

ODISHA RENEWABLE ENERGY DEVELOPMENT AGENCY

BHUBANESWAR

BID DOCUMENT

DETAIL OF E-TENDER CALL NOTICE No. 3376 /OREDA DTD-12.8.2016

FOR

Design, Supply, Installation, Commissioning and Maintenance of roof top Solar PV Power Plants in the state Special Area Demonstration Programme, MNRE, GOI

Date of release of bid	12.8.16
Date & time of pre-bid meeting	19.8.16, OREDA Conference hall, 11-30 AM
Final online bid document hoisting	20.8.16
Date and time of last submission online	31.8.16 at 5.00 PM
Date and time of submission of hard copy of documents.	3.9.16 at 11-00 AM
Opening of Techno-commercial bid (Part-I)	3.9.16 at 11-30 AM
Date of opening of the price bid (part-II)	To be informed to the qualified bidders.

Revised and Final

S-3/59, MANCHESWAR INDUSTRIAL ESTATE, BHUBANESWAR-751010

Phone : (0674) 2588260,2586398,2580554. Fax:2586368

Website: www.oredaorissa.com,

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Disclaimer

Kindly Note:

This document is not transferable

Though adequate care has been taken for preparation of this document, the bidder shall satisfy himself that the document is complete in all respects. Intimation of any discrepancy shall be given to this office immediately or in the pre-bid meeting. If no intimation is received from any bidder on or before the pre bid meeting , it shall be considered that bid document is complete in all respects and has been received by the bidder.

The Odisha Renewable Energy Development Agency (OREDA) reserves the right to modify, amend or supplement this bid document keeping in view the necessity in implementation of the scheme.

While the bid document has been prepared in good faith, neither OREDA nor their employees or advisors make any representation, warranty, express or implied or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability and completeness of this bid document, even if any loss or damage is caused by any act or omission on their part.

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NOTICE INVITING TENDER

E-TENDER NOTICE NO: 3376 /OREDA

DTD-12.8.2016

ODISHA RENEWABLE ENERGY DEVELOPMENT AGENCY invites sealed e-tenders in two part bidding system from manufacturer, system integrator, EPC firms for Design, Manufacture, Supply, Installation (Erection), Testing, Commissioning, including Warranty and Comprehensive Maintenance Contract for a period of 5 years for rooftop Solar PV power plants as detailed in the state of Odisha.

Date of release of bid	12.8.16
Date & time of pre-bid meeting	19.8.16, OREDA Conference hall, 11-30 AM
Revised & final online bid document uploading	20.8.16
Date and time of last submission online	31.8.16 at 5.00 PM
Date and time of submission of hard copy of online documents.	3.9.16 at 11-00 AM
Opening of Techno-commercial bid (Part-I)	3.9.16 at 11-30 AM
Date of opening of the price bid(part-II)	To be informed to the qualified bidders.

Interested prospective bidders may visit OREDA's website www.oredaorissa.com and www.tenderwizard.com/OREDA for details relating bidding process and all other terms and conditions. The bidders can view the tender documents from www.oredaorissa.com website free of cost.

Sd/

Chief Executive, OREDA

DETAIL OF NOTICE INVITING TENDER

ODISHA RENEWABLE ENERGY DEVELOPMENT AGENCY invites sealed e-tenders in two part bidding system from manufacturer, system integrator, EPC firms for Design, Manufacture, Supply, Installation (Erection), Testing, Commissioning, including Warranty and Comprehensive Maintenance Contract for a period of 5 years of solar power plant in the places **(packaged for all plants)** as detail below.

Particulars of schedule of work	Estimated Cost (Rs)	Earnest Money Deposit (Rs.)	Tender processing fee Non refundable (in Rs.)	Non refundable Cost of Bid document	Last date/time for submission of bids	Date and time of opening of bid
<p>Supply, installation, commissioning including warranty and Comprehensive Maintenance Contract for a period of 5 year in all respect as per the technical specification, schedule of materials and terms and condition of the of the work award on the basis of the lowest price (packaged for all) arrived at within a period of valid tender under the scope of work.</p> <p>15 Kwp X 5 on-grid SPV power plants at collectorates</p> <p>25 Kwp hybrid battery back up SPV power plant at Revenshaw University</p> <p>20 Kwp on-grid SPV power plant at RWS&S Office</p> <p>30 Kwp on-grid SPV power plants at Rajbhawan</p>	1,50,00,000	150,000	As applicable	Rs. 10500/-	<p>Online up to 31.8.16 at 5-00 PM</p> <p>Hard up to 3.09.16 at 11-00 AM</p>	Technical bid 3.09.16 at 11-30 AM

Interested prospective bidders may visit OREDA's website www.oredaorissa.com and www.tenderwizard.com/OREDA for details relating bidding process and all other terms and conditions. The bidders can view the tender documents from www.oredaorissa.com website free of cost. The authority reserves the right to accept / reject any part thereof or all the bids without assigning any reason.

Sd/-

Chief Executive, OREDA

1. Instruction to bidders for online submission

The prospective bidders who do not have the supporting documents of proofs of all the eligibility (qualification) conditions must not submit the bid document.

(i) The bidders who want to submit bid shall have to pay the **tender cost** for the package (As mentioned in TENDER SCHEDULE, non-refundable which is inclusive VAT @ 5%), in the form of **Demand draft** only, drawn in favour of Chief Executive, OREDA payable at Bhubaneswar / BG with validity of 90 days in the prescribed format.

(ii) The bidders shall have to submit the non-refundable tender processing fee (As mentioned in TENDER SCHEDULE, which is inclusive of service **tax@15%**) in the form of e-payment mode

NOTE: For tender processing fee to K.S.E.D.C. Ltd. Bangalore, the bidder can use various modes of e-payment facility available through Tender wizard Portal, i.e. by Credit Card, Debit Card, Net Banking).

(iii) The bidders shall have to scan the Demand Draft / Bank guarantee towards EMD , Tender Cost , signed copy of tender document (all pages) as a token of acceptance and other additional documents against the tender and upload the same in the prescribed form in .pdf or .jpg format in addition to sending the original as stated below.

(iv) The prospective bidders are advised to register their user ID, Password, company ID from website www.tenderwizard.com/OREDA by clicking on hyper link “**Register Me**”.

(v) Any clarifications regarding the scope of work and technical features of the project can be had from the undersigned during office hours

NB: All subsequent addendum/Corrigendum to the tender shall be hoisted in OREDA’s official web site www.oredaorissa.com and www.tenderwizard.com/OREDA only

NB:-All subsequent addendum / Corrigendum / revised final document to the tender shall be hoisted in OREDA’s official web site www.oredaorissa.com and www.tenderwizard.com/OREDA only.

For and on behalf of OREDA

2. SUBMISSION OF BIDS ONLINE

MODE OF SUBMISSION OF BID:-

(A) (i) The bidder shall submit the bid in Electronic Mode only i.e. in www.tenderwizard.com/OREDA portal. The bidder must ensure that the bids are received in the specified website of the OREDA by the date and time indicated in the Tender notice.

(ii) Bids submitted by telex / telegram will not be accepted.

(iii) The OREDA reserves the right to reject any bid, which is not submitted in electronic mode and according to the instruction, stipulated above.

(A-I) PARTICIPATION IN e-TENDER:-

ACQUISITION OF DIGITAL SIGNATURE CERTIFICATE

(i) For all the users it is mandatory to procure the Digital Signatures of **Class III only**.

(ii) Bidders are requested to follow the below steps for registration.

(A-2) REGISTRATION IN TENDER WIZARD PORTAL

(i) Log in www.tenderwizard.com/OREDA Click “Register”, fill the online registration Form.

(ii) Payment for an amount of Rs. 2300/- or such specified shall be made to KSEDCL, Bangalore for vendor registration in tender wizard portal in **e-payment** mode only.

(iii) As soon as the verification is being done the e-tender user id will be enabled/provided.

(A-3) ON LINE REQUEST FOR e-tender DOCUMENTS.

After viewing Tender Notification in www.tenderwizard.com/OREDA if bidder intends to participate in tender, he has to use his e-tendering User Id and Password which has been received after registration and acquisition of DSCs (Digital signature certificate). If

any Bidder wants to participate in the tender he has to follow the instructions given below.

(i) Insert the PKI (which consist of your Digital Signature Certificate) in your System. (Note: Make sure that necessary software of PKI be installed in your system).

(ii) Click / Double Click to open the Microsoft Internet Explorer (This icon will be located on the Desktop of the computer).

(iii)Go to Start > Programs > Internet Explorer. Type www.tenderwizard.com/OREDA in the address bar, to access the Login Screen.

(iv) Enter e-tender User Id and Password, click on “Go”. Click on “Click here to login” for selecting the Digital Signature Certificate. Select the Certificate and enter DSC Password. Re-enter the e- Procurement User Id Password

(v) Click “Un Applied” to view / apply for new tenders.

(vi) Click on Request icon for online request. After making the request, bidder has to pay the requisite tender processing fee (as indicated in tender notice) through e-payment facility only available in the portal. Bidders will receive the Tender Documents which can be checked and downloaded by following the below steps.

(vi) Click to view the tender documents which are received by the user. Tender document screen appears.

(vii) Click “Click here to download” to download the documents.

NOTE: For vendor registration and payment of tender processing fee to KESDCL, the bidder can use various modes of e-payment facility available through Tender wizard Portal, i.e. by Credit Card, Debit Card, Net Banking.

(B) ONLINE SUBMISSION OF BID

The bidders shall have to scan the Demand Draft towards EMD, Tender Cost , signed copy of tender document (all pages) as a token of acceptance and other additional documents against the tender and upload the same in the prescribed form in .pdf or .jpg format in addition to sending the original **except bid sheets (.xls)** prior to last date and

time of receipt of bids as specified in tender Notice. Tender processing fees is mandatory & to be paid on **e-payment** mode as stated elsewhere in the document.

(B-1) PROPER FILLING UP OF THE PRICE SCHEDULE:

The bidder should fill up the Techno commercial and price schedule properly and fill in the bid sheets provided in .xls format and up-load the same without changing the file name. The tender may be rejected if the schedule of price is submitted in incomplete form.

NB: The bid sheets (.xls file) shall be uploaded in www.tenderwizard.com/OREDA portal, prior to online closing of the tender. By no other means (except online) price bid shall be accepted for evaluation of tender.

(i) After completing all the formalities Bidders will have to submit the tender as specified NIT and they must take care of all instructions. Prior to submission, verify whether all the required documents have been attached and uploaded to the particular tender or not.

Note down / take a print of bid control number once it displayed on the screen

(ii) Tender Opening event can be viewed online.

(iii) Competitors bid sheets are available in the website for all participated bidders.

NOTES:

For any e-tendering assistant contact help desk number,

080- 40482000(Bangalore). OREDA HELP DESK- 09937140591

(C) DEAD LINE FOR SUBMISSION OF BIDS

Soft copy of the bid shall be uploaded through the portal www.tenderwizard.com/OREDA on or before the online submission time and date as stipulated in the bidding document. **DD towards Tender cost, DD towards Bid Security, tender processing fee acknowledgement & a set of all uploaded documents must be received by OREDA at the address specified not later than the time and date stated in the tender notification.**

In the event of the specified date for the submission of bids being declared a holiday for OREDA, the bids will be received on the next working day as per the time indicated in tender notification.

(ii) OREDA may, at its discretion, extend this deadline for submission of bids by amending the Bidding Documents in accordance with ITB for the reasons specified therein at any time prior to opening of, in which case all rights and obligations of Employer and bidders will thereafter be subject to the deadline as extended.

(D) LATE BIDS

(i) Soft part of the bid cannot be uploaded on the portal after expiry of submission time and the bidder shall not be permitted to submit the same by any other mode. In such case, even if the bidder has submitted the specific documents in hard copy in original (viz., bid security, tender cost & any other document) within the stipulated deadline, its bid shall be considered as late bid. The hard copy submitted [specific documents (viz., bid security, tender cost.)] shall be returned unopened to the bidder.

(ii) Hard copy of the bid security of the bid received by OREDA after the deadline for submission of bid prescribed by the GTCC will be considered as late bid even the bidder has uploaded the soft part of the bid within the stipulated deadline. In a such case, the soft part of the bid uploaded on the portal shall be sent unopened to “Archive “ and shall not considered at all any future.

(E) MODIFICATION AND WITHDRAWAL OF BIDS:-

(i) Bidder may modify or withdraw its bids through the relevant provisions on the portal www.tenderwizard.com/OREDA up to due date and time of submission of bid indicated in tender notification.

(ii) The Bidder’s modifications shall be done and submitted as follows:

Modified Electronic form of the bid as per the provision of portal therein.

(iii) Bidder may withdraw its bid through the relevant provisions of portal only.

(iv) No bid shall be modified/ withdrawn subsequent to the dead line for submission of bids. Withdrawal/modification of bid before the expiry of bid validity shall result forfeiture of Bidder's bid security.

2. SEALING AND MARKING OF BID:-

(A) Hard copy of the followings should be submitted with OREDA:

- (i) Demand draft towards cost of bid document.
- (ii) Tender processing fee acknowledgement copy.
- (iii) Bid Security in shape of DD/BG as described.

Technical Bid document in hard bound form with each page legibly numbered comprising of the following

All the papers of bid documents **except the price bid** duly signed & should be uploaded in **e-tender** portal. Hard copy (i.e EMD, Tender cost & signed e-tender document) shall be submitted OREDA office at S-57, Mancheswar Industrial Estate, Bhubaneswar 751010 before tender closing date and time.

*Contactors/Vendors are advised to upload their tender documents well in advance to avoid last minutes disappointed.

Check list of documents to be submitted along with the bid as serialised below

Sl no	Particulars	Complied	Page-no / Flag
1	Bank draft for Rs.10,500/- or exempt as admissible with proof for local NSIC / MSME only	Bank No Dt	Envelope
2	Bank draft for Rs.150,000/-towards Earnest Money deposit or exempt as admissible for local NSIC / MSME with proof.	Bank No Dt	Envelope
3	Undertaking duly signed and stamped by the bidder. Undertaking to unconditionally accept all terms and conditions of the bid document with copy of Board Resolution		
4	Valid document registering the status of the bidder as manufacturer /systems integrator / EPC		
5	Copy of the PAN card of the bidder's firm		
6	Copy of the TIN card of the bidder's firm		
7	Copies of Tax returns, VAT/ tax return		
8	Document showing turnover on the letter head of the chartered accountant for last 3 years.		
9	Proof of installation of min two 15 Kwp and above Solar power plant in Govt / PSU /Govt Agencies. Copies of certificates given by the concerned government agencies to be enclosed		
10	Valid Test reports of components of solar power plant from MNRE accredited test lab as applicable under JNNSM(module, battery & PCU as applicable)		

11	Declaration /Original Board resolution to undertake the work under the jurisdiction of the local office, if qualified		
12	Willingness to open service centre in the state of Odisha and Local registered office for total execution		
13	Undertaking for Indigenouness of the supplied items		
14	Filled in bid document duly signed and stamped at the bottom of each page except the price bid format.		
15	Price bid in separate single sealed envelope online only		

UNDERTAKING BY THE BIDDER

I/we here by undertake that

We have thoroughly read and examined the notice inviting TENDER and the TENDER document along with all its schedules, annexure etc.

1. The rates quoted by us are firm and final and are meant for execution of the allotted supply / installation within the time frame stipulated in the TENDER/supply / installation order.
2. All terms and conditions of the TENDER including the rates quoted by us shall remain valid for a period of one year or as may be agreed upon from the date of opening of the technical bids.
3. In case our TENDER is incomplete in any respect or we violate any of the prescriptions given in the TENDER for submission of the same OREDA shall , without prejudice to any other right or remedy , be at liberty to forfeit the earnest money deposited by us.
4. In case of award of supply / installation in our favour OREDA shall have the right to convert the EMD deposited by us in to full or part (as the case may be) of the security deposit to be deposited by us against award of the supply / installation.
5. In case we fail to commence or complete the supply / installation as per the time schedules or fail to fulfill any of the terms and conditions given in the tender OREDA shall , without prejudice to any other right or remedy , be at liberty to forfeit the security deposit made by us against the award of the supply / installation.
6. I/We hereby declare that I/We shall treat the TENDER documents, specifications and other records connected with the supply / installation as secret/confidential and shall not communicate information derived there-from to any person other than a person to whom 7. I/We have authorized to communicate the same or use the information in any manner prejudiced to the safety of OREDA/the State Govt.

8. I/We shall abide by all the laws prevailing at the time of the execution of the supply / installation and shall be responsible for making payments of all the taxes, duties, levies and other Govt. dues etc. to the appropriate Govt. departments.
9. The entire TENDER document has been discussed in the Board meeting and a resolution has been concurred for participation in the TENDER (copy enclosed)
10. We are not involved in any litigation that may have an impact of affecting or compromising the delivery of services as required under this TENDER
11. We are not blacklisted / defaulted in any manner by any Central / State Government / Public Sector Undertaking in India.
12. In case any false documents submitted and found any time in future the firms shall be liable to be proceeded against as per prevailing laws.
13. I/We shall be responsible for the payment of the respective taxes to the appropriate authorities and should I/we fail to do so, I/we hereby authorize OREDA to recover the taxes due from us and deposit the same with the appropriate authorities on their demand.

Signature of bidder with stamp & date

Letter of Authorization

(to be submitted in the letter head of the bidder)

To,

Chief Executive

Odisha Renewable Energy Development Agency

S-59, MIE, Bhubaneswar-751010, Odisha

Sub: Submission of tender for the supply / installation of Design, Manufacturing, Testing, Supply, Installation, Commissioning & Maintenance of roof top SPV power plants.

Ref: TENDER Call Notice No. -----/ OREDA, dtd -----.

Sir,

I/we hereby authorise Ms. /Mr. _____, Designationof our company to sign all relevant documents on behalf of the company/firm in dealing with the above e-tender. She / He is also authorized to attend all meetings and submit technical and commercial information as may be required by OREDA in the course of processing of the e-tender.

We further authorise Ms. /Mr. _____ designation..... of our company to make technical presentation on behalf of the company.

Signature of the authorise persons

1. _____

2.

Signature attested

Name and designation of the attesting officer with stamp.

Yours faithfully

Head of the organization

1. Eligibility Criteria

In order to be eligible to participate in the E-tender, the bidder must fulfill the following eligibility criteria. Any discrepancy or deviation from the same shall make the bidder ineligible for participating in the E-tender and such E –tender documents shall be rejected.

1. The bidder must be a company registered under the Indian Companies Act 1956 or a firm registered under VAT / CST.
2. And the bidder must be a manufacturer of any component of solar system or a system integrator or EPC firm of the same. A copy of the registration certificate (DIC, NSIC, MSME, Register of Companies) to that effect is to be attached.
3. The materials to supply (solar module, battery and PCU as applicable) must have valid test certificate of the MNRE accredited valid test labs.
4. And the firm must have installed minimum 3 SPV power plants of capacity of 10 Kwp and above in Government / PSUs / Govt Institute in any part of the country during last 3 years. The certificates only to that effect from the authorised officers are to be attached.
5. And the bidder company must have average annual turnover of Rs. 3 crore for last 3 years (2013-14 to 2015-16). A Chartered Accountant certificate is to be attached to that effect.
6. And the firm must not have been debarred / blacklisted / default by any Govt. Dept, agency, PSUs / institution / agencies / autonomous organisations. A self-certificate by an authorized person of the bidder's company/firm is to be attached.

2. Scope of the work

The Bidder should act for providing an End-to-End solution for the identified locations including but not limited to design, supply providing of the required Solar Photo Voltaic power plant, with accessories, grid tied inverter, a bidirectional meter, peripherals like cables, junction boxes, earthing, etc. and installation, performance testing, commissioning adhering to the technical specification , warranty, annual maintenance, etc. The bidders have to ensure planning and smooth execution of the project as per the time schedules provided work order

On issue of work order the allotted PIA has to

2.1 Facilitate the application to the DISCO for NOC and obtain the approval for drawing, net- meter or certification of the net-meter to be provided by the firm, if any.

2.2 A clear understanding of the logistics and other feasible features of the sites.

2.3 Storage facility to be provided by the vendor for pre-installation inspection at intermediate points for facilitating inspection by the designated official of OREDA, if necessary.

2.4 Supply of complete systems (BOQ) as per technical specifications given in this document and as specified in the work order depending upon the demand of the job.

2.5 Installation of the supplied systems and commissioning of the same as per the prevailing electrical norms of the competent authority on the rooftops or on ground within the premises of the users, as the case may be as directed by the designated officials of OREDA in consultation.

2.5 Comprehensive Maintenance Contract (CMC) of the complete system for five years warranty period. The date of commencement of CMC shall be reckoned from the date of commissioning of the system.

2.6 Training at least one designated persons from each for the Govt. office as well as all designated technical persons of OREDA in day to day maintenance and upkeep of the system.

2.8 The successful bidder shall after completion and commissioning of the systems submit all details as per the online format of the installed systems like site details, systems details, installation report, etc. in the formats supplied by OREDA from time to time.

2.9 Installation of all necessary protection devices to protect the power plant from lightening, sudden surges in voltage and current and to ensure safety of the grid to which the plant is connected .The bidder should also ensure protection of life and property likely to be endangered due to the installed solar power plant

3.0 Opening of service centre/keeping servicing personnel and making available all essential spares in the vicinity of the plant such that the power plants will give the desired performance with least interruption

3.1 Submission of periodic reports and returns as per the MIS prescribed by OREDA

3.2. Other compliances

- a) While installing solar power plants on rooftops the physical condition of the roof should be taken in to consideration.
- b) There should not be any damage what so ever to the roof top due to setting up of the solar power plant so that on a later day there is leakage of rain water, etc. from the roof top.
- c) In case small damages are inevitable for erecting the footings for the module mounting structure etc. the roof top may be given a suitable grading plaster with suitable leak proof compound so as to render the roof entirely leak proof. .
- d) The solar PV array must be installed on the roof top in such a way that there is sufficient space on the roof top for maintenance etc.
- e) If the roof top does not have any access such as stairs or Ladder, a proper and safe ladder must be provided to ensure easy access to the roof top mainly for the purpose of maintenance and inspection.

- f) While cabling the array care must be taken such that no loose cables lie on the rooftops. The roof top should look clean and tidy after installation of the array. Display board is to be fixed in a prominent place.
- g) Collect and Compile the Customer's Information and hand it over to the CRM Dept of OREDA for assignment of Customer ID and building up of master Consumer Database.
- h) Extend both periodic and on call maintenance services through the CRC of OREDA as detailed elsewhere in this document.

3. INSTRUCTIONS TO BIDDERS

Intending bidders are requested to carefully study the instructions contained hereunder before preparing their bid documents for submission.

1. A Bidder shall submit a single offer-bid only. The bidders shall be responsible for properly uploading the relevant documents in the e-tender portal in the specified location and Tender Inviting Authority shall not be held liable for errors or omissions done while uploading the online bid.
2. Bidders must submit their bids for all items as stated in this bid document above.
3. Demand Drafts towards cost of document and EMD should be submitted in a separate envelop placed inside the envelope containing the technical bid.
4. Bids must be submitted in English language only.
5. Incomplete, telegraphic or conditional bids shall not be accepted.
6. Prices quoted must be firm and fixed. No price variation / escalation shall be allowed during process of completion of the project or for a period of one financial year whichever is earlier.
7. The bidders must sign at the bottom of each page of the bid documents at the time of submission in token of unconditional acceptance of the departmental terms and conditions, technical specifications etc.
8. Valid TIN / VAT / CST / tax return submission document duly attested must be submitted along with the bid. All rules and circulars of Finance Department, Govt of Odisha issued from time to time will be applicable during project period from issue of tender to the completion of 5 years CMC period.
9. Deviations in terms and conditions, Specification of material, Inspection clause etc. will not be accepted under any condition.
10. The bidder shall submit copies of documents defining the constitution or legal status, place of registration and principle place of business of company or firm.

11. The bidder shall furnish a brief write up backed with adequate data, explaining capacity and experience (both technical and commercial) for the manufacture and supply of the required systems, equipments within the specified time of completion after meeting all their commitments.
12. Earnest money as specified in bid may be deposited in cash at OREDA cash counter or in shape of Demand Draft drawn in favour of Chief Executive, OREDA payable at Bhubaneswar from any nationalized bank. Bids without E.M.D will not be accepted unless exempt.
13. Bids received late due to postal delay or otherwise will not be considered.
14. The bidders are required to furnish their offers in the price bid both in words & figures neatly computer typed. Any correction shall liable the document to be rejected. In case of any conflict between figures and words, the latter shall prevail.
15. Since timely execution of supply / installations is of paramount importance, requests for extension of time shall not be ordinarily entertained.
16. Canvassing in any manner shall not be entertained and will be viewed seriously leading to rejection of the bid.
17. Certificate to the effect that the systems to be supplied are indigenous & not fully imported must be furnished.
18. Power of attorney to sign the agreement on behalf of bidders & partnership deed articles, if any, should be enclosed along with original bid documents.
19. Notice inviting Tender, bid documents, prescribed Technical bid, price bid, terms & conditions will form the part of the tender.
20. All pages of the bid documents must be signed & sealed by the authorized person on behalf of the bidders.
21. Bids will be accepted & will be opened as per information mentioned in the notice-inviting tender. No receipt against submission of bid shall be issued by OREDA.
22. A pre bid meeting has been convened on 19.8.2016 in the conference hall of OREDA. After discussion, deliberation and written statement / suggestions of the representative, the final tender document revised and approved by the technical committee is uploaded on the website replacing the previous one.

23. Any clarification on the technical specification and commercial terms and conditions may be clarified in writing from OREDA.

24. Deviation of any commercial terms and condition and technical specification shall not be entertained under any circumstances

25. Bidders may in their own interest visit the sites in order to develop a clear understanding of the logistics and other features of the sites before submitting bids and under taking may be attached in the tender document. OREDA will not be responsible for any incidental or consequential losses of the firms while execution and till expiry of the period of maintenance.

26. All the bidders shall essentially indicate the break-up of prices as shown in Price bid.

27. If qualified, the bidder must open a local office at Bhubaneswar before commencement of the supply / installation for coordination of all jobs and service centres fully equipped with technical person and spare parts at cluster level in the district where solar pumps installed. Such facility must have proper mailing address with contact person detail from time to time for all documents. All supply / installation orders shall be placed with the state local registered office of the qualified empanelled bidders having valid Odisha TIN/ OVAT as per the FD circular no 5439 dtd 25.2.14.

28. On award of contract the qualified bidder shall be termed as executing agency.

29. Opening of the bids:

The procedure of opening of the bid shall be as under

i) The technical bid opening is ONLINE. The date of opening of the technical bid is only published in advanced. The date of opening of the price bid will be decided after verification of those bidders who qualify in the technical bid evaluation and will be informed in advance.

ii) The online opening of the technical bid and the price bid shall be done by the Chief Executive / or his authorised representative as per bid schedule. The prospective bidders can access to the online opening by logging in to the e-tender portal with the registered digital signature. Bidders / its authorised representative may not come to this office of OREDA for the opening of the technical or price bids.

iii) In the event of the specified date for opening of the bids being declared holiday, the bid shall be opened at the appointed time and venue on the next working day.

iv) In the event of the bid and claims in the online documents are materially missing or of substantial error or want of required qualifications, shall stand disqualified and rejected.

30. Evaluation of Bids

i) The documents submitted as technical bids shall be scrutinized by a bid evaluation committee duly appointed.

ii) The bid evaluation committee may also verify the veracity of claims in respect of the known performances of the items offered, the experience and reputation of bidder in the field, the financial solvency. The Tender Inviting Authority, if required reserves the right to inspect the facility of the bidder for verification of information furnished in the bid.

iii) The decisions of the bid evaluation committee on whether the bidders are responsive or non responsive.

iv) The verification of the items shall be conducted by the Technical Committee in which the external experts from the user institutions / funding agency.

v) The decision of the technical committee will be published

31. Price bid opening

i) The opening of the price bid shall be done online by the Tender Inviting Authority or the authorized representative and only the price bids in the proper format of the those firms qualified in the evaluation of the technical bids shall be opened.

ii) The lowest rate quoted in proper format complete in all respect the will be accepted.

32. Acceptance/ Rejection of the bid documents:

Chief Executive, OREDA reserves the right to reject or accept any bid or annul the bidding process at any time prior to award of contract, without having prejudice of incurring any liability to the affected bidders or any obligation to inform the bidders

Sd/-

Chief Executive

I/we have carefully read & understood the above terms & conditions of the bid & agree to abide by them.

Signature and Seal of bidder

4.Commercial Terms & Conditions

The Chief Executive, OREDA shall award the contract to the successful bidders whose bids shall be qualified after evaluation in terms of the responsiveness and lowest rate determined on the basis of price bids.

4.1 Rate :

The offer should indicate the unit cost of the system, Installation & Commissioning charges, CMC Charges and taxes & duties separately. The unit cost must be inclusive of packing, forwarding, loading & unloading charges, cost of insurance and transportation FOR destination where the system as per the technical spec will be installed as per the requisition /work order from the user / consumer.

4.2 Tax & Duties etc

i) As works contract, the contractor will submit the execution certificate under clause a) of sub-section (5) of section 54 of Odisha Value Added Tax Act-2004 from the competent authority before payment before prepare the bill otherwise 4% towards WCT / OVAT (TDS) will be deducted from each bill and certificate for such deduction will be issued. This will be subject to bifurcation of supply of materials, installation & commissioning and CMC.

4.3 Earnest Money Deposit

4.3.1 Earnest money deposit as specified in Table-1 is required to be deposited along with the bid without which the bid will not be accepted. No interest will be payable for the EMD amount under any circumstances.

4.3.2.Earnest money can be deposited in shape of a Demand Draft in favour of Chief Executive, OREDA from any Nationalised Bank Payable at Bhubaneswar / BG with validity of 90 days in prescribed format and the proof of deposits should be attached to the bid.

4.3.3 E.M.D would be refunded to the unsuccessful Bidders after finalization of the bid without any interest.

4.3.4.EMD would be refunded to successful bidder(s) after submission of security deposit as detailed at clause once S D / PGF amount exceeds the EMD amount.

4.3.5.E. M. D would be forfeited in case of non- compliance of the purchase order by the successful bidder.

In case of claim for exemption from deposition of Earnest money sufficient proof in support of claim for exemption of EMD for as prescribed in Govt. of India Notification is to be attached with the bid.

4.4. **Security Deposit/ Performance Guarantee Fees:**

The successful bidders must deposit Two numbers of bank guarantees (Annexure-H) towards Security cum Performance Guarantee fees with the Chief Executive, OREDA, Bhubaneswar along with bills, challans and all other documents as per payment clause before processing of payment as follows

- i) 5 % of the ordered value in shape of irrevocable Bank Guarantees with 5 years validity from the date of supply, installation and commissioning till the completion of respective warranty and CMC period of the composite system.
- ii) 5 % of the ordered value in shape of irrevocable Bank Guarantees with 10 years validity from the date of supply, installation and commissioning till the completion of respective warranty period of the module.

The said deposit would be forfeited, if the supplies are not made and performances are not as per the Terms & Conditions of the purchase order. The first security deposit amount will be refunded after the expiry of the Warranty period and CMC period of the systems i.e 5 years after commissioning of each system, subject to satisfactory execution / performance of the systems. The 2nd PBG will be refunded after the expiry of 10 years i.e module performance guarantee after successful performances.

4.5 **Programme Execution Schedule:**

The programme of execution of the supply, installation and commissioning shall be carried out as per the schedule given in the supply / installation order subject to issue of clearance by the user. The entire job has to be completed within maximum 3 months of sites clearance reports from User/ OREDA

Execution of supply / installation shall be carried out in an approved manner as outlined in the technical specification or where not outlined, in accordance with the relevant Indian Standard Specification, to the reasonable satisfaction of the Authorized OREDA Officer.

4.5.1 Upon intimation about commissioning of the systems by the executing firm a joint inspection will be carried out by the representatives of the executing firm, OREDA and other officers from Govt of Odisha / Govt. of India, if necessary.

4.5.2 The issuance of a JCC shall, in no way relieve the executing firm of its responsibility for satisfactory operation of the solar submersible pump systems.

4.6 Validity of offer:

The price bid offer (Annexure E,F,G,H, I,) must be kept valid for a period of one minimum year from the date of opening of the technical bid. No escalation clause except the admissible tax component under the period of consideration up to completion of CMC period would be accepted. The validity can be extended on same terms and condition, if mutually agreed upon.

4.7 Tax return:

The bidders must submit attested copy of valid up to date CST / VAT clearance / e-filing submission certificate along with the bid. The bid would not be considered without this document.

The original certificate would be produced at the time of opening of the bid, or, before issue of purchase order, if required.

4.8 Warranty:

The Supplier warrants that the Goods(as per the test report issued by authorized test centre) supplied under this Contract are new, unused, of the most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The Supplier further warrants that the Goods supplied under this Contract shall have no defect arising from design, materials or workmanship (except when the design and/or is required by the Purchaser's Specifications) or from any act or omission of the Supplier, that may develop under normal use of the supplied Goods in conditions prevailing in the country of final destination.

This warranty shall remain valid for 60(sixty) months after the Goods or any portion thereof as the case may be, have been delivered to and commissioned and accepted at the final destination indicated in the Contract.

The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall repair or replace the defective Goods or parts thereof, without cost to the Purchaser other than, where applicable, the cost of inland delivery of the repaired or replaced Goods or parts from the port of entry to the final destination.

If the Supplier, having been notified, fails to remedy the defect(s), the Purchaser may proceed to take such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

4.9 Penalty and termination of contract:

The systems shall be supplied, installed and commissioned within the scheduled time as mentioned in the supply / installation order. If the supplier fails to adhere to the schedule, OREDA shall without prejudice to its other remedies under the contract deduct from the contract price as liquidated damages a sum equivalent to 1% of the delivery price of the delayed goods or unperformed services for each week of delay until actual delivery or installation/commissioning up to a maximum deduction of 5% of the contract price for delayed goods or installation and commissioning. Once the maximum is reached (i.e 5 weeks of delay) OREDA may consider termination of the contract and forfeit the security deposit without prejudice to the other remedies of the contract.

If at any time during the performance of the Contract, the Supplier or its subtle executants(s) should encounter conditions impeding timely delivery of the Goods and performance of the Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of the Contract.

A delay by the supplier in the performance of its delivery obligations shall render the supplier liable to the imposition of liquidated damages pursuant, unless an extension of time is agreed upon without the application of liquidated damages.

4.10 Termination for Default

The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or in part:

- 4.10.1 if the Supplier fails to deliver any or all of the Goods within the period(s) specified in the Contract, or within any extension thereof granted by the Purchaser; or
- 4.10.2 if the Supplier fails to perform any other obligation(s) under the Contract.
- 4.10.3 If the supplier, in the judgement of the purchaser, has engaged in corrupt or fraudulent practices in competing for or in executing the contract.

For the purpose of this clause:

“Corrupt practice” means the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. “fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the borrower, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the borrower of the benefits of free and open competition.

In the event the Purchaser terminates the Contract in whole or in part, the Purchaser may procure, upon such terms and in such manner as it deems appropriate, Goods or services similar to those undelivered, and the Supplier shall be liable to the Purchaser for any excess costs for such similar Goods or services. However, the Supplier shall continue the performance of the Contract to the extent not terminated.

4.11 Inspection:

Pre delivery inspection of major components may be carried out by a team of designated officials of OREDA, any other department as may be considered appropriate at the factory site of the vendor / manufacturer. Before despatch of consignment intimation shall be given sufficiently ahead so that no delay occurs for deputing officials and inspection at the premises / test site.

- 4.11.1 The rest of the tests and inspections shall be made at the place of delivery. Officers authorized by OREDA shall be entitled at all reasonable time to inspect and supervise and test during erection and commissioning. Such inspection will not relieve the executing firm of their obligation in the contract.
- 4.11.2 OREDA shall have the right to have the tests carried out at its own cost by an independent agency at any point of time.

4.12 Payment:

Payment will be made in installment of solar water pumping system installed out of the total supply / installation order issued against the respective in the following manner

Full value of systems with full taxes / duties (excluding CMC charges) will be made after commissioning of the project. The check list of documents to be submitted along with the bills and Security cum Performance Bank Guarantee for release will be as per the purchase order issued.

For processing of the payment the indicative documents are to be submitted such as inspection and testing report, location map of the System, GPS based photograph wherever available of the system, System handing over report, Warranty certificate, Joint commissioning certificate or any other documents as may be required.

4.13 Allocation of award & Execution:

All supply / installation orders shall be placed with the state local registered office of the qualified empanelled bidders having valid Odisha TIN/ OVAT as per the FD circular no 5439 dtd 25.2.14.

Total allocation of work will be awarded to the lowest evaluated responsive bid at L1 rate in suitable manner. However, the firm work order will be placed on availability of clearance and subsequent performance of the firm. In case of more than one bidders quoting the same rate, the work will be awarded in equal parts among them.

In case L1 bidder fails to execute the work in time or in case of violation of terms and conditions, the same will be offered to L2, L3 bidders so on accepting the L1 price.

4.14 **Comprehensive Maintenance Contract:**

CMC will be applicable during the period of the warranty period of 5 years. The bidder must enter into a Comprehensive maintenance contract for the specified period at the time of execution of the order. Offer without such CMC shall not be considered (sample format of CMC enclosed at Annexure). The scope of CMC must cover supply of all spare parts, services and performance reports during the contract in force. Order shall be placed on bidders who agree to offer such CMC. The payment of annual maintenance charges under the Comprehensive Maintenance Contract shall depend upon the functionality of the system duly certified by the concerned Authorised officials of OREDA. Upon receipt of such certificates CMC amount as applicable shall be paid at the end of 1st, 2nd, 3rd, 4th and 5th years.

4.15 **Limitation of Liability:**

OREDA, will, in no case be responsible for any accident fatal or non-fatal, caused to any worker or outsider in course of transport or execution of supply / installation. All safety measures as per prevailing norms should be adopted. All the expenditure including treatment or compensation will be entirely borne by the Executants. The Executants shall also be responsible for any claims of the workers including PF, Gratuity, ESI & other legal obligations. The executants shall take all steps towards the security compliances.

4.16 **Force Majeure:**

In no event shall either Party have any liability for failure to comply with this Agreement, if such failure results directly from the occurrence of any contingency beyond the reasonable control of the Party, including, without limitation, strike or other labor disturbance, riot, major power failure, war, natural calamities including but not limited to floods, earthquakes, fire, volcanic eruptions, epidemics, National Emergency, interference by any government or governmental agency, embargo, seizure, or enactment or abolition of any law, statute, ordinance, rule, or regulation (each a " Force Majeure Event"). In the event that either Party is unable to perform any of its obligations under this Agreement because of a Force Majeure Event, the Party who has been so affected shall as soon as may be, after coming to know of the Force Majeure Event, inform the other Party and shall take reasonable steps to resume performance as soon as may be after the cessation of the Force Majeure

Event. If the period of nonperformance due to a Force Majeure Event exceeds thirty (30) days, the Party whose ability to perform has been so affected may, by giving written notice, terminate this Agreement.

4.17 Dispute:

For adjudication of any dispute between OREDA and the bidders arising in this case, reference can be made to any Law courts under the jurisdiction of Odisha High court only. The Chief Executive, OREDA reserves the right to accept or reject any or all bids without assigning any reason thereof.

Sd/-

Chief Executive

I/We have carefully read and understood the above terms and conditions of the bid and agree to abide by them.

Signature of the bidder with

Seal

5. TECHNICAL SPECIFICATION

The general scope under this contract includes to design, manufacture, testing ,inspection, packing and forwarding, transportation up to project site, loading & unloading, storage in safe custody, erection, carrying out preliminary tests at site, commissioning, performance testing, operation and maintenance for 5 years & handing over to all the equipment of SPV Power plant on the respective sites / as per instruction from time to time. The illustrative Schedule of requirements is in accordance with the specifications contained in this document

System Detail:

Sl.No.	Brief Description	Units	Make
1	SPV module as per specifications.	1 Set	Indigenous, compliant to bid document specification, IEC/ MNRE
2	SPV module mounting structure suitable for accommodating capacity SPV modules including foundation as per specifications on rooftop	1 Set	As per IEC / BIS
3	PCUs as per specifications	As per spec	SMA / OPS/Schneider/KACO Siemens / ABB / Emerson / Refusol / Delta /equivalent
4	Array Junction Boxes	1 Set	Tyco / Hensel/ spelberg / equivalent
5	Main Junction Boxes	1 Set	Tyco / Hensel/ spelberg / equivalent
6	Data Logging system with remote monitoring as per specification	1 Set	system as per specifications
7	DC Distribution units as per	1 Set	Siemens / ABB / Schnieder

	specifications		Electric/ L&T / equivalent
8	AC Distribution units as per specifications	1 Set	Siemens / ABB / Schnieder Electric/ L&T / equivalent
9	Cables requirement as per design	Mtrs.	Finolex / Polycab / Havells /equivalent
10	Fire extinguisher in accordance with BIS codes, sand buckets	1 Set	As per relevant standard
11	Lightning arrester complete set as per specification	1 Set	As per BIS compliant
12	Earthing complete set as per specification	1 Set	As per BIS compliant
13	Battery as per specification and capacity with all housing, where necessary	1 set	As per MNRE test certificate
14	Fuses, Transfer switches, Printed Circuit boards required for power plant	1 Set	As per relevant standard
15	Providing training to engineers and site staff for operating Maintenance and trouble shooting skills		
16	Operation and maintenance of the SPV Power Plant for a period of 5 years from date of commissioning of the power plant.		
17	Engineering, electrical drawings and installations and O&M manuals	1 Sets	

All the items against which no make has been mentioned must confirm to ISI standards and not below IEC specifications.

Specification of Solar PV Modules

Solar PV modules shall be of the crystalline silicon type, manufactured in India. Detailed specifications of the solar PV modules are given below:

Type	Crystalline silicon
Origin	Manufactured in India
Efficiency	>13%
Fill factor	>70%
Degradation	$\geq 90\%$ of design nominal power after 10 years.
Warranty	$\geq 80\%$ of design nominal power after 20 years.
Module frame	Non-corrosive and electrolytic compatible with the mounting structure material.
Termination box	Thermo-plastic, IP 65, UV resistant
Blocking diodes	Schottky type
Module minimum rated power	The nominal power of a single PV module shall not be less than 74Wp.
RF Identification tag for each solar Module	Must be able to withstand environmental conditions and last the life of the solar module and shall be kept inside the module. As per guidelines issued for off-grid and decentralized applications programme under JNNSM, the RFID tag must be inside of the module from 01.07.2013 onwards.
RF Identification tag data	<ul style="list-style-type: none"> a) Name of the manufacturer of PV Module b) Name of the Manufacturer of Solar cells c) Month and year of the manufacture (separately for solar cells and module) d) Country of origin (separately for solar cells and module) e) I-V curve for the module f) W_m, I_m, V_m and FF for the module g) Unique Serial No and Model No of the

	Module h) Date and year of obtaining IEC PV module qualification certificate i) Name of the test lab issuing IEC certificate j) Other relevant information on traceability of solar cells and module as per ISO 9000
Power output rating	To be given for standard test conditions (STC). I_V curve of the sample module should be submitted
Compliance with standards Codes	IEC 61215 / IS 14286 IEC 61730 part 1 and 2
Salt Mist Corrosion Testing	As per IEC 61701

Solar PV Module Mounting Structure

The PV modules shall be mounted on fixed metallic structures of adequate strength and appropriate design, which can withstand the load of the modules and high wind velocities up to 150 km per hour. The support structure shall be hot dip galvanized steel or aluminum.

Wind velocity withstanding capacity	150 km / hour
Structure material	Hot dip galvanised steel with galvanisation thickness of min 120 micron or aluminum alloy.
Bolts, nuts, fasteners, panel mounting clamps	Stainless steel SS304
Mounting arrangement for flat roofs	With concrete ballast made of PCC (1:2:4), M15
Mounting arrangement for metal sheet roofs	Mounting directly on the sheet metal, ensuring stability and wind withstanding capacity, or penetrating the sheet metal and fixing to the substructure, ensuring that the roof, remains water proof and ensuring stability and wind withstanding capacity.

Mounting arrangement for elevated structures	The elevated structure has to be securely anchored to the supporting surface. Concrete foundations of appropriate weight and depth for elevated structures mounted directly on the ground; Bolted with anchor bolts of appropriate strength for elevated structures mounted on RCC surfaces with removable concrete blast made of pre-fabricated PCC(1:2:4), M15; Assuring enough ground clearance to prevent damage of module through water and other environmental factors
Minimum edge between roof and edge and mounting structure	$\geq 0.60\text{m}$
Minimum clearance between	Shall not be less than 100mm
Access for panel cleaning and maintenance	All solar panels must be accessible from the top for cleaning and from the bottom for access to the junction box.
Panel tilt angle	North – south orientation with a fixed tilt angle of 30degrees (depending on location) south facing.

Solar Array Fuse

The cables from the array strings to the solar grid inverters shall be provided with DC fuse protection. Fuses shall have a voltage rating of 1,000V DC, current rating as required and shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers

Solar Grid Inverter

The solar grid inverter converts the DC power of the solar PV modules to grid-compatible AC power.

The detailed specification of the solar grid inverter is given below.

Total output power (AC)	To match solar PV plant capacity while achieving optimum system efficiency
Input DC voltage range	As required for the solar grid inverter DC input
Maximum power point (MPPT) Tracking	Yes
Number of independent MPPT Inputs	1 or more
Output AC voltage	Three phase 415V (+ 12.5%, -20%)
Operating Frequency range	47.5 – 52.5 Hz
Nominal frequency	50 Hz
Power factor of the inverter	>0.98 at nominal power
Total harmonic distortion	Less than 3%
Built-in Protection	AC high / low voltage; AC high /low Frequency
Anti-islanding protection	As per VDE 0126-1-1 or IEC 60255.5 or IEC 62116 or equivalent standards
Operating ambient temperature range	-10 oC - +60 oC
Humidity	0 – 95% Rh
Inverter efficiency	:>=95%
weighted efficiency	:94%
Protection degree	IP 65 for outdoor mounting, IP 54 for

	indoor mounting
Communication interface RS 485 / RS 232 and RJ45	IEC 62103, IEC 62109-1, IEC 62109-2
Safety compliance	Galvanic Isolation
Cooling Convection Display type	LCD for data display. LCD / LED for status display
Display parameters to include	Output power (W), cumulative energy (Wh), DC voltage (V), DC, current(A), AC voltage(V), AC, frequency(Hz), AC current(A); cumulative hours of operation,
Compliances with standard and codes	IEC6163 / IS 61683 & IE 60068 2(1,2,14,30)

SPECIFICATIONS OF TUBULAR GEL MAINTENANCE FREE VRLA BATTERIES

Sl no	Description	Battery Details
1	Battery Rating	2 V- 300Ah
2	Type of Battery	Triumph Tubular Gel Maintenance Free Valve Regulated Lead Acid Battery Suitable for SPV Power Plants
3	Model offered	T-GEL-VRLA
4	Cell capacity	300Ah at C/10
5	No. of cells	As per Required Voltage of SPVPP
6	Battery dimensions (L x W x H) mm	As per IEC norms
7	Applicable standards	IEC 60896 – 21 & 22, IEC 61427, DIN 43539 P5
8	AH Efficiency	> 95%
9	WH Efficiency	> 85%
10	Self Discharge	<0.5 % per week at 27 C
11	Design float life	20 years design life at 27°C
12	Design cycle life	5200 Cycles at 20% depth of discharge at 27
13	Charge controller setting	On/of type Over voltage disconnect 2.450+/- 0.005v/cell at 27 C Array connection voltage disconnection 2.300+/- 0.005v /cell at 27 C Low voltage disconnection 1.850+/- 0.005 v/cell Load reconnection voltage 2.080+/- 0.005 v/cell at 27 C Pulse with modulation CV controller type same voltage range.
14	Recommended max period of storage	6 month at 27 C
15	Operating temp range	-20C to 55 C
16	Grid Alloy	Lead Calcium tin alloy with special additives

17	Container & Lid Material	Poly propylene co-polymer
18	Sealing Method	Heat sealing
19	Safety vent	Self resealing, Pressure Regulating Valve with Flame arrestor
20	Ventilation	Normal ventilation is required
21	Positive Plate type	Tubular
22	Separator	Micro porous synthetic separator
23	Electrolyte	Gel type
24	Terminals & ICC	Lead plated brass & Lead plated copper with PP Mould.
25	Cell enclosure	Steel Enclosures with Acid Resistant Epoxy Powder coating or suitable.
26	Mounting	Mounting frame with acid resistant coating

DC Distribution Box

A DC distribution box shall be mounted close to the solar grid inverter. The DC distribution box shall be of the thermo plastic IP65 DIN rail mounting type and shall comprise the following components and cable terminations:

Incoming 2 core(Positive and negative DC) cables from the DC Combiner Box;

DC circuit breaker, 2 pole (the cable from the DC Combiner Box will be connected to this circuit breaker on the incoming side);

DC surge protection device (SPD), class 2 as per IEC 60364-5-53;

Outgoing 2 core cable(Positive and negative DC) to the solar grid inverter.

As an alternative to the DC circuit breaker a DC isolator may be used inside the DC Distribution Box or in a separate external thermoplastic IP 65 enclosure adjacent to the DC Distribution Box. If a DC isolator is used instead of a DC circuit breaker, a DC fuse shall be installed inside the DC Distribution Box to protect the DC cable that runs from the DC Distribution Box to the Solar Grid Inverter.

AC Distribution Box

An AC distribution box shall be mounted close to the solar grid inverter. The AC distribution box shall be of the thermo plastic IP65 DIN rail mounting type and shall comprise the following components and cable terminations:

Incoming 3 core / 5 core cable from the solar grid inverter

AC circuit breaker, 2 pole / 4 pole

AC surge protection device (SPD), class 2 as per IEC 60364-5-53

Outgoing cable to the building electrical distribution board.

Connection to Building Electrical System

The AC output of the solar grid inverter shall be connected to the building's electrical system after the DISCOM service connection meter and main switch on the load side. The solar grid inverter output shall be connected to a dedicated module in the Main Distribution Board (MDB) of the building. It shall not be connected to a nearby load or socket point of the building.

For buildings or loads with diesel generator backup, the wiring of the solar grid inverter shall be such that the solar grid inverter cannot run in parallel with the diesel generator. This implies that the solar grid inverter must be connected to a distribution board on the grid side of the automatic or manual change-over switch or as per the requirement of DISCOM.

Cables

All cables shall be supplied conforming to IEC 60227/ IS 694 & IEC60502/ IS 1554
Voltage rating: 1,100V AC, 1,500V DC

For the DC cabling, XLPE insulated and PVC sheathed, UV stabilised single core flexible copper cables shall be used. Multi-core cables shall not be used.

or the AC cabling, PVC or XLPE insulated and PVC sheathed single or multi-core flexible copper cables shall be used. Outdoor AC cables shall have a UV-stabilised outer sheath.

The total voltage drop on the cable segments from the solar PV modules to the solar grid inverter shall not exceed 2.0%.

The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 2.0%

The DC cables from the SPV module array shall run through a UVstabilised

PVC conduit pipe of adequate diameter with a minimum wall thickness of 1.5mm.

Cables and wires used for the interconnection of solar PV modules shall be provided with solar PV connectors and couplers.

All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermo-plastic clamps at intervals not exceeding 50 cm.

The minimum DC cable size shall be 4.0 mm² copper. The minimum AC cable size shall be 4.0 mm² copper. In three phase systems, the size of the neutral wire size shall be equal to the size of the phase wires. The following colour coding shall be used for cable wires:

DC positive: red (the outer PVC sheath can be black with a red line marking)

DC negative: black

AC single phase: Phase: red; neutral: black

AC three phase: Phases: red, yellow, blue; neutral: black

Earth wires: green

Cable conductors shall be terminated with tinned copper end-ferrules to prevent fraying and breaking of individual wire strands. The termination of the DC and AC cables at the Solar Grid Inverter shall be done as per instructions of the manufacturer, which in most cases will include the use of special connectors.

Earthing

The PV module structure components shall be electrically interconnected and shall be grounded.

Earthing shall be done in accordance with IS 3043-1986, provided that earthing conductors shall have a minimum size of 6.0 mm² copper, 10 mm² aluminium or 70

mm² hot dip galvanised steel . Unprotected aluminium or copper-clad aluminium conductors shall not be used for final underground connections to earth electrodes.

A minimum of two separate dedicated and interconnected earth electrodes must be used for the earthing of the solar PV system support structure with a total earth resistance not exceeding 5 ohm.

The earth electrodes shall have a precast concrete enclosure with a removable lid for inspection and maintenance. The entire earthing system shall comprise non-corrosive components.

Surge Protection

Surge protection shall be provided on the DC side and the AC side of the solar system.

The DC surge protection devices (SPDs) shall be installed in the DC distribution box adjacent to the solar grid inverter.

The AC SPDs shall be installed in the AC distribution box adjacent to the solar grid inverter.

The SPDs earthing terminal shall be connected to earth through the above mentioned dedicated earthing system. The SPDs shall be of type 2 as per IEC 60364-5-53

Junction Boxes

Junction boxes and solar panel terminal boxes shall be of the thermo plastic type with IP 65 protection for outdoor use and IP 54 protection for indoor use. Cable terminations shall be taken through thermo-plastic cable glands. Cable ferrules shall be fitted at the cable termination points for identification.

Caution Signs

The standard caution and danger boards or labels as per Indian Electricity Rules, the AC distribution box near the solar grid inverter and the building distribution board to which the AC output of the solar PV system is connected shall be provided with a noncorrosive caution label.

Metering

The existing service connection meter needs to be replaced with a bidirectional (import kWh and export kWh) service connection meter for the purpose of net-metering.

Installation of the Solar Service Connection Meter will be carried out by DISCOM.

It is mandatory that the Solar Rooftop PV system shall be connected to the Grid as per the guidelines of DISCOMs along with necessary protection devices.

Documentation

The Installer shall supply the following documentation:

System description with working principles.

System single line diagram.

Solar PV array lay-out.

Routing diagram of cables and wires.

Data sheets and user manuals of the solar PV panels and the solar grid inverter.

A system operation and maintenance manual.

Name, address, mobile number and email address of the service centre to be contacted in case of failure or complaint.

Warranty cards.

Maintenance register.

Test Certificates and Reports to be Furnished

Test Certificates / Reports from IECQ / NABL accredited laboratory for relevant IEC / equivalent BIS standard for quoted components shall be furnished. Type Test Certificates shall be provided for the solar modules and the solar grid inverter to provide evidence of compliance with standards as specified by Ministry of New and Renewable Energy (MNRE). OREDA reserves the right to ask for additional test certificates or (random) tests to establish compliance with the specified standards.

CONFIRMATION TO MNRE TECHNICAL SPECIFICATIONS AND STANDARDS

The bidder should ensure that all components and systems used under this Scheme shall strictly adhere to the Technical Specifications and Guidelines issued by MNRE vide Notice no: 30/11/2012-13/NSM dated 26th May 2014, as

“Operational Guidelines for Implementation of Off-Grid and Decentralized Solar Applications Sub Scheme – “Off-Grid and Decentralized Solar PV

Scope of operation & maintenance (CMC) of SPV power plant for a period of 5 years.

Annexure-A

All materials, components of the power plant during the period of maintenance shall be the property of OREDA / MNRE / Temple Administration.

Regular operation & maintenance of the SPV Power Plant for a period of five years of warranty / CMC after commissioning along with supply of consumable items as and when necessary and submission of daily performance data of power plant shall come, under the operation & maintenance contract.

The break down maintenance of the entire system including supply of necessary spare parts, if any are already under the coverage of warranty clause of the General Terms & Condition and special terms & condition for a period of 60 months from date of commissioning of power plant. The operation and maintenance schedule of the SPV power plant during the 5 years contract period shall be as detailed below.

1. 5 years operation and maintenance period shall begin on the date actual commissioning for the power plant. The requisite numbers of qualified and trained personnel are required to be deputed round the clock from that very day.
2. The security of the power plant will rest with the suppliers till such time operation and maintenance of the power plant is not handed over to the purchaser.
3. The deputed personnel shall be qualified and well trained so that they can handle any type of operation hazard quickly and timely.
4. The deputed personnel shall have to keep daily log sheet for the power plant as per format to be supplied after commissioning of the power plant.
5. The deputed personnel shall be in a position to check and test all the equipment regularly, so that preventive actions, if any, could be taken well in advance to save any equipment from damage. Any abnormal behavior of any equipment shall be brought to the notice of OREDA immediately for appropriate action.
6. The deputed personnel shall keep clean the power plant in all time. Other activities in the control room will not be allowed under any circumstances.
7. Normal and preventive maintenance of the power plant such as cleaning of module surface, all electrical connection, changing of tilt angle of module mounting structure, cleaning & greasing of battery terminals etc.

8. During operation & maintenance period of ten years of the power plant, if there is any loss or damage of any component of the power plant (not due to miss management / miss handing of user) due to any other reasons, what-so-ever, the supplier shall be responsible for immediate replacement / rectification. The damaged component may be repaired, if it is understood after examination that after repairing performance of the component shall not be degraded, otherwise the defective component shall have to be replaced by new one without any extra cost.
9. List of spare parts & measuring instruments are to be supplied along with the systems may be specified in the bid.
10. Operation & Maintenance Instructions:
 - 10.1 The successful bidder shall furnish before three months prior to completion of the works. 4 copies of operating and maintenance instruction in English for approval and supply 5 sets of the approved manuals of instructions at the time of inspection and taking over of the equipment. These manuals shall properly bound in book form and contain all information, description of equipment, diagram etc. necessary to enable the customer to operate and maintain the whole scheme.
 - 10.2 Proper Operation & Maintenance of the plant shall be carried out by the contractor during O & M period of 60 months with 6 monthly / annual review check up of plant and equipment in detail with purchaser.
 - 10.3 Properly qualified and trained personnel well versed in O&M of SPV plants and knowledge of computers with approval from purchaser shall be deployed at site for operation & maintenance.
 - 10.4 Proper repainting, re-coating of exposed surfaces to prevent rusting & replacement of worn out parts shall be carried out along with the maintenance of the PCU and battery bank.
 - Plant personnel shall be deputed on such basis so that a qualified / trained person with a minimum Technical qualification) Diploma in Engineering) should be available at site always during the operation & maintenance period.
 - Supplier shall depute on engineer of their company for the operation and maintenance of the plant who shall be fully responsible for the complete O&M and optimum operation of the plant. The name and contract nos. of

this engineer shall be notified to the purchaser for the purpose of contract, responsibility and correspondence with regard to all trouble shooting.

- Replacement & repair of damaged parts shall be carried out immediately during the O&M period so as to ensure at least 95% uptime.
- Plant operation reports in a format prescribed by the purchaser shall be furnished by the supplier on a weekly and monthly basis.
- Plant shall be operated as per the standard IER practices to ensure proper safety measures.
- The supplier shall ensure replacement of worn out parts and component including battery back during the operation & maintenance period for which purpose the supplier shall carry and maintain minimum inventory levels of spares at the plant and its works.
- In case of delay in repair & maintenance and non observance of purchasers O&N schedule, the purchaser shall have the right to impose any penalties including forfeiture of performance security.
- Round the clock maintenance (routine preventive breakdown and capital maintenance) of complete plant and equipments including battery banks, SPV Array, PCU, SCADA system with dedicated telephone lines shall be carried out by the supplier in accordance with manufacturer's instructions, manufacturer's procedures, relevant safety codes, Indian Electricity Act, Indian Electricity Rules, purchaser's instructions, prudent utility practices etc.
- In case of any fault, the fault must be removed within 12 hours failing which a penalty of Rs.1,000/- per day shall be charged. In case of any part to be imported the maximum period for repair should not be more than 5 days. However, under Force Majeure circumstances penalty can be waived off.

10.5 Routine, preventive, breakdown & Capital Maintenance:

- Routine and Preventive maintenance shall include such checks and maintenance activities round the clock on hourly, shift wise, daily, weekly, fortnightly, monthly quarterly, half yearly and yearly basis which are required to be carried out on all the components of the power plant to minimize breakdown and to ensure smooth and trouble free running of the power plant. The supplier shall be responsible to carry out routine and

preventive maintenance and replacement of each and every component/ equipment of the power plant and he shall provide all labour, materials, consumables etc. for routine and preventive maintenance of his own cost.

- Breakdown maintenance shall mean the maintenance activity including repairs and replacement of any component or equipment of the power plant which is not covered by routine and preventive maintenance and which is required to be carried out as a result of sudden failure / breakdown of that particular component or equipment while the plant is running. The supplier shall be responsible to carry out breakdown maintenance of each and every component of the power plant and he shall provide the required manpower, materials, consumables, components or equipment etc. for breakdown maintenance at his own cost irrespective of the reasons of the breakdown/ failure.

- Capital maintenance shall mean the major overhaul of any component or equipment of the power plant which is not covered by routine, preventive and breakdown maintenance which may become necessary on account of excessive wear & tear, aging which needs repair / replacement. The capital maintenance of power plant and all civil structures shall normally be planned to be carried out on an annual basis. For this purpose a joint inspection by the supplier and purchaser shall be carried out of all the major components of the power plant, about two months in advance of the annual maintenance period. In order to ascertain as to which components of the power plant require capital maintenance. In this regard the decision of the purchaser will be final and binding. However, if the condition of any plant and component warrants its capital maintenance at any other time, a joint inspection of the purchaser and supplier shall be carried out immediately on occurrence of such situation and capital maintenance shall be carried out by arranging the shutdown of the plant / part of the plant. If required, in consultation with concerned authorities. The decision of the purchaser shall be final and binding.

FORMAT FOR BANK GUARANTEE FOR EMD

On stamp paper of requisite amount

Annexure-B

B.G. No:.....

This Deed of Guarantee made this day of (... month) of 2012 (Year Two thousand twelve) we, ...(name and address of the bank)...., (herein after referred to as 'The Bank') which expression shall unless the counterpart otherwise admit include its legal representative, successors and the Chief Executive, Orissa Renewable Energy Development Agency, S-59, Mancheswar industrial Estate, Bhubaneswar referred to as the 'OREDA') which expression shall include its legal representative, successors and assignees.

Whereas 'OREDA' has invited tender for the work of Design, supply, installation, commissioning and maintenance of SPV Systems vide Tender Call Notice No.-----/OREDA AND WHEREAS M/S. (Name and address of the firm), who having submitted their tender hereinafter referred to as the 'Tenderer' and have agreed to deposit to the 'OREDA' an amount of Rs..... (Rupees) as per the terms and conditions of the Tender Document AND WHEREAS the 'OREDA' also willing to accept a Bank guarantee in lieu of payment by demand draft of any amount equivalent to the amount of earnest money required to be deposited by the Tenderer to the 'OREDA' i.e. an amount equal to Rs..... which as guarantee will be kept valid up to -----.

In consideration of the 'OREDA' having agreed to consider the Bid proposals submitted by the tenderer without depositing the amount of earnest money and against this Bank guarantee, we(name and address of the bank) hereby undertake and guarantee to make payment to the 'OREDA' the amount of Bid earnest money deposit at any time (time being the essence of the contract) when the 'OREDA' asks for the same as per the terms and conditions of the tender Document.

The bank further undertakes not to revoke this guarantee during its currency except with the previous consent of the 'OREDA' in writing and the guarantee shall be continuous

and irrevocable guarantee up to a sum of Rs..... (Rupees.....)only provided always that any indulgence or relation on the part of the 'OREDA' to the said tenderer with or without the consent of the bank shall not prejudice or restrict remedies against the bank nor shall the same in any event be a ground of defence by the Bank against the 'OREDA'.

In case the 'OREDA' Force puts forth a demand in writing on the Bank for the payment of amount full or in part against this bank guarantee, the bank will consider that such demand by itself is a conclusive evidence and proof that the tenderer has failed in complying with the terms and conditions stipulated by the 'OREDA' in its bids and payment will be made to the 'OREDA' without raising any disputes regarding the reasons for such failure on the part of the tenderer.

The bank shall not be discharged for release from this guarantee by any arrangement between the tenderer and the 'OREDA' with or without the consent of the bank or any alterations in the obligations of the parties or by an indulgence, forbearance shown by the 'OREDA' to the tenderer.

This guarantee shall be in addition to and without prejudice to any other securities or remedies which the 'OREDA' may have or hereafter possess against the tenderer and the 'OREDA' shall be under no obligations to marshal in favour of the bank any such securities or fund or asset that the 'OREDA' at its absolute discretion may vary, exchange, renew, modify or refuse to complete or enforce or assign any security or instrument.

The Bank agrees that the amount hereby guaranteed shall be due and payable to the 'OREDA' on 'OREDA' serving a notice requiring the payment of the amount and such notice shall be served on the bank either by actual delivery thereof to the Bank or by dispatching thereof to the bank by Registered post at the address of the said Bank. Any notice sent to the Bank at its address by Registered Post shall be deemed to have been duly served on the Bank notwithstanding that the notice may not in fact have been delivered to the Bank.

In order to give full effect to the provisions of this guarantee the bank thereby waives all rights inconsistent with the above provisions and which the bank might otherwise as a guarantor be entitled to claim and enforce.

We,.....(name and address of the bank), lastly undertake not to revoke this guarantee during its currency except with the previous consent of the 'OREDA' in writing.

“Notwithstanding anything contained herein”,

- (i) Our liability under this guarantee shall not exceed Rs..... (Rupees only).
- (ii) This Bank Guarantee shall be valid up to -----
- (iii) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if we receive from you a written claim or demand on or before ----- (date of expiry of Guarantee)”.

Dated:-.... day of 2016

Name and designation of the officer

Seal. name & address of the Bank and address of the Branch

Model Bank Guarantee Format for Performance Security

[Ref Para 22(i1)]

To

WHEREAS----- (name and address of the supplier) (hereinafter called "the supplier") has undertaken. in pursuance of contract no----- dated----- to supply ----- (description of goods and services) (herein after called "the contract")'

AND WHEREAS it has been -stipulated by you in the said contract that the supplier shall furnish you with a bank guarantee by a scheduled commercial bank recognized by you for the sum specified therein, as security for compliance with its obligations in accordance with the contract;

AND WHEREAS we have agreed to give the supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we, are guarantors and responsible to you on behalf of the supplier. up to a total of ----- . (Amount of the guarantee in words and figures). and we undertake to pay you. Upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid. without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your- demanding the said debt from the supplier before presenting us with the demand.

We further agree that no change or addition to or other 'modification of the terms of the contract to be performed there under or of any of the contract documents --which may be made between you and the supplier shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change. Addition or modification. This guarantee shall be valid until the day of-----20----- .

Our branch at * (Name & Address of the ____ * branch) is liable to pay the guaranteed amount depending on the filing of claim and any part thereof under this Bank Guarantee only and only if you serve upon us at our----- * branch a written claim or demand and received by us at our ____ * branch on or before Dt.-----otherwise bank shall be discharged of all liabilities under this guarantee thereafter.

(Signature of the authorized officer of the Bank)

Name and designation of the officer

Seal. name & address of the Bank and address of the Branch

PRICE BID (online filing)**Annexure-D**

As per MNRE/ JNNSM/ Other national / international standards on components / systems with terms and condition on warranty / replacements, performances

Sl no	Particulars	Price in Inr per system
1	Supply of Solar module of 15 Kwp capacity , roof top mounting structure suitable for accommodating SPV modules including foundation as per specifications on rooftop , on-grid PCU as per specification. Array, main and AC/DC distribution junction, Lightning arrester, earthing, data logging & remote monitoring, required cables, fire extinguisher as IEC, BIS, MNRE specification	
2	Taxes and duties(OVAT)	
3	Sub Total (1 +2)	
4	Rates for Installation and commissioning of the systems as in SL 1 above	
5	Any other Taxes and duties	
6	Sub Total	
7	Total (3+6)	
8	CMC for 5 years from the date of Commissioning,1 st year,2 nd year,3 rd year,4 th year,5 th year	
9	Any other Taxes and duties	
10	Sub Total (8+9)	
11	Grand Total (7 +10)	

Signature of the bidder with Seal

PRICE BID (online filing)

Annexure- E

As per MNRE/ JNNSM/ Other national / international standards on components / systems with terms and condition on warranty / replacements, performances

Sl no	Particulars	Price in Inr per system
1	Supply of Solar module of 25 Kwp capacity , roof top mounting structure suitable for accommodating SPV modules including foundation as per specifications on rooftop, PCU as per specification. Battery backups (240 V,300AH, VRLA, T-GEL), array, main and AC/DC distribution junction, Lightning arrester, earthing, data logging & remote monitoring, required cables, fire extinguisher as IEC, BIS, MNRE specification	
2	Taxes and duties(OVAT)	
3	Sub Total (1 +2)	
4	Rates for Installation and commissioning of the systems as in SL 1 above	
5	Any other Taxes and duties	
6	Sub Total	
7	Total (3+6)	
8	CMC for 5 years from the date of Commissioning,1 st year,2 nd year,3 rd year,4 th year,5 th year	
9	Any other Taxes and duties	
10	Sub Total (8+9)	
11	Grand Total (7 +10)	

Signature of the bidder with Seal

PRICE BID (only for online filing)**Annexure-F**

As per MNRE/ JNNSM/ Other national / international standards on components / systems with terms and condition on warranty / replacements, performances

Sl no	Particulars	Price in Inr per system
1	Supply of Solar module of 20 Kwp capacity , roof top mounting structure suitable for accommodating SPV modules including foundation as per specifications on rooftop , on-grid PCU as per specification. Array, main and AC/DC distribution junction, Lightning arrester, earthing, data logging & remote monitoring, required cables, fire extinguisher as IEC, BIS, MNRE specification	
2	Taxes and duties(OVAT)	
3	Sub Total (1 +2)	
4	Rates for Installation and commissioning of the systems as in SL 1 above	
5	Any other Taxes and duties	
6	Sub Total	
7	Total (3+6)	
8	CMC for 5 years from the date of Commissioning,1 st year,2 nd year,3 rd year,4 th year,5 th year	
9	Any other Taxes and duties	
10	Sub Total (8+9)	
11	Grand Total (7 +10)	

Signature of the bidder with Seal

PRICE BID (only for online filing)

Annexure-G

As per MNRE/ JNNSM/ Other national / international standards on components / systems with terms and condition on warranty / replacements, performances

Sl no	Particulars	Price in Inr per system
1	Supply of Solar module of 30 Kwp capacity , roof top mounting structure suitable for accommodating SPV modules including foundation as per specifications on rooftop , on-grid PCU as per specification. Array, main and AC/DC distribution junction, Lightning arrester, earthing, data logging & remote monitoring, required cables, fire extinguisher as IEC, BIS, MNRE specification	
2	Taxes and duties(OVAT)	
3	Sub Total (1 +2)	
4	Rates for Installation and commissioning of the systems as in SL 1 above	
5	Any other Taxes and duties	
6	Sub Total	
7	Total (3+6)	
8	CMC for 5 years from the date ofCommissioning,1 st year, 2 nd year,3 rd year,4 th year,5 th year	
9	Any other Taxes and duties	
10	Sub Total (8+9)	
11	Grand Total (7 +10)	

Signature of the bidder with Seal

PRICE BID (only for online filing)

Annexure-H

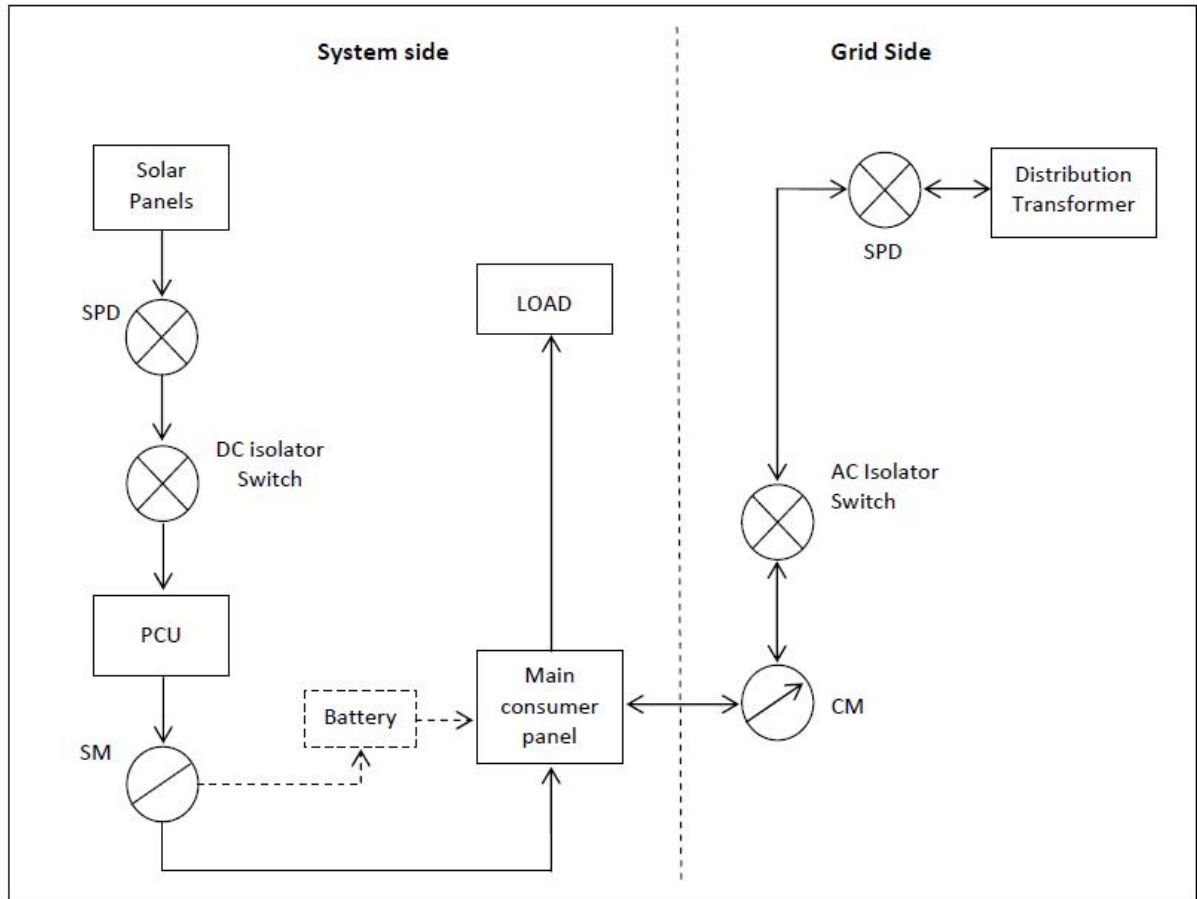
TOTAL CALCULATION

Sl no	Locations	Capacity	Rate (Rs) As annex above	Quantity	Total cost including CMC, all taxes
1	Collectorate of Mayurbhanj, Jharsuguda, Kandhamal, Koraput and Gajapati grid-tied with bi-directional meter.	15 Kwp		5	
2	Revenshaw University, Cuttack hybrid with battery back up	25 Kwp		1	
3	RWS&S, Khandagiri grid-tied with bi-directional meter	20 Kwp		1	
4	Raj Bhawan Odisha, Bhubaneswar grid-tied with bi-directional meter	30 Kwp		1	
Grand Total					

Rupees -----

Signature of the bidder with Seal

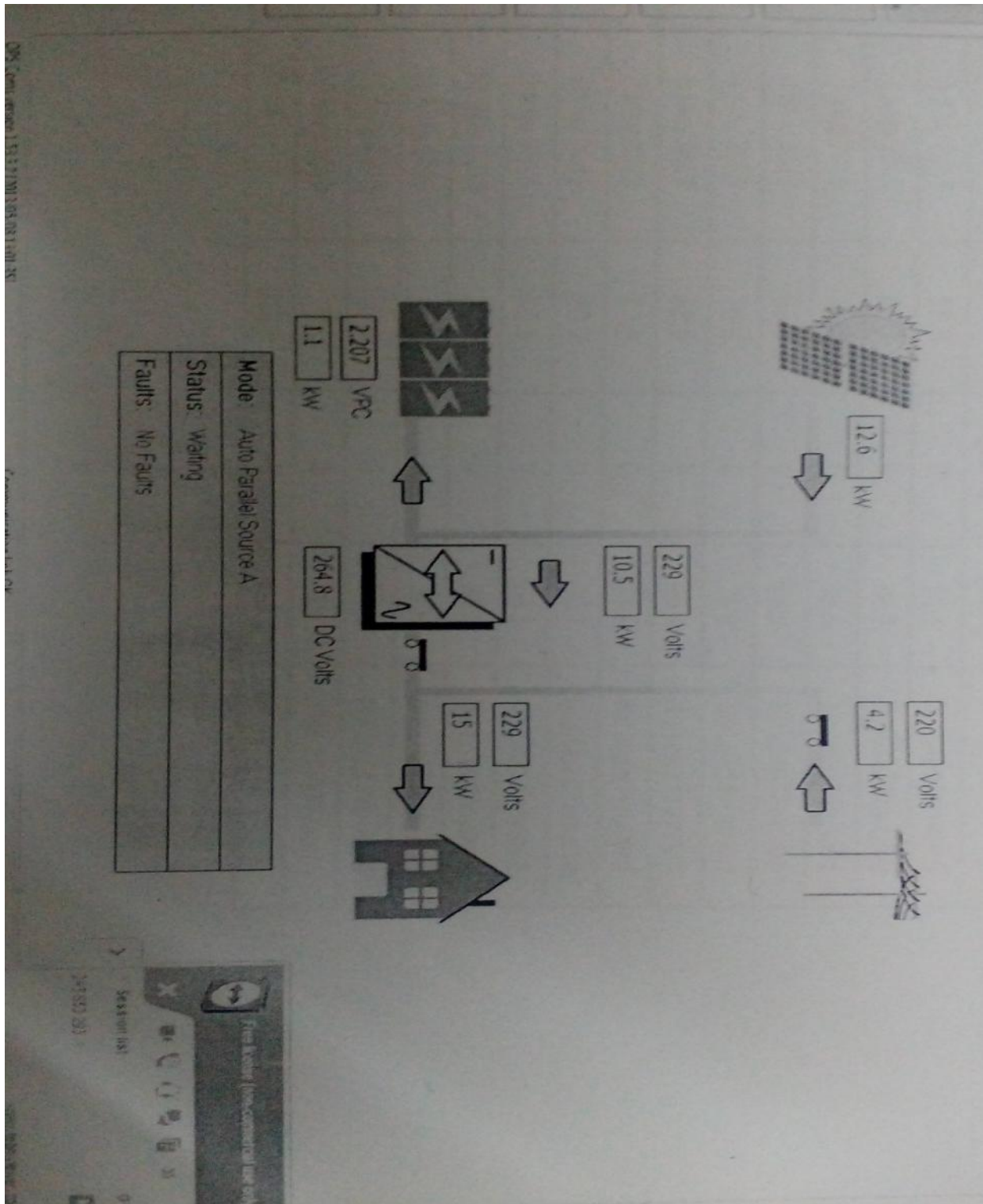
Overview of a basic grid interactive Photo Voltaic system



SPD- Surge Protective Device, PCU- Power Conditioning Unit, SM-Solar Generation Meter, CM- Consumer Meter (Net meter or Bi-directional meter)

* The actual connectivity diagram may vary depending upon site specification.

Reference diagram for on-grid power plant



Reference diagram for 25 Kwp hybrid (without values)