening of the price bid during which period or till the tenders are decided, whichever is earlier, he will not be free to withdraw the bid.

12. HOW TO QUOTE

The bidder shall quote their rates in the BOQ. (One .xls file with two BOQ sheets). Bidders are requested to fill both the BOQ sheets, as one being for supply and other for work.

- a) In case of Supply - Bidders are expected to quote the base rate of each item and applicable taxes shall be shown separately.
- b) In case of Work – Bidders shall quote the base rate and all applicable taxes and duties, including GST tax should be shown separately.

13. TERMS OF PAYMENT

(a) Supply

- (i) 10% of the supply value except duties & taxes shall be paid as advance payment, only after receipt of Bid (bank) guarantee in the prescribed format, from a scheduled or nationalized Bank, as detailed in Sec -5, .
- (ii) 50% of the supply value including 100% duties & taxes, if any, shall be paid on receipt and acceptance of all equipment/material at site along with relevant certificates/tax documents.
- (iii) Balance 40% of the supply value shall be released on satisfactory completion of project.

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(b) Erection, Testing and Commissioning

(i) 90% of the contract value will be paid on satisfactory completion of erection, testing and commissioning of solar photovoltaic power plant including obtaining approval from Electrical Inspectorate and Net-metering operational connection with DISCOM.

(ii.) Balance 10% after 1 year of commissioning of solar plant.

(c) The contract price shall be payable subject to any deduction which the purchaser may be authorized to make under the contract and under any other statutes. Example: Income tax etc.

14. TIME OF COMPLETION

The bidder shall complete the supply & installation of solar photovoltaic power plant and statutory approval from Maharashtra State Electrical Inspectorate, Net – Metering connection with DISCOM etc. within 2 months of placement of purchase / work orders.

15. SAFETY REGULATIONS

The successful bidder shall observe and abide by all safety Rules and Regulations of the YUCBL and legislation.

16. INCOME TAX & GOODS AND SERVICE TAX CLEARANCE CERTIFICATE / REGISTRATION

Bidder shall furnish copies of Goods and service tax GST and PAN. He should also furnish documents with respect to Tax Registration number and the service classification details.

17. NO CLAIM / COMPENSATION FOR SUBMISSION OF TENDER

The bidder whose bid is not accepted shall not be entitled to claim any costs. Charges and expenses incidental to or incurred by him through or in connection with his submission of bid or its consideration by the YUCBL, even though the YUCBL may elect to modify / withdraw the invitation to tender or does not accept the bid.

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18. YUCBL's / COMPANYS RIGHT TO ISSUE ADDENDUM TO TENDER DOCUMENTS

The company reserves the right to issue any addendum to tender documents and / or to clarify, amend, supplement and delete any of the conditions, clauses or items stated in the tender documents.

19. YUCBL's / COMPANYS RIGHT TO ACCEPT OR REJECT TENDER

The YUCBL / company is not bound to accept the lowest or any tender bid or to assign any reason thereof. The purchaser also reserves the right to accept any or all tender bid either in whole or in part or to invite revised price bids.

20. SIGNING OF CONTRACT

- a) The tender documents shall form the basis of the final contract to be entered into with the successful bidder.
- b) On tender bid acceptance and issue of Letter of Intent (LOI) by the YUCBL / company, separate purchase order for supply parts and work order for execution will be issued in duplicate and at the earliest but not later than 30 (thirty) days after receipt of Bid (bank) guarantee and Performance bank guarantee .
- c) On receipt of the work order/purchase order, the bidder shall return one copy of work order/purchase order at the earliest, after duly signed and stamped on all pages as token of acceptance; this shall form the final contract between the bidder and YUCBL / company along with the tender documents.

21. GUARANTEE PERIOD

- a) The bidder shall guarantee his supplied items excluding solar PV modules for a minimum period of five years from the date of completion and acceptance of work.
- b) The bidder shall guarantee his supplied Solar PV modules
 - (i) For a minimum period of ten years against Potential Induced Degradation (PID), material and workmanship, maximum & linear degradation of 0.7% per annum of basic technical specifications from the date of completion and acceptance of work.

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- (ii) For a minimum period of 20 years against performance and degradation from basic technical specifications from the date of completion of project and acceptance of work.
- c) The bidder shall guarantee the workmanship and work executed

22. OTHER TERMS AND CONDITIONS

- a) Scrap if any, generated shall be removed immediately after completion of work and the area shall be cleaned thoroughly. The scrap should not be disposed in and around work location.
- b) Tools required for the work shall be to the account of the bidder.
- c) **The bidder is advised to visit the site during (Any working day between 10 AM and 3PM) before submitting the offer, to carefully examine the site & surroundings and shall take into account all site conditions for carrying out and completion of the work.**
- d) Our General Conditions of Contract and Safety regulations shall be applicable for this contract to the required extend.

23. ASSIGNMENT AND SUB-LETTING

Bidder shall not assign or sub-let the contract. In case any part of the work is being undertaken by agencies other than the successful bidder, the same shall be with the consent of THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. only. In case of breach of these conditions, the YUCBL / company shall terminate the contract without any notice and entrust the work to any other vendors at assigned vendor / bidder's risk and cause.

24. DEFAULT

If it appear to THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. that contracted contractor / vendor :

- a) is not taking any interest in timely commencement of the work.
- b) is not executing the contract in accordance with or as specified in the contract.
- c) or his authorized representative is not available to take orders regarding the

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execution of the work.

- d) refused to carry out the reasonable instructions of the YUCBL / company for the execution of the work.
- e) commit any other breach of the contract.

THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. may, at contracted contractor's expenses and without prejudice to any other right of it

- a) Perform such portion of the contract work as contractor might have failed to execute or,
- b) Take the work wholly or part out of contracted contractor's hand and re-contract the same to any other person /firm or
- c) Cancel the contract.

- 25. The YUCBL / company shall not be liable for any loss suffered by contractor as a result of the YUCBL / company's action. Contracted contractor shall indemnify the YUCBL / company against all losses suffered by the contractor and liabilities imposed on the YUCBL / company as result of the default committed by contractor.
- 26. THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. reserves the right to reject any or part of tender including the lowest, without assigning any reason.
- 27. All questions, disputes arising under, out of or in connection with this Tender/Contract shall be decided by the Managing Director of the YUCBL / Company whose decision shall be final and binding on the Bidder/Contractor.
- 28. Any suit or legal proceeding against YUCBL / Company in connection with this Tender/Contract shall be filed or instituted only in a Court having jurisdiction in the town of Yavatmal, Maharashtra.

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29. DOCUMENTS TO BE SUBMITTED ALONG WITH THE TENDER BID (Part 1)

- a. Scanned / photo copy of the tender document duly signed and stamped as a token of acceptance of the terms of the tender.
- b. Brief write up about your organization, highlighting experience in similar line.
- c. Deviations statements, if any.

The format of Deviation statement is detailed below:

Sr.No.	Clause	Description as per RFP	Deviation
1			
2			
3			

30. AWARD OF CONTRACT

THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. reserves the right:

- a. To accept, at its sole and unfettered discretion, any tender for whole or part quantities or to reject any or all tenders without assigning any reasons whatsoever.
- b. To award the contract to one or more number of firms.
- c. To enter into parallel contracts simultaneously or at any time during the period of contract with one or more bidder(s) as THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. may feel fit.
- d. THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. does not bind itself to accept the lowest tender or assign any reason for non-acceptance of the same.
- e. In the event of an order the rates quoted shall be firm and fixed during the tenure of contract.
- f. General conditions of Contract and Safety regulations form a part of this tender and are applicable to the extent required.

**For The Yavatmal Urban Co-operative Bank Ltd, Yavatmal
The Chief Executive Officer (CEO)**

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31. FORMAT FOR PROJECT EXECUTION SCHEDULE

Sr. No.	Activities – Description	Responsibility	Period in weeks	
			Week Starting	Week Ending
1	Placement of order (effective date of order)	THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD.		
2	Finalize contract agreement (acceptance of purchase / work order)	Supplier		
3	Visit THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. – Collection of data required by supplier			
4	Design validation / appraisal of drawings by inspecting agency			
5	Submission of QAP & drawings by supplier to THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. for approval			
6	Procurement of materials			
7	Fabrication / Manufacturing			
8	Procurement of brought out items			
9	Shop testing / painting			
10	Packing / forwarding / shipment			
11	Receipt at THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. site			
12	Site preparation			
13	Erection			
14	Final inspection & testing by inspecting agency			
15	Trial run testing			
16	Finish painting			
17	Site documentation			
18	Handing over			

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32. TECHNICAL SPECIFICATIONS OF SOLAR PHOTOVOLTAIC POWER PLANT

1. DESIGN CRITERIA

Solar PV Power plant shall be designed considering the following:

- a) Maximum achievable Performance Ratio (PR)
- b) Optimum cost solution to produce low-cost energy
- c) Increasing the plant profitability from the design
- d) High reliability, leading to minimum maintenance requirements.
- e) To have a minimum 25 years design life for PV power plant
- f) To be designed / automated for normal unattended operation
- g) Innovative Array cleaning system

2. SITE DESCRIPTION

THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. building is located at LIC Chowk, Yavatmal, 445 001, Maharashtra. The GPS coordinate of the site is 20°23'15"N and 78°7'50" E. The total contract demand of the plant is 101 kVA and the connected load is 81 kW. The building has 11KV / 415V transformer, installed in March, 2018. The 11kV/415V transformer is located within building's premises and step downs supply voltage to 0.415kV and feed to building's internal connected load. The energy meter is installed at 3 – Phase, 415Volts.

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3. BUILDING DETAILS

Sl No.	Location Description	Possible PV system capacity	Grid Voltage rating	Remarks
1	Corporate office / Main building	55KWp	415V Main ACDB	PV system shall be installed on the Corporate office building's roof (flat RCC) & generated electricity shall be fed to the NET energy meter's ACDB located at ground floor of the building. (at Metering cubicle)

4. EXISTING ELECTRICAL NETWORK

Maharashtra State Electricity Distribution Company Ltd. (MSEDCL) supplies electricity to THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD.. The supply voltage to YUCBL is at 11 kV which is then stepped down to 415 V. the stepped down 415 V is distributed within the building. DISCOM / Grid power is stable source of electricity in proposed location, only during substation maintenance occasionally, the Admin building is powered by external DG. There is no grid outage as such at site and solar power will offset grid power.

Grid electricity consumption (from April 2018 to September 2018): 42,346 kWh

Apart from seasonal variation, there are daily variations are also observed in electrical energy consumption pattern of the YUCBL. Thus while designing the solar PV plant, the bidder / contractor should consider that rooftop solar plant will generate most of daily yield / energy between 10Am to 2 PM on the other hand, the consumption pattern will be full day and partially in evening, morning and night. Thus bidder / contractor are requested to study the load pattern in detail before starting the design. The main determining factor of the capacity of solar PV plant is available roof area. The output from proposed 55kWp Solar PV plant at proposed

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location is optimistic to the total connected electrical load thus effect of variability of solar energy generation and load consumption should be balanced properly, in a way, that annual energy generation and consumption should nullify each other.

5. SITE 1: ADMINISTRATIVE BUILDING

The GPS coordinates of the site is 20.392755 N and 78.133186 E.

The dimension of the proposed roof of the building is 31.4 Meter x 11.35 Meter, hence the total area of the roof is 356 Meter². The roof is flat RCC and almost 8 months old. The south orientation is shadow free and clear. The Solar PV module mounting structure are expected to be designed considering typical raised slab heighted and elevated at optimistic tilt angle. The rain water catchment and drainage shall be concealed type, so that, it would not stain on surrounding walls. It has been observed visually that the roof is strong enough to carry the load of solar PV array (combined weight of PV modules, mechanical structures and associated civil foundation)

6. MAJOR COMPONENTS OF SOLAR PV POWER PLANT

- a. Solar PV Modules
- b. Module mounting structure
- c. RCC raised slab heighted columns, to hold Solar PV module mounting structure
- d. Grid connected string Inverters
- e. Wireless or Web-based Monitoring system
- f. Array combiner boxes consist of protections, string monitoring sensors
- g. Cables
- h. Earthing and Lightning Arrestors
- i. Fire protection system
- j. Array cleaning system

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6.1 Solar crystalline PV Module

Minimal and Indicative technical specifications of Solar PV modules:

Sr.No.	PARTICULARS	SPECIFICATION
1	Make	Vikram Solar, Trina, Suntec, Canadian
2	Max. output (Pmax) as per STC	320 Wp
3.	MPP voltage (Vmpp) V	37.65 V
4.	MPP current (imp) A	8.5 A
5.	Open circuit voltage (Voc) V	45.96 V
6.	Type	Crystalline Silicon
7.	Module dimensions (LxWxH)**	1955 mm × 982 mm × 36 mm
8.	PV Module type	Mono / Polycrystalline silicon
9.	No. of PV cells per Module	72 polycrystalline solar cells, 4 bus bars
10	Solar module frame material	Anodized aluminum frame with twin wall profile
11	Weather resistant junction Box	IP67, 3 bypass diodes
	Mechanical Features	
1	Glass	High transmission low iron tempered glass, AR coated
2	Glass iron content	Low iron
3	Glass transmissivity	EVA (Ethylene Vinyl Acetate)
4	Frame	Anodized aluminum frame with twin wall profile
5	Encapsulation	Ethyl Vinyl Acetate (EVA)
6	Trilaminate back surface	Composite film
7	By-pass diode	Yes

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BIDDER shall offer Tier – 1, make crystalline **PV** modules. However BIDDER may choose between Mono and Polycrystalline Silicon PV Modules.

To connect the solar PV modules interconnection cable shall be provided. Photo / electrical conversion efficiency of PV module shall be of highest in the class. Module shall be made of high transmissivity, low iron content front surface giving high encapsulation gain and hot butyl rubber edge sealant for module protection and mechanical support. All materials used shall have a proven history of reliable and stable operation in out-door applications. The module shall perform satisfactorily in relative humidity up to 100% with temperatures between -10°C and +85°C and withstand wind gust up to 180 km/h from back side of the panel.

Offered modules must be IEC 61215 (Crystalline Modules) and IEC 61730 part I and II certified. BIDDER shall submit appropriate certificates.

Other general requirements of PV module

- a) The module's power tolerance should be only in plus side. Preference will be given to modules which does not have negative power tolerance.
- b) The module frame shall be made of corrosion resistant aluminum, which should be electrolytically compatible with the structural material used for mounting the module.
- c) Protective devices against surges at the PV module shall be provided
- d) Module Junction box (weather resistant) shall be designed for long life out door operation in harsh environment.
- e) Minimum guarantee for a period of ten years against Potential Induced Degradation (PID), material and workmanship, maximum & linear degradation of 0.7% per annum (Year on year) of basic technical specifications from the date of installation and acceptance of work.
- f) Minimum guarantee for a period of 20 years against performance from the date of installation and acceptance of work.

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- g) The modules should be guaranteed for linear degradation of power generated not exceeding 10% over 10 years period and not exceeding 20% over the entire 25 year period.
- h) Preference will be given to modules having linear power degradation warranty (year on year till 25th year)
- i) The solar modules shall have suitable encapsulation and sealing arrangements to protect the photovoltaic cells from the environment. The arrangement and the material of encapsulation shall be compatible with the thermal expansion properties of the photovoltaic cells and the module framing arrangement/material. The encapsulation arrangement shall ensure complete moisture proofing for the entire life of the solar modules.
- j) Each module shall have low iron tempered glass front or equivalent for strength and superior light transmission. It shall also have tough low iron tempered glass back or equivalent for environment protection against moisture and provide high voltage electrical insulation.
- k) Array capacity shall be suitable to the requirement, and calculations should be provided by the BIDDER. Depending on size of the power plant, number of modules required shall be worked out accordingly.
- l) Data sheet of the offered module shall be submitted along with the Proposal giving under STC conditions details of peak power, peak power current, short circuit current, fill factor, temperature derating, peak power voltage, open circuit voltage, module dimensions and weight etc. The datasheet shall also contain performance at NOCT, at 200 W/M² irradiance and curve for irradiance levels from this 20% to 100% in steps of 20%.
- m) Each PV Module used in the Solar Power Project must have RF Identification Tag with at least the following information:
 - i. Name of the manufacturer of PV Module
 - ii. Name of the Manufacturer of Solar cells
 - iii. Month and year of the manufacture (separately for solar cells and module)
 - iv. Country of origin (separately for solar cells and module)

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- v. I-V curve for the module
- vi. Pm, Im, Vm, Isc, Voc and FF for the module
- vii. Unique Serial No and Model No of the module
- viii. Date and year of obtaining IEC PV module qualification certificate
- ix. Name of the test lab issuing IEC certificate
- x. Other relevant information on traceability of solar cells and module as per ISO 9000 series.

Orientation and Tilt of Solar PV Modules

The BIDDER shall mention Solar PV Module's orientation & tilt angle to maximize the energy generation / solar PV plant's production (kWh/kWp/year).

6.2 Module mounting structure

Structure specification

S.No.	PARAMETERS	SPECIFICATION
1	Type	Raised slab heighted and elevated at optimistic tilt angle for maximum energy generation. Compatible with present Flat RCC Roof.
2	Material	Aluminum extrusion or Galvanized Iron
3.	Overall dimension	As per design
4.	Coating	Hot dip Galvanized with 85 micron thickness
5.	Wind gust resistance	180 km/hr
6.	Tilt angle	Fixed angle, depends on the site latitude
7.	Foundation	As per design without damaging the existing roof.
8.	Number of module/structure	As per design
9.	Fixing type	Fixed

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- n) The structure shall be suitable for flat concrete roof. The structure should be designed as per guidelines of Indian Standard design codes. Proper codal provisions for IS-875, IS-800, IS-456 etc should be followed.
- o) The roof mounted array structure shall be made of either anodized aluminum extrusion or hot dip galvanized MS angles suitable to withstand maximum 180km/hour wind gust. The minimum thickness of galvanization shall be at least 70 microns. All nuts & bolts shall be made of very good quality stainless steel. The structure shall be fixed tilt type with an inclination angle that gives maximum output energy from the plant.
- p) The work should be completed with supply, fitting fixing of clamps, saddles, nuts & bolts etc. While quoting the rate, the BIDDER may mention the design & type of structure offered. All nuts & bolts shall be made of very good quality stainless steel only.
- q) The structure shall be designed to allow easy replacement of any module and shall be in line with site requirements.
- r) The structure shall be designed for simple mechanical and electrical installation. It shall support PV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly. There shall be no requirement of welding or complex machinery at site.
- s) The array structure shall be so designed that it will occupy minimum space without sacrificing the output from PV panels.
- t) The supplier/manufacturer shall specify installation details of the PV modules and the support structures with appropriate diagrams and drawings.
- u) The drawings along with detailed design shall be submitted to THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. for approval before starting the procurement and execution work. The work will be carried out as per designs approved by THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD.
- v) RCC Array Foundation Base: The supports of the structures shall be made with GI or Aluminum extrusion angles, will be fixed and grouted on the flat concrete top of raised RCC

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column. While making foundation design, due consideration shall be given to weight of module assembly on the roof (roof load bearing capacity), maximum wind gust of 180 km/hr and seismic factors for the site.

w) BIDDER can visit the site before quoting rate for civil works. After taking into consideration all aspects of the site, condition of roof etc., BIDDER shall quote for civil works. No extra claim shall be entertained at post project stage. The foundation design of module structure design shall be submitted to THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. for approval. The work will be carried out as per designs approved by THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD..

BIDDER shall provide the following documents for the Solar PV module mounting structures at design stage:

- i. Drawings of Mounting Structures
- ii. Engineering calculations based on wind gust (STAAD Pro analysis) of 180 km/hour and seismic factors as per IS 1893 latest revision for the site.
- iii. Galvanizing thickness testing or Aluminum Anodizing thickness data
- iv. Module mounting clamp details
- v. Quality assurance documents for steel/metal, nut, bolts and washers from the supplier(s).

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6.3 Grid connected Inverter

S. No.	PARAMETERS	55kWp	
		15KW	20KW
1	Make	Zeversolar Eversol TLC Series or equivalent	Zeversolar Eversol TLC Series or equivalent
2	Capacity	15 KWp	20 KWp
3.	No. of invertors	1	2
4.	Normal Output Design Voltage	220/380 V	240 / 415 V
5.	Output Frequency	50, 60 (± 5Hz)	50, 60 (±5Hz)
6.	Min. Start Voltage/Rated DCVoltage	250 V/ 640 V	250 V/ 640 V
7.	MPPT Voltage Range	270 V – 950 V	270 V – 950 V
8.	Maximum DC Voltage	1000 V	1000 V
9.	Maximum Efficiency/ Euro Efficiency	98.3% / 97.9%	98.3% / 97.9%
10	Operating Temperature Range	-25 ° C.....+60 °C	-25 ° C.....+60 °C
11	Enclosure ingress Protection(IP rating)	IP55(fans), IP65(others)	IP55(fans), IP65(others)
12	No. of MPPTs	2	2
13	Nominal Voltage	220/380V	240/415V
14	Nominal Voltage Range	277V – 520V	277V – 520V
14	Frequency Tolerance	50, 60 (± 5Hz)	50, 60 (± 5Hz)
15	Communication Port	RS485	RS485
16	User Interface	Graphical LCD	Graphical LCD
17	Weight	48 kg	48 kg
18	Size	500 x 758 x 175mm	500 x 758 x 175mm

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Grid connected String Inverters of reputed make shall be considered for this project.

Inverters shall convert the DC energy produced by array to AC voltage using its MPPT (Maximum Power Point tracker) control to extract maximum energy from solar array and produce 415V AC, 3 phase, 50 Hz to synchronize with the low voltage side of the grid.

It should be high reliability design based on 25 years life of power electronics products, should include sealed power and signal control electronics, high efficiency magnetic. The Inverters shall have no or negligible night standby losses.

Inverters shall have connectivity port (RS232/RS485/Bluetooth) for communication for web monitoring system.

Inverter will have internal self protection (anti-islanding) in case of any fault in the grid. Also it will have inbuilt contactors/breakers with fuses for self protections. Furthermore, each inverter can be connected to a remote and local data monitoring system with which we can monitor all the parameters and current energy generation for the given period.

The Inverter will have in-built microprocessor based controls. It is designed in such a way that it will synchronize with the utility (grid) power with respect to the voltage and frequency of Grid and it gets corrected itself according to the grid parameters within its settable limits.

Inverter shall have the software and controls capable of operating the complete system for safe and efficient operation and includes the Islanding protection, Overvoltage /under voltage protection, ground fault/short circuit protection system, communication equipment such as modems, web box etc. DC reverse polarity protection , Grid monitoring of all the phases & pole sensitive residual current monitoring unit, protection against voltage fluctuations in the grid & protection against internal faults in the power conditioner, operational errors and switching transients.

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Features:

- Digital Signal Processor (DSP) based controls with self-diagnostics
- LCD display with keypad for display of operating status and for access of user-changeable settings
- Inverter shut off and disconnects
- Over- and under-voltage and frequency protection, shutting down the inverter
- Anti-islanding protection - prevents back-feeding inverter-generated power to the grid in the event of a utility outage
- User definable power tracking allows the user to match the inverter to the array, as well as to adjust delay periods to customize system shutdown sequences
- Isolation protection
- DC and AC over voltage protection
- Graphical user interface software for real time communications, monitoring, and control

6.4 Solar PV plant monitoring system:

The Solar PV plants shall have monitoring data logger with local and remote monitoring facilities.

The data logger shall give the following minimum information:

- i. Array Voltage : V_{dc}
- ii. Array current: I_{dc}
- iii. Inverter output voltage: V_{ac}
- iv. Inverter output current: I_{ac}
- v. Frequency:
- vi. DC kWh

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- vii. AC kWh
- viii. Performance Ratio (PR):
- ix. Power Factor:
- x. Ambient Temperature:
- xi. Module surface temperature:
- xii. Wind speed:
- xiii. Global Horizontal Irradiance (GHI)

The above parameters can also be monitored via web enabled remote computer.

6.5 Array combiner boxes consist of protections, string monitoring sensors

Depending on its location, a different IP rating will be required.

- For outdoor installations, minimum IP 65 rating will be required
- For indoor installations, minimum IP 21 rating will be required

BIDDER shall furnish the following documents at the design stage:

- Datasheets of Array Combiner Box & any other electrical cabinets
- Thermal calculations verifying the minimal required volume for the heat dissipation for all outdoor boxes/cabinets

The junction boxes/DC Combiners shall be dust, vermin and water proof and made of FRP. 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 outgoing cables. Suitable markings shall be provided on the bus bar for easy identification, and cable ferrules shall be fitted at the cable termination points for identification. The junction boxes shall have suitable arrangement for the following:

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- a) Combine groups of modules into independent sub-arrays that shall be wired to the Inverter.
- b) A test point for each sub-group for quick fault location.
- c) To provide group array isolation.
- d) The rating of the JB's shall be suitable with adequate safety factor to inter connect the Solar PV array.
- e) Shall have transducers to monitor physical string level monitoring
- f) Shall have DC rated circuit breakers (for both positive & negative) or string fuses for individual string isolation
- g) Shall have communication ports for web monitoring

6.6 Cables

DC Cables

Sr. No.	PARAMETERS	SPECIFICATION
1	Type	Multi strand flexible UV resistant rubber cable (Solar PV grade cable)
2	Make	Lapp / Polycab / Havells / Finlox / Universal / Equivalent
3	Material	Tin plated Copper for strings, Copper for string to junction box or onwards
4	Working voltage	Upto 1100 V
5	Test voltage	650V / 1.1kV
6	Temperature	-15 deg C to +70 Deg C
7	Standard	IS 1554 / 694-1990

AC Cables

The AC cables shall be normal electrical power cable (armored & unarmored) with required voltage and current rating. The AC cables should be sourced from reputed manufacturers.

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Cable Carrier System

The cable carrier system shall be designed considering the following:

- Facility for easy laying of cables.
- Access to maintenance.
- Neat and aesthetic appearance.
- Safety of equipment & personnel
- Ground water seepage.
- Interference with drainage system etc.
- Cable entry to switchgears and panels.

6.7 Earthing and Lightning Arrestor

Earthing:

DC Earthing must be separated from AC earthing. The DC earthing conductor sizing shall be done in accordance with NEC 250.166 & NEC 250.122.

The PV module electrical earthing must be done as per the guideline of module manufacturer.

Earthing system shall be complete with earth grids and electrodes, embedded in concrete and all the above ground earth conductors for all the equipments & systems of the power plant. The earthing system design and installation shall minimally comply with IS-3043, IEEE-80, IEEE-665 and Indian Electricity Rules.

The following elements must be earth connected:

- ✓ Mounting Structure
- ✓ Metal cable tray
- ✓ Metal elements in electrical cabinets
- ✓ Inverters

The contractor shall submit the detailed calculation sheets for DC & AC Earthings at the design stage.

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Lightning Protections:

The PV plant should be protected from thunder or lightning protection system will be based on Early Streamer Emission (ESE) lightning conductor air terminals. There should be for air terminals providing an umbrella protection against direct Lightning Strike. Lightning Arrester needs to be installed on roof and have mast height as per design.

The contractor shall submit the detailed calculations for Lightning Protectors at the design stage.

Fire fighting System

An adequate fire fighting system shall be installed for inverters and other switch gears as per applicable fire fighting norms.

Array Cleaning System

BIDDER must propose array cleaning system for the plants. The array cleaning system should be innovative and suitable for rooftop solar PV plants. The BIDDER shall also indicate the amount of water and water quality required for the proposed array cleaning.

6.8 Reverse Power Flow Relay

During minimum operating load surplus solar power generated will be flow back to transformer primary side, hence install a reverse power flow relay of suitable rating between inverter output and primary side of transformer. So that no excess power will be flow back.

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33. BILL OF MATERIALS

A complete Bill of Materials inclusive of Solar PV Modules, array junction box, main junction box, cables, Array mounting structures etc shall be provided along with the offer. The number of each component proposed for supply shall be clearly specified. The items not listed in BOM but required for successful installation/commissioning of power plant shall also be added, as required. A format for furnishing the BOM & Efficiency parameters is as follows.

Item	Unit	Quantity
PV Modules	Nos.	
Module mounting Structure	Nos.	
Grid connected string Inverter	Nos.	
Data logger with remote monitoring	Nos.	
Irradiance, Temp & Wind sensors	Nos.	
DC Cables	metre	
Communication Cables	metre	
AC Cables	metre	
Array Combiner Box/String Monitoring Box	Nos.	
AC Distribution Boxes (ACDB)	LS	
String fuses	Nos.	
DC Circuit Breakers	Nos.	
AC Circuit Breakers	Nos.	
Cable trays/conduits	Nos.	
Earthing Kits	Nos.	
Lightning Arrestors	Nos.	
Surge Protection Devices	Nos.	
Reverse power flow relays	Nos.	
Misc items like cable tags, labels etc.	Set	
Nut & bolts	Set	
MC4 connectors	Set	
Warning Stickers	Set	

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The above table is representative sample of material required. Any other item required to complete the Project but not listed above, BIDDER shall indicate.

In case the BIDDER is proposing an alternate configuration for 55 kWp Solar PV power plant, BIDDER should include above table of the same format for the alternate configuration.

Efficiency Parameters

Please provide the guaranteed values on efficiency / Loss of sub-systems for the following parameters:

Component	Efficiency (η)	Loss estimation
Optical loss		
Loss due to horizon		
Array Soiling loss		
Module mismatch loss		
Module Quality loss		
Shading loss		
Temperature induced loss		
Cable loss		
Loss due to Inverter efficiency		
Grid availability & maintenance		
Total System efficiency (η total)		
Plant Performance Ratio		
Plant Yield (kWh/kWp)		
Plant predicted generation (kWh)		

The BIDDER may provide performance curve for the above parameters.

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34. SPARE PARTS

BIDDER shall keep stock of essential spares at their nearest service center and/or at the site for warranty period. BIDDER shall list out spare parts required for power plant and submit to the CONSULTANT during design stage. BIDDER shall bear the cost of the spare parts for 5 years and shall be included in the bid proposal.

35. INSTALLATION AND COMMISSIONING

- a) BIDDER is responsible for arranging all the accessories and measuring instruments required to smoothly commission the power plants.
- b) The plant shall be commissioned in the presence of PURCHASER/ CONSULTANT authorized personnel or its nominated representative.
- c) An acceptance report shall be prepared and signed by all participating parties.

36. QA & QC PROGRAM

A QA/QC program shall be submitted by BIDDER during design stage. The scope of the program shall include plans covering control of each Solar PV plants design, component functional tests and the construction process. Control of the construction process shall include material control, process control and field testing of the plants. The PURCHASER / CONSULTANT reserve the right to witness tests, review data, and enforce the suppliers program.

37. PACKING, SHIPPING AND MARKING

BIDDER shall be responsible for assuring that all materials shipped are properly packed and protected to prevent damage or deterioration during shipment. Packaging and shipping costs including transit insurance shall be borne by the SUPPLIER. Customs clearance of imported items and all costs and actions associated with import duties, taxes and processing of documents shall be borne by BIDDER.

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38. PROGRESS REPORTS

Progress Reports shall be submitted by the first day (Monday) of each week (for the previous week). These reports should be concise letter reports of 1 to 2 pages and shall include a Critical Path Method (CPM) schedule updated weekly illustrating the baseline and current status for various phases of the project. Also, it shall include the status of works subcontracted to other vendors by the SELLER. The reports shall briefly describe project activities during the previous week, milestones attained and activities planned for the next reporting period. The reports shall also include details of problems encountered and the solutions applied. The PURCHASER reserves the right to verify contents of the Progress Reports through visits to SELLER facilities or facilities of the sub contractor appointed by the SELLER.

39. AFTER SALES & SERVICE

BIDDER shall give the details of their service center/commitment for service center in the state of Maharashtra, India and ensure that essential men and materials are placed to ensure quick and efficient after sales service.

Training and after sales service for 5 years is an important component of supply. The terms and conditions for training and after sales supply and service are to be presented clearly in the proposal and the extent and duration of after sales support clearly defined. An explanation of preventative maintenance schedule, plan of operation, scope and implementation of the after sales service is to be defined.

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40. DOCUMENTATION

The following shall be supplied as part of the editable documentation during construction phase.

- a) Design summary sheet, this shall be updated promptly as changes occur. Any changes from the initial bid must be approved by the CONSULTANT.
- b) Detailed itemized bill of materials with full specifications
- c) Back-up sheets for design calculations
- d) Mechanical, Electrical & Civil Drawings
- e) Manpower planning
- f) Project time schedule
- g) Quality Assurance (QA) Plan
- h) Erection and installation procedures
- i) Site storage and handling instructions
- j) Manuals of plant Operation & Maintenance
- k) Health and safety Manual

41. CODES & STANDARDS

The entire system is designed to comply with the international and national standards. Following are the standards and codes being followed for the project.

S.No.	Description	Standard
1	PV Panels	IEC 61215 / IEC 61730 Part I & II
2	Grid connected photovoltaic systems: Minimum requirements for system documentation, commissioning, tests & inspection	IEC 62446
3.	Photovoltaic Systems: Characteristics of the Utility Interface	IEC 61727
4.	Test Procedure for islanding prevention measures for Utility connected photovoltaic	IEC 62116

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S.No.	Description	Standard
	inverters	
5.	Photovoltaic devices	IEC 60904
6.	Photovoltaic Systems – Power conditioners – Procedure for measuring efficiency	IEC 61683
7.	Photovoltaic systems performance monitoring – Guidelines for measurement, data exchange and analysis	IEC 61724
8.	Balance-of-system components for Photovoltaic Systems	IEC 62093
9.	Safety of power converters for use in photovoltaic power systems	IEC 62109
10	DC Combiners/JBs	IEC standard, IP65 & above
11	Inverters	IEC 62116
12	Power Transformers	IS:2026 IEC 60076
13	Recommended Criteria for terrestrial PV power systems	IEEE 928
14	Recommended practice for utility interface of residential and intermediate PV systems.	IEEE 929
15	Guide for harmonic control and reactive compensation of Static Power Controllers	IEEE 519
16	Photovoltaic (PV) module safety qualification Part 2: Requirements for testing	IEC: 61730 -1, -2
17.	Photovoltaic Devices- Part-I: Measurement of Photovoltaic current-Voltage Characteristic	IEC: 60904-1
18	Basic environmental testing procedure for Electronic and electrical items	IS 9000
19	DC Earthing	NEC 250.166 & NEC

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S.No.	Description	Standard
		250.122
20	Structural steel and mild steel plates	IS:226-1975
21	Stainless steel tube	IS: 13316 – 1990-92
22	Power transformers	IS: 2026
23	Current transformer	IS: 2705
24	Voltage transformers	IS: 3156
25	Cross Imaged polyethylene insulated PVC	IS: 7098
26	Low voltage switchgear	IS: 18623
27	Electrical relays for Power system protection	IS: 3231
28	Control switches and push buttons	IS: 6865
29	Code practices for earthing	IS: 3043
30	Stabilized power supplies D.C. output	IS: 12021

42. INSPECTION AND TESTING

Stage wise inspection from the initial stage of appraisal of drawings, material procurement etc. until dispatch of items from shop / final testing shall be done by THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. during its manufacture and assembly at vendors / sub vendors work / site.

Test for materials and equipment shall be carried out as per relevant codes.

43. ERECTION

- a) The contractor has to carryout complete erection, testing and commissioning of the Solar Photovoltaic power plants supplied by them.
- b) The supplier shall arrange for labour, all machineries, tool and tackles, structural and derricks, safety items, consumables and other items required to enable loading, shifting, fabricating, erection etc. However YUCBL shall provide electric power, and water at single point free of cost.

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- c) Service of competent personnel for supervision and execution of site fabrication, erection etc. shall be provided by the supplier.
- d) Boarding or lodging for the fabrication and erection crew shall be arranged by the supplier.
- e) Contractor shall remove all the waste materials or garbage from and around the work site and leave the place thoroughly cleaned up ready for use.

44. WARRANTY AND PERFORMANCE GUARANTEE

Overall Plant: The BIDDER shall provide overall plant warranty that includes civil and mechanical structures, electrical works including inverters, distribution board/digital meters and overall workmanship for Sixty (60) months post the commissioning of the plant. During the warranty period, the SELLER shall, at no cost whatsoever to the PURCHASER, undertake all work of repair, amendment, reconstruction, rectification and make good defects, imperfections or other faults in the Works, as the case may be and/or as may be directed by the PURCHASER.

PV Panels: A minimum warranty of 25 years shall be given with degradation of power generated not exceeding 10% over 10 years period and not exceeding 20% over the entire 25 year period.

Inverters: A minimum overall warranty of 5 years shall be given. The BIDDER shall specify the terms for comprehensive O&M for inverters for the next 5 years post the expiry of the warranty period.

The plant performance shall be monitored at an array level. The SELLER shall provide the expected generation and corresponding Performance Ratio (PR) for the site coordinates.

Preference will be given to SELLER who is willing to provide plant **Performance Ratio (PR) Guarantee**. In case the SELLER is open to providing PR guarantees, please indicate the PR being guaranteed on a year-on-year basis and the mechanism to secure the same. The SELLER shall submit the PR calculation to achieve the guaranteed PR figure.

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Turn Around Time: During the warranty period, the BIDDER shall guarantee a turnaround time of 24 hours for any major repair work (any fault that leads to reduced power generation) required at the plant. For minor repair works, the turnaround time shall be 72 hours.

45. GENERAL CONDITIONS OF CONTRACT

a) Definition and terminology

In the contract documents as hereinafter defined, where the context so admits, the following words and expressions shall have the following meaning:-

- i. The term 'Company' and 'YUCBL' shall mean The Yavatmal Urban Co-operative Bank Ltd, Yavatmal, MS -445001
- ii. The term 'Engineer' shall mean the Engineer in charge of the work under contract or in his absence another person assigned by the Company.
- iii. The term 'Contractor' shall mean the persons, firms or Company with whom the contract has been entered into and shall be deemed to include the contractors successors, representatives, heirs, executors and administrators unless excluded specifically by the Contract.
- iv. The term 'works' shall mean and include all works and items and services to be executed, supplied or done by the contractor under the contract.

b) Scope of Work

Scope of work shall be as specified in the tender.

c) General Obligations

The contractor shall be deemed to have visited and carefully examined the site and its surroundings to have considered the possibility or difficulties that may be caused to his operation by reason or any strike or non-operation by his own employees or labour working under him. The contractor shall provide everything necessary for the proper execution of works according to the intend and meaning of the schedules of qualities and the specifications taken together whether the same may not be particularly shown or described therein. The contractor shall carry out and complete the above work in every respect in accordance with

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this contract, and the direction of Engineer within the time specified. The Engineer may in his discretion and from time to time, issue further written instructions details, directions and explanations of the proper execution of the work, and shall reserve the right to alter, modify, change, withdraw such instructions, details etc.

d) Rates for items of Work

The rates entered in the schedule of rates of the tender bid are intended to provide for work duty and properly completed in accordance with the conditions of tender/ contract. The rates quoted shall be deemed to have included all incidental charges or contingencies, which may not have been specifically provided in tender rates. The rate quoted shall be fixed and firm for a period of one year from the date of work and no enhancement will be considered by the Company.

e) Power

Necessary power will be supplied free of cost, if required, It shall be the responsibility of the contractor to provide necessary switch gear and to extend the supply line to the place of work as required and confirming to relevant status. The contractor shall obtain clearances, wherever required from relevant authorities internal and external and the rates quoted shall include the above expenses also.

f) Time for completion

The contractor shall complete in all respect the contract work within the stipulated time and date. In case of delay in completion of the work, the contractor shall be liable to pay damages at the rate of 1 % of the contract amount per week or part thereof delay subjected to a maximum of 20%. However, in the opinion of the company the work is delayed:-

i. Due to force majeure or civil commotion.

ii. Due to reason of loss or damages by the accidental fire then in any such case, the Company may give a fair and reasonable extension of time for the completion of the work. The decision of the Company in this regard shall be final and binding of the contractor.

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The damages shall be recoverable from any amount due to the contractor. The decision of the Company under the provision of this clause shall be final and binding on the contractor.

g) Setting out works

The contractor shall set out the works and shall be responsible for the true and perfect setting out of the same and for correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time any error in respect appears during the progress of the works, the contractor shall at his own expense rectify such error to the satisfaction of the Engineer.

h) Materials

The contractor shall make his own arrangements for collection and transportation of free issue items from Company stores to the work site or to any other place required. The contractor shall also make his own arrangements for safe handling and proper storage of the free issue items at his own risk and cost. Losses and /or damages to the materials issued by the Company to the contractor shall be recovered from the contractor's bills. No compensation of any kind will be entertained by the Company for any delay, caused in the issue of materials from the Company's stores.

The contractor shall be responsible for accounting of the free issue materials supplied by the Company. Balance materials including empty drums/barrels if any shall be returned to the Company's stores regularly and proper receipt to that effect shall be obtained by the Contractor. The receipt shall be attached to the bills claiming payment for the work.

i) Materials supplied by the Contractors

All materials brought in by the contractor shall be in good condition and shall be presented for inspection to the Engineer and if rejected for any reason by the Engineer, the Contractor shall replace them immediately at the Contractor's cost.

For all materials, tools and equipment brought within the Company's premises, the contractor shall sign a declaration form and produce the same before the security section,

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a copy of which shall be sent to the Engineer. Materials, tools and equipments removed from the Company's premises without written consent of the Company.

The Company shall not be responsible for protection against loss/damages of Contractor's materials and equipments, tools etc. brought inside the Company's premises. The contractor shall make his own arrangements for the safe custody of all items brought by him.

j) Wastage of materials

The Contractor shall ensure that there is no loss/wastage of materials supplied by the Company. In case the wastage is in excess of that specified by the Company, contractor shall be liable to pay compensation to the Company at double the market rates. Any amount due to this account shall be recoverable from the Contractor's bills and/or security deposit. The decision of the Company under provision of this clause shall be final and binding on the contractor.

k) Workmanship

The entire job shall be done in accordance with the Company's specifications. All the work covered under this contract shall be done to the entire satisfaction of the Engineer who shall determine the quality, acceptability and fitness of the work. The decision of the Engineer about the quality of the work shall be final and binding on the Contractor.

l) Deployment of qualified / experienced personnel/ supervisors

The Contractor shall provide to the satisfaction of the Engineer sufficient and qualified staff to carry out the work and for the supervision of the works.

If and whenever any of the Contractor's staff is found guilty of any misconduct or be incompetent or insufficiently qualified in the performance of his duties the contractor shall remove him from the site, at once, if so directed by the Engineer.

m) Sub Contractors

No part or whole of the work or interest therein shall in an any manner be assigned or sublet by the contractor, unless specifically approved by the Engineer.

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n) Inspection of works and materials

Engineer will have full power and authority to inspect the works and materials brought by the Contractor at any time and the contractor shall provide all assistance to the Engineer.

o) Company not bound by personal representatives

The Contractor shall not be entitled to any increase over the scheduled rates or any other rates whatsoever be reason of any representation, explanation or statement, promise or guarantee given or alleged to have been given to him by any person. No claim for enhancement in rates will be entertained on account of revision of wages of workers.

p) Measurement

All the works done satisfactorily and accepted shall be jointly measured by the Engineer and the Contractor's authorized representative. Such measurement will be duly recorded by the Engineer or his authorized representative shall sign the measurement book in token of acceptance of the measurement.

q) Local and other authorities notice and fees

Contractor shall comply with and give notices required by any act or by any regulation or law of any local or any other public authority that have any jurisdiction with regard to the Contract work and shall pay and indemnify the Company against any fees or charges legally demandable under such Act, Regulation or byelaw in respect of the work.

r) Contractor's liability

It is the responsibility of the contractor to meet all claims for the compensation under the Workmen's Compensation under the workmen's Compensation Act or under any other law in respect of accidents or injury including death suffered by the workmen engaged by him for carrying out the contract work undertaken by the Contractor. The contractor hereby agrees that he shall keep the company fully indemnified in respect of claims under the "Workmen's Compensation Act" and all other claims aforesaid and the contractor shall not under any circumstances raise any disputes with regard to the same.

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s) **Employment Liability**

The contract shall be solely and exclusively responsible for engaging or employing persons for the execution of work. All employees engaged by the Contractor shall be on his/their pay roll and paid by him/them. All disputes or differences between the contractor and his/their employees shall be settled by him/them. The Company has absolutely no liability whatsoever concerning the employees of the contractor. The Contractor shall indemnify the Company against all loss or damages or liability arising out of or in the course of his/their employing persons of relations with his/their employees.

- t) The Contractor shall provide all labor, supervisions, tools, tackles consumables, scaffolding materials etc. required for the job. In case the contractor is using Company's tools and tackles with the permission of the Engineer, the hiring charges/ cost s decided by the Engineer shall be recoverable from the Contractor's bill.

u) **Guarantee**

All works carried out by the Contractor shall be guaranteed for a period of 60 months from the date of final acceptance. In case of any defects in the work carried out by the contractor within the guarantee period of 60 months, specified above the contractor shall be liable to rectify the defects free of cost within the time allowed by the Company. In case of Contractor's failure to rectify the defects within the time allowed by the Company, the Company may get the work done at the risk and cost of the Contractor without any notice to him and all expenses and damages on this account shall be recoverable from any amount due to the contractor or from the Security Deposit.

21. Safety / Security

The contractor shall adhere to and enforce all safety and fire prevention rules of the Company during the performance of the work. The Company reserves the right to reject entry to the Contractor's workmen either individually or wholly without assigning any reason. Prior to commencement of the work, the Contractor shall furnish list of

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employees when he intended to take in for his job, to the Chief Executive Officer (CEO) of the Company with a copy to the Personnel Department.

During the progress of work, the contractor should maintain good housekeeping at the work-site. They shall remove unwanted items like barrels; drums etc. from work site on a daily basis and keep plant areas clean.

Contractor's supervisor shall always be available at the work spot and shall carry with him a valid work/safety permit, duly signed by the concerned officer.

- v) The Contractor shall be responsible for engagement of required workers/supervisors for the work. The contractor shall also be responsible for the good conduct, proper and prompt performance of all the workers/supervisors engaged by him. If any damages occur to Company's properties the company reserves the right to make good such damages at the contractor's risk and cost.

- w) The accepted rate shall be firm, fixed and binding on the contractor and shall not be entitled to any escalation/variation on my account. In case there is any revision of wages etc., to the employees of the contractor, the company shall in no way be responsible to compensate the contractor for increase in benefits, wages etc.

- x) The Company also reserves the right to engage more than one contractor for undertaking the works. The contractor shall also carry out portion of the work, if allotted and carry out such works on the terms and conditions specified in the work order. The contractor will have to adjust his works in such a way that the working of the plant does not suffer. If he has to stop the work, he will have to do so. No compensation shall be claimed for such adjustment of work, under any circumstances.

- y) The contractor is liable to pay ESI, Provident Fund and other statutory dues to all workers engaged by him or in connection with the work. The contractor should furnish the details of employment wages paid etc., to the Personnel Department on weekly basis. Payments against the work will be considered only after enquiring compliance

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with the above. The contractors if required shall be liable to furnish such details required by statutory authorities regarding employment, wages etc.

- z) The contractor is required to register himself with provided fund commissioner, Director of ESI etc. as a principal employer. The employer code number assigned by the authorities may be communicated to the company within 7 days from the date of receipt of letter of acceptance/work order. If no communication in this regard is received by the Company, recoveries will be affected towards the above as per law in force from the running bills, final bills at the rates applicable from time to time from the wages, paid to the workers engaged by contractor.

- aa) All questions, dispute arising out of or in connection with the contract work shall be decided by the Chief Executive officer (CEO) whose decision shall be final and binding on the contractor.

- bb) All disputes, differences arising under, out of or in connection with the contract shall be subjected to the jurisdiction of the courts at District Yavatmal, Maharashtra.

46. SAFETY REGULATIONS

In respect of all labor, directly or indirectly employed in work for the performance of contractors' part of this agreement Contractor shall at his own expense arrange for all safety provisions as per safety codes of CPWD, Indian Standards Institution, The Electricity Act, The Mines Act and such other Acts as applicable.

Contractor shall also observe and abide by all safety rules and regulations of the Company.

1. Carrying Match boxes and Lighters / smoking

Smoking is strictly prohibited anywhere inside the YUCBL's building premises. Carrying of match boxes and lighters within the plant premises as also not permitted.

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2. Safety clearance procedure

- (i) Any work involving carried out within the building must be covered by a work permit issued by Engineer. In addition, a safety permit must be obtained from the Safety Department, prior to commencement of the following types of work.
 - a) Any work involving open flames and sparks such as welding, gas cutter soldering, grinding, use of hurricane lamps, petromax etc.
 - b) Sand blasting
 - c) Use of gasoline, diesel or electric power driven engines and tools.
 - d) Entry of vehicles inside the battery limits of process area
 - e) Entry of personnel into any process or storage facilities that has been in service.
 - f) Entry into hazardous and potentially hazardous areas
 - g) Entry of personnel into confined space such as tank, vat, pit etc.
 - f) All points stipulated in the Safety permit must be strictly complied with.
 - h) The Company reserves the right to cancel a work or safety permit without assigning reasons, when called upon to stop the work by any company personnel; contractor shall immediately cease to continue the work. Before recommencement, fresh work and safety permits must be obtained.
3. Under no condition shall any Contractor's personnel tamper, with or use any property belonging to the Company without obtaining prior sanction from the Engineer concerned.
4. Contractor's personnel shall stop their work and proceed to safe area in the event of an emergency arises in the area they are working like in case of fire, leaking of toxic gases, oil spillage, power failure etc. They should not crowd round and create confusion in the area where the emergency has occurred. Before recommencement of the work, they should obtain clearance of Engineer.

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5. (i) Before erecting temporary shelters like tents anywhere, within the Company premises, written permission of Safety department must be obtained.
 - (ii) Temporary fixtures like, shed tents etc, shall be erected in conformity with normal safety standards.
 - (iii) Temporary piping, hose connection and electrical wiring must be laid in such a manner that they will not cause tripping or hitting hazards.
 - (iv) All precautions should be taken to ensure that any temporary electric wiring used within the YUCBL's building and work area will not emit sparks.
6. Good housekeeping must be practiced by the Contractor's personnel at all times while within the plant. During and after completion of the work, they are to ensure that their work area is kept clean and tidy. Left over materials and equipment should be removed to a safe area and stored in an orderly manner. These materials should not block exists to roads, buildings, aisles, passages and approach to fire extinguishers or areas where emergency safety shower electrical switch panels and switch rooms are located.
 7. It is entirely the Contractor's responsibility to provide all the safety equipment wherever required to their personnel as stipulate in the safety manual of the Company. The Company is in no way responsible for any injury, disability or death of any of the Contractor's workmen due to non-compliance of the safety regulations. However, in certain cases, personal protective equipment can be made available to the contractor on payment to the Company. The contractor shall also ensure that their workers use/wear required personal protective equipments while on duty.
 8. The Contractor must disclose the nature of chemicals with respect to its Fire/reactivity/toxicity (Material safety data sheet) they bring to the YUCBL's building or work location for work to the safety dept. before commencing the work.
 9. The Contractor's supervisor must be present at the work spot as long as the work is being continued. The worker shall never left at site without supervised by the Contractor.

10. Accident or injury to workmen

The Company shall not be liable for or in respect of any damage or compensation payable as law in respects of or in consequences of any accident or injury to any workmen or other persons in the employment of the contractor or any sub-contractor and the contractor shall indemnify and keep indemnified the company against all such damages and compensation and against all claim demands, proceedings, costs charges and expenses whatsoever in respect or in relation thereto.

The contractor shall at any times indemnify the Company against all claim demands for compensation under the provisions of the Workmen's Compensation Act or any other law for the time being in force.

11. Contractor's personnel shall not wear loose clothing while working around, moving or rotating machinery and equipment.
12. Any unsafe practice or disregard of normal safe working practices by contractor's personnel when pointed out by Company personnel shall be immediately corrected.

13. Personal conduct

- (a) Entering YUCBL's building premises while under the influence of alcohol/ narcotics is strictly forbidden.
- (b) Fooling on work, mock fighting or fighting within the YUCBL's building premises will not be tolerated.
- (c) Gambling within the YUCBL's building premises is strictly forbidden.
- (d) Entering the YUCBL's building premises while in possession of weapons such as knives etc. is prohibited.
- (e) Contractor's personnel shall not pick up quarrel or get into arguments with Company's personnel or act in any manner subversive of YUCBL's discipline. In case of any misunderstanding such problem should be referred to appropriate personnel in the security department.

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14. Fire protection equipment

- a) A work permit must be obtained prior to Contractor's personnel drawing water from the YUCBL's building's firewater loop.
- b) All efforts should be made by the Contractor's personnel to prevent occurrence of any unwanted fire.

15. Report on accident

- a) All injuries sustained by Contractor's personnel damages to vehicle and property, no matter how slight they are, shall be promptly reported to the safety department during normal working hours and to the Duty Officer, other than normal working hours and to the prescribed statutory authorities.
- b) The contractor shall also make adequate arrangement for rendering all possible aid to the victims of the accidents.
- c) Medical treatment for injured Contractor's personnel will be entirely the responsibility of the Contractor. However, if required emergency first aid treatment may be given by YUCBL's First aid center.
- d) Any question or doubts on safety regulations enumerated above or the generally accepted safe working practices may be clarified with the safety department.

I hereby declare that, I have perused in detail and examined closely all clauses, the detailed preliminary standard techno – commercial specification for items, for which I tender, before I submit such bid and agree to be bound/comply with all such specifications excluding clause and other clauses relating to contained therein for all agreements which I execute with THE YAVATMAL URBAN CO-OPERATIVE BANK. LTD. I have signed the register as below in acknowledgement thereof.

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Below is a checklist for major clauses and documents to be submitted by bidder with bid:

Sr.No.	Particulars	Submitted/Non submitted	Agreement with clause	Deviation
1	SCOPE OF WORK	Basic system design		
2	PRE-QUALIFICATION OF BIDDER	List of certificates submitted		
3	CONTRACT PRICE	Commercial bid		
4	SECURITY DEPOSIT			
5	NON-PERFORMANCE OF CONTRACT/CANCELLATION OF CONTRACT/ RIGHTS OF THE YUCBL			
6	NEGOTIATION			
7	VALIDITY OF OFFER			
8	HOW TO QUOTE	List of submitted documents		
9	TERMS OF PAYMENT			
10	TIME OF COMPLETION	Execution Schedule		
11	. SAFETY REGULATIONS			
12	INCOME TAX & GOODS AND SERVICE TAX CLEARANCE CERTIFICATE / REGISTRATION	List of certificates submitted		
13	NO CLAIM / COMPENSATION FOR SUBMISSION OF TENDER			
14	YUCBL's / COMPANYS RIGHT TO ISSUE ADDENDUM TO TENDER DOCUMENTS			
15	YUCBL's / COMPANYS RIGHT TO ACCEPT OR REJECT TENDER			
16	SIGNING OF CONTRACT			
17	GUARANTEE PERIOD			
18	ASSIGNMENT AND SUB-LETTING			
19	DEFAULT			

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20	DOCUMENTS TO BE SUBMITTED ALONG WITH THE TENDER	<ul style="list-style-type: none"> • Scanned / photo copy of the tender document duly signed and stamped as a token of acceptance of all the terms of tender. • Brief write up about your organization • Deviations statements, if any 		
21	DESIGN CRITERIA	Basic design		
22	BILL OF MATERIALS	<ul style="list-style-type: none"> • Complete Bill of Materials shall be provided along with the offer 		
23	INSTALLATION AND COMMISSIONING	Draft handover – takeover document		
24	QA & QC PROGRAM	<ul style="list-style-type: none"> • QA/QC program shall be submitted by BIDDER during design stage 		
25	PACKING, SHIPPING AND MARKING			
26	PROGRESS REPORTS	<ul style="list-style-type: none"> • Progress Reports shall be submitted by the first day (Monday) of each week (for the previous week) during installation 		
27	AFTER SALES & SERVICE	AMC service schedule		
29	CODES & STANDARDS			
30	INSPECTION AND TESTING			
31	WARRANTY AND PERFORMANCE GUARANTEE	Warranty and Performance guarantee schedule		
32	GENERAL CONDITIONS OF CONTRACT			

Date:

Name of Bidder or Contractor:

Address of the Bidder or Contractor

Signature of Bidder or Contractor