eTendering System Government of Kerala

Kerala Tenders

Tender Details

Date : 05-Mar-2023 02:14 PM

Print

Basic Details

Organisation Chain	ANERT		
Tender Reference Number	ANERT-TECH/153/2021-PO(KKG)		
Tender ID	2021_ANERT_458898_4		
Tender Type	Open Tender	**Form of contract**	Empanelment
Tender Category	Works	**No. of Covers**	1
General Technical Evaluation Allowed	No	**ItemWise Technical Evaluation Allowed**	No
Payment Mode	Online	**Is Multi Currency Allowed For BOQ**	No
Is Multi Currency Allowed For Fee	No	**Allow Two Stage Bidding**	No

Payment Instruments

	S.No	Bank Name
Online Bankers	1	SBI MOPS

Cover Details, No. Of Covers - 1

Cover No	Cover	Document Type	Description
1	Fee/PreQual /Technical/Finance	.pdf	Signed EoI Document and Corrigenda, Pre-Agreement
		.pdf	Grading Certificate
		.pdf	Pre Qualification Documents
		.pdf	All other documents

Tender Fee Details, [Total Fee in ₹ * - 29,500]

Tender Fee in ₹	29,500		
Fee Payable To	Nil	**Fee Payable At**	Nil
Tender Fee Exemption Allowed	Yes		

EMD Fee Details

EMD Amount in ₹	0.00	**EMD through BG/ST or EMD Exemption Allowed**	No
EMD Fee Type	fixed	**EMD Percentage**	NA
EMD Payable To	Nil	**EMD Payable At**	Nil

Work /Item(s)

Title	Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala				
Work Description	Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala				
Pre Qualification Details	Please refer Tender documents.				
Independent External Monitor/Remarks	NA				
Tender Value in ₹	NA	**Product Category**	Solar Power Plants	**Sub category**	NA
Contract Type	Empanelment	**Bid Validity(Days)**	365	**Period Of Work(Days)**	90
Location	All Kerala	**Pincode**	695033	**Pre Bid Meeting Place**	NA
Pre Bid Meeting Address	NA	**Pre Bid Meeting Date**	NA	**Bid Opening Place**	ANERT HQ
Should Allow NDA Tender	No	**Allow Preferential Bidder**	No		

Critical Dates

Publish Date	04-Mar-2023 02:30 PM	**Bid Opening Date**	16-Mar-2023 03:30 PM
Document Download / Sale Start Date	04-Mar-2023 02:30 PM	**Document Download / Sale End Date**	15-Mar-2023 03:00 PM
Clarification Start Date	NA	**Clarification End Date**	NA
Bid Submission Start Date	04-Mar-2023 02:30 PM	**Bid Submission End Date**	15-Mar-2023 03:00 PM

Tender Documents

NIT Document

S.No	Document Name	Description	Document Size (in KB)
1	Tendernotice_1.pdf	NIT and Abstract	347.45

Work Item Documents

S.No	Document Type	Document Name	Description	Document Size (in KB)
1	Tender Documents	VendorRegnIV.pdf	Tender Document	715.01
2	Additional Documents	ICRAApplication.pdf	ICRA Docs	228.93

Tender Inviting Authority

Name	CEO ANERT
Address	ANERT Law College Road, Vikas Bhavan. PO, Thiruvananthapuram - 695 033

AGENCY FOR NEW & RENEWABLE ENERGY RESEARCH AND TECHNOLOGY (ANERT)
Department of Power, Government of Kerala
Thiruvananthapuram, Kerala – 695 033;
www.anert.gov.in , projects@anert.in

E-TENDER DOCUMENT

Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV)

Ref. No.: ANERT-TECH/153/2021-PO(KKG)

PART – 1: GENERAL CONDITIONS

Date of Publishing of Bids : - 04/03/2023

Last Date of Submission of Bids : - 15/03/2023

CONTENTS

E-TENDER NOTICE

Competitive e-tenders in one cover system with Earnest Money Deposit (EMD) are invited from reputed Manufacturers/System Integrators / EPC Contractors with relevant experience in the ***Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV)***. The e-tender documents can be downloaded from the e-tendering website of Govt. of Kerala. Tender form will not be available in any other form.

Thiruvananthapuram CEO

04/03/2023

TENDER ABSTRACT

Ref. No.	**ANERT-TECH/153/2021-PO(KKG)**
Name of Work	**Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV)**
Download of Tender Form	http://www.etenders.kerala.gov.in
Last date of submission of bids	15/03/2023 @ 3.00 PM
Date and Time of opening the bids	16/03/2023 @ 3.30 PM
Cost of Tender form	**Rs. 29,500/- (Including GST)**
Period of Registration	2 years from the date of selection
Availability of Tender Forms	Website http://www.etenders.kerala.gov.in
Place of opening of tender	Office of CEO, ANERT Law College Road, Vikas Bhavan. PO, Thiruvananthapuram - 695 033, Kerala

Thiruvananthapuram
04/03/2023

Sd/-
CEO

GENERAL TERMS AND CONDITIONS FOR E-PROCUREMENT

This e-Tender is being published by ANERT inviting Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV). The tender is invited in one cover system through e-procurement portal of Government of Kerala (www.etenders.kerala.gov.in). Prospective bidders willing to participate in this tender shall necessarily register themselves with above mentioned e-procurement portal.

The tender timeline is available in the critical date section of this tender published in www.etenders.kerala.gov.in

1. ONLINE BIDDER REGISTRATION PROCESS:

1.1 Bidders should have a Class III or above Digital Signature Certificate (DSC) to be procured from any Registration Authorities (RA) under the Certifying Agency of India. Details of RAs will be available on www.cca.gov.in. Once, the DSC is obtained, bidders have to register on www.etenders.kerala.gov.in website for participating in this tender. Website registration is a one-time process without any registration fees. However, bidders have to procure DSC at their own cost.

1.2 Bidders may contact e-Procurement support desk of Kerala State IT Mission over telephone at 0471- 2577088, 2577188, 2577388 or 0484 – 2336006, 2332262 - through email: helpetender@gmail.com/etendershelp@kerala.gov.in for assistance in this regard

2. ONLINE TENDER PROCESS:

The tender process shall consist of the following stages:

i. Downloading of tender document: Tender document will be available for free download on www.etenders.kerala.gov.in. However, tender document fees shall be payable at the time of bid submission as stipulated in this tender document.

ii. Pre-bid meeting: (will be updated in ANERT website – www.anert.gov.in)

iii. Publishing of Corrigendum: All corrigenda shall be published on www.etenders.kerala.gov.in and shall not be available elsewhere.

iv. Bid submission: Bidders have to submit their bids along with supporting documents to support their eligibility, as required in this tender document on www.etenders.kerala.gov.in. No manual submission of bid is allowed and manual bids shall not be accepted under any circumstances.

v. In case bidder encounters any technical issues pertaining to e-Procurement system while acting on the tender, computer screen shot of the error message with date & time stamp on the web-browser along with the query shall be e-mailed by the bidder to the help desk **(helpetender@gmail.com/ etendershelp@kerala.gov.in)**, for resolution of the problem. At the same time, problem must be intimated to the concerned Tender Inviting Authority via email.

vi. The time taken to ascertain, evaluate and suggest a solution for the problem reported by bidder may vary from case to case. Hence bidders are advised to submit the bid **at least 2 working days before the due date** and time of bid submission to avoid any last-minute issues that may come up.

vii. Opening of Bid and Bidder short-listing: The single cover bids will be opened, evaluated and shortlisted as per the eligibility. Failure to submit the required documents online will attract disqualification. Price bids of the eligible bidder's will open the same day of opening and the work will be awarded.

3. DOCUMENTS COMPRISING BID:

3.1 (a) The First Stage - Pre- Qualification cum Technical Bid with Commercial terms

Technical proposal shall contain the scanned copies of the following documents which every bidder has to upload:

Cover 1 shall contain, Part-I (this document in PDF form)/scanned copies of:

i. Tender documents downloaded (signed with office seal)
ii. Summary of Bid qualification requirement (Annexure A)
iii. Undertaking of the agency in the prescribed format (Annexure B) on Govt. of Kerala stamp paper worth Rs.200/-
iv. Authorisation for the authorised signatory to sign the documents
v. Copy of Registration Certificate of the bidder firm
vi. Copy of GST Certificate

vii. Copy of PAN card / TAN

viii. Certificate of grading issued by ICRA Analytics Limited

ix. Declaration by the bidder (format as in Annexure – C)

x. Declaration of relationship with ANERT employee (format as in Annexure - D)

xi. Undertaking of List Accredited installers (Annexure- F)

xii. Undertaking regarding subcontractors engaged (Annexure-G)

xiii. Undertaking for No Blacklisting & No Banning (Annexure-H)

3.2 The department doesn't take any responsibility for any technical snag or failure that has taken place during document upload.

4. VENDOR REGISTRTION FEES

4.1 The Bidder shall pay, Vendor Registration fee of Rs. 29,500/-. No exemption to provide to any others including MSMEs, MSEs or NSIC registered agencies

4.2 Online Payment modes: The fees can be paid in through e-Payment facility provided by the e-Procurement system. Bidders can make payment only via Internet banking facility

State Bank of India Multi Option Payment System (SBI MOPS Gateway): Bidders are required to avail Internet Banking Facility in any of below banks for making tender remittances in eProcurement System.

A) Internet Banking Options (Retail)			
1	Allahabad Bank	32	Kotak Mahindra Bank
2	Axis Bank	33	Lakshmi Vilas Bank
3	Andhra Bank	34	Mehsana Urban Co-op Bank
4	Bandan Bank	35	NKGSB Co-operative Bank
5	Bank of Bahrain and Kuwait	36	Oriental Bank of Commerce
6	Bank of Baroda	37	Punjab and Maharashtra Cooperative Bank
7	Bank of India	38	Punjab National Bank
8	Bank of Maharashtra	39	Punjab and Sind Bank
9	Bassein Catholic Co-operative Bank	40	RBL Bank
10	BNP Paribas	41	Saraswat Cooperative Bank
11	Canara Bank	42	ShamraoVithal Cooperative Bank
12	Catholic Syrian Bank	43	South Indian Bank
13	Central Bank of India	44	Standard Chartered Bank
14	City Union Bank	45	State Bank of India

15	Corporation Bank	46	Syndicate Bank
16	Cosmos Bank	47	Tamilnad Mercantile Bank
17	DCB Bank	48	Tamilnadu Cooperative Bank
18	Dena Bank	49	The Kalyan Janata Sahakari Bank
19	Deutsche Bank	50	TJSB Bank
20	Dhanalaxmi Bank	51	UCO Bank
21	Federal Bank	52	Union Bank of India
22	HDFC Bank	53	United Bank of India
23	ICICI Bank	54	Vijaya Bank
24	IDBI Bank	55	YES Bank
25	Indian Bank		
26	Indian Overseas Bank		
27	IndusInd Bank		
28	Jammu & Kashmir Bank		
29	Janata Sahakari Bank		
30	Karnataka Bank		
31	Karur Vysya Bank		
B) Internet Banking Options (Corporate)			
1	Bank of Baroda	21	Laxmi Vilas Bank
2	Bank of India	22	Oriental Bank of Commerce
3	Bank of Maharashtra	23	Punjab & Maharashtra Coop Bank
4	BNP Paribas	24	Punjab & Sind Bank
5	Canara Bank	25	Punjab National Bank
6	Catholic Syrian Bank	26	RBL Bank
7	City Union Bank	27	Shamrao Vitthal Co-operative Bank
8	Corporation Bank	28	South Indian Bank
9	Cosmos Bank	29	State Bank of India
10	Deutsche Bank	30	Syndicate Bank
11	Development Credit Bank	31	UCO Bank
12	Dhanalaxmi Bank	32	Union Bank of India
13	Federal Bank	33	UPPCL
14	HDFC Bank	34	Vijaya Bank
15	ICICI Bank	35	Axis Bank
16	Indian Overseas Bank		
17	Janta Sahakari Bank		
18	Jammu & Kashmir Bank		
19	Karur Vysya Bank		
20	Kotak Bank		

During the online bid submission process, bidder shall select ***SBI MOPS*** option and submit the page, to view the ***Terms and Conditions*** page. On further submitting the same, the e-Procurement system will re-direct the bidder to MOPS Gateway, where two options namely ***SBI*** and ***Other Banks**** will be shown. Here, Bidder may proceed as per below:

a) *SBI Account Holders* shall click ***SBI*** option to with its Net Banking Facility., where bidder can enter their internet banking credentials and transfer the Tender Fee and EMD amount.

b) *Other Bank Account Holders* may click ***Other Banks*** optionto view the bank selection page. Here, bidders can select from any of the 54 Banks to proceed with its Net Banking Facility, for remitting tender payments.

**Transaction Charges for Other Banks vide SBI Letter No. LHO/TVM/AC/2016-17/47 – 1% of transaction value subject to a minimum of Rs. 50/- and maximum of Rs. 150/-*

** Bidders who are using Other Banks option under SBI MOPS Payment Gateway, are advised by SBI to make online payment 72 hours in advance before tender closing time.*

5. SUBMISSION PROCESS:

5.1 For submission of bids, all interested bidders have to register online as explained above in this document. After registration, bidders shall submit their Technical bid online on www.etenders.kerala.gov.in along with online payment of fees. They are also required to fill the form available in the ANERT website.

5.2 For page-by-page instructions on bid submission process, please visit www.etenders.kerala.gov.in and click "Bidders Manual Kit" link on the home page.

5.3 It is necessary to click on "Freeze bid" link/ icon to complete the process of bid submission otherwise the bid will not get submitted online and the same shall not be available for viewing/ opening during bid opening process.

6. VALIDITY OF REGISTRATION

6.1 This vendor registration will be valid for a period of 24 months from the date of opening of offers. The offers with lower validity period are liable for rejection. Further, the tenderer may extend the validity without altering the substance and prices of their Bid for further periods, if so required

7. DEVIATIONS

7.1 The offers of the Tenderers with Deviations in Commercial terms and Technical Terms of the Tender Document are liable for rejection.

8. BLACK LIST

8.1 All the intending tenderers shall agree that in the event of the documents furnished with the offer being found to be bogus or the documents contain false particulars, they shall be blacklisted for future tenders/ association with ANERT and EMD shall be forfeited against any losses incurred by ANERT.

9. BIDDER'S LOCATION

9.1 The tenderers are requested to furnish the exact location of their factories/godown with detailed postal address and pin code, telephone and fax nos. etc. in their tenders to arrange inspection by ANERT, if considered necessary.

9.2 All communication shall be made to the registered email of the bidder in the e-tendering systems and ANERT shall not be responsible for non-receipt or delay of any such communication.

10. CORRUPT AND FRAUDULENT PRACTICES

ANERT requires compliance with its policy in regard to corrupt and fraudulent/prohibited practices as set forth in this proposal. In further pursuance of this policy, the selected service Provider(s) shall permit ANERT or its representatives to inspect the accounts, records and other documents relating to the submission of the Proposal and execution of the contract, in case of award, and to have the records inspected by ANERT.

11. CONFLICT OF INTEREST

i. The service Provider(s) is required to provide professional, objective, and impartial services, at all times holding ANERT‟s interests paramount, strictly avoiding conflicts with other assignments or its own corporate interests, and acting without any consideration for future work. The supplier has an obligation to disclose to ANERT any situation of actual or potential conflict that impacts its capacity to serve

the best interest of ANERT. Failure to disclose such situations may lead to the disqualification of the supplier or the termination of its Contract and/or sanctions by the Government.

ii. Relationship with the ANERT staff: a service Provider (including its subsidiaries /partners) that has a close business or family relationship with a professional staff of the ANERT who are directly or indirectly involved in any part of the preparation of the Terms of Reference for the assignment, the selection process for the Contract, or the supervision of the Contract, may not be awarded a Contract, unless the conflict stemming from this relationship has been resolved in a manner acceptable to ANERT throughout the selection process and the execution of the Contract. Any other types of conflicting relationships as indicated in the TENDER

12. CONFIDENTIALITY

i. From the time the Proposals are opened to the time the Contract is awarded, the agency (ies) should not contact any of the officials of ANERT on any matter related to its Technical Proposal. Information relating to the evaluation of Proposals and award recommendations shall not be disclosed to the agency (ies) who submitted the Proposals or to any other party not officially concerned with the process, until the publication of the Contract award information.

ii. Any attempt by the agency (ies) or anyone on behalf of the Suppliers to influence improperly ANERT in the evaluation of the Proposals or Contract award decisions may result in the rejection of its Proposal and may be subject to the application of prevailing Government sanctions procedures.

iii. Notwithstanding the above provisions, from the time of the Proposals‟ opening to the time of Contract award publication, if a agency (ies) intends to contact ANERT on any matter related to the selection process, it should do so only in writing.

iv. The Bids should be submitted only through the e-tender portal www.etenders.kerala.gov.in. Agency (ies) shall upload all the necessary documents in the e tender portal before the last date & time for online submission. Proposal received after the submission deadline will be treated as non-responsive and will be excluded from further evaluation process.

v. Proposals must be direct, concise, and complete. ANERT will evaluate bidder's proposal based on its clarity and the directness of its response to the requirements of the project as outlined in this tender document. Bidders shall furnish the required information on their technical and financial proposals in the enclosed formats only. Any deviations in format or if the proper information is not provided properly, the tender will be liable for rejection. Tender Evaluation committee may seek clarification, if required, while evaluating the proposal.

vi. The technical bid opening date, time and the address are as stated in the tender document.

13. APPLICABLE LAW

This vendor registration process shall be governed by the laws and procedures established by Government of Kerala, within the frame work of applicable legislation and enactment made from time to time concerning such commercial dealings. Any default in the terms and conditions of the document by the service provider will lead to rejection of work order.

14. AMENDMENT OF TENDER DOCUMENT

At any time prior to the deadline for submission of the tender, ANERT may for any reason, modify the tender document. The amendment document/ corrigendum shall be notified through the website www.etenders.kerala.gov.in and such amendments shall be binding on all the bidders.

15. GOVERNMENT OF KERALA – CORRUPT AND FRAUDULENT PRACTICES

ANERT follows the policy of the Government of Kerala for anti-corruption and fraudulent practices to maintain sound procurement principles of open competition, economy and efficiency, transparency, and fairness. ANERT requires the agency (ies) to observe the following Government manuals (amended from time-to-time) during the selection process and in execution of such contracts The Kerala Financial Code (KFC), 2008 (7th Edition, 1st Edition was in 1963), The Stores Purchase Manual (SPM), 2013.

AGENCY FOR NEW & RENEWABLE ENERGY RESEARCH AND TECHNOLOGY (ANERT)
Department of Power, Government of Kerala
Thiruvananthapuram, Kerala – 695 033;
www.anert.gov.in , projects@anert.in

E-TENDER DOCUMENT

Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV)

Ref. No.: ANERT-TECH/153/2021-PO(KKG)

PART – 2: REGISTRATION PROCEDURE

Date of Publishing of Bids : - 01/11/2022

Last Date of Submission of Bids : - 15/11/2022

IMPLEMENTATION PLAN

16. GENERAL

16.1 This Expression of Interest is being invited for listing agencies for installation of Solar Power Plants in Kerala. The validity of the list will be for two years. The list of vendors selected through this process will be published for the information of proponents for installation of Solar Power Plants and for use by ANERT. The status of registration of any agencies in this list shall be terminated if it is found the agency is violating empanelment conditions.

16.2 The applicant should not have any pending litigation with ANERT

16.3 The beneficiary /Government/any other proponent shall have the freedom to select an agency of their choice from the list of Agencies published by ANERT through this process, for installation of the solar power plants. This list will be the base list for the implementation of Solar Power Plants in Kerala. However, for government funded programmes, necessary formalities based on store purchase rules / any other relevant guidelines in force may also be observed.

16.4 The installation of solar power plants should be as per the technical compliance and installation practices of MNRE, ANERT, CEA and all other statutory regulations specified. Any amendments/ modification issued time to time, in this regard will be incorporated.

17. ANERT PROGRAMMES

17.1 ANERT Programmes shall include installation of grid connected, off-grid & Hybrid solar power plants for any interested beneficiaries within the State, who apply for such installations and the proposed locations found suitable for the same. These installations could be under CAPEX / RESCO / OPEX mode.

17.2 ANERT is the Nodal agency for implementation of Solar Power Plants in Public buildings and Proposed Solar City at Thiruvananthapuram. All activities to be undertaken by ANERT shall be implemented through these listed vendors.

17.3 Price offers will be invited for various capacities of grid connected and off-grid solar power plants as and when required.

17.4 Deposit works entrusted to ANERT by various institutions / firms for installation of grid connected or off-grid roof-top mounted solar power plants would be

another category of ANERT programmes during this period. The Agencies listed through this process only would be eligible for undertaking such works also and price offers will be collected based on site conditions separately.

17.5 ANERT will be acting as a PMC for Government Institutions who wish to install Power Plants on RESCO mode.

17.6 ANERT may also fix rate contract for installation if a particular programme demands so. This list will not be applicable for installations made under any Financial Assistance schemes of ANERT / MNRE.

18. VENDOR REGISTRATION PROCESS

18.1 OEMs / EPC Contractors / System Integrators have to express their interest for registration with ANERT by submitting bids online along with required documents for getting listed as an empanelled agency.

18.2 The eligibility of capacity for installation of single plant and total allocation per batch (allotment) will be based on the grading provided by the grading agency appointed by ANERT.

18.3 The grading agency selected for this purpose is "ICRA Analytics Limited" Securities and Exchange Board of India (SEBI) approved Agency for "Assessing and Grading of Integrators/ Contractors for supporting registration process of agencies under Solar Programme implemented in the state of Kerala.

18.4 The grading will be done by M/s ICRA Analytics Ltd at the rates finalised by ANERT as below:

#	Rate For Undertaking Grading Services	AMOUNT (incl GST)
1	Initial Grading	23,600/-
2	Renewal of Grading post one year	9,440/-

18.5 The contact details of the ICRA Analytics Limited mentioned below and personnel dedicated for ANERT functionalities are as below:

ICRA Analytics Ltd
Infinity Benchmark, 17th Floor,
Plot – G-1, Block GP, Sector V,
Salt Lake, Kolkata – 700091,

Name	Contact Details	Email id
Mr. Sourav Das	+91 98307 38030	anert.grading@icraanalytics.com
Mr. Indranil Chakraborty	+91 99033 77455	

19. MODE OF IMPLEMENTATION

19.1 Under ANERT schemes, on reception of enquiry from beneficiary, the registered vendor has to visit the site, carry out a feasibility assessment and provide the feasibility report through the m-ANERT Mobile App / through physical reports. However, obtaining the clearance for connectivity from the Distribution Licensee (for grid connected systems) would be the responsibilities of the beneficiary.

19.2 The Agency shall complete the installation of the plant and provide commissioning report to ANERT through the portal, within 3 months after getting the Order.

19.3 The specifications and conditions of installation /warranty have to be complied with at all the installations made by the vendor.

19.4 Agency should have service centres at regional levels in Kerala (even though a service centre in every district would be appreciated). List of service centre has to be submitted along with EoI.

19.5 During installation of Solar Plant, the presence of an accredited Solar Installer certified by ANERT is essential and this will be made mandatory. The list of such accredited installers is available in ANERT website.

19.6 If any of the agency / EPC contractor is planning to engage a third-party contractor for fabrication, details of such contractor have to be filed and registered with ANERT. In such case the subcontractor should also engage certified installers for installation.

19.7 Empanelled agency can also make use of the services of Urja-Mithra service centres established by ANERT. Total of 140 nos. of service centres has been established (one each in an assembly constituency).

19.8 Any complaint or service call from the beneficiary has to be attended within 48 hours and problems have to be rectified within 7 days.

20. ROLE OF ANERT

20.1 Registration of vendors for implementation of Solar Programme in Kerala.

20.2 Listing of components to be used for installation, based on the technical compliance and service facility.

20.3 Listing of agencies with price as per requirement.

20.4 Monitoring the performance of agencies/EPC contractors.

20.5 Co-ordinating with Agency and Distribution Licensee, Electrical inspectorate and Beneficiary for smooth and speedy implementation of the programme.

20.6 Monitoring, inspection/ verification of the system installed

21. QUALIFICATION CRITERIA

21.1.1 An agreement in Rs.200/- Kerala stamp paper as per the format given in Annexure IC must be submitted along with e-tender document.

21.1.2 The agency must have valid Grading certificate issued by ICRA Analytics Limited (SEBI listed agency selected by ANERT for undertaking grading for this Vendor Registration) issued after 1st December 2021.

21.1.3 Authorisation for signing the documents has to be provided by the bidder. The documents signed by this authority only will be accepted for Expression of Interest and other documents submitted under this project. If the agency desires to change this authority fresh authorisation has to be submitted.

21.1.4 The bidder should have service centres/authorised service providers in all districts of Kerala – Minimum 3 service centres - North, Central and South regions. Detailed list with address, contact details and proof has to be submitted. If the bidder does not have such facility at the time of tendering, an undertaking should be submitted along with the tender on Kerala stamp paper worth Rs. 200/- agreeing to set up such facility and intimate the same within 15 days of letter of intent. Urja Mithra service centres supported by ANERT can also be included as service centres provided the bidders make separate agreements with them.

21.1.5 The bidder should meet the Criteria regarding availability of accredited installers (technicians)

21.2 **Eligibility Requirement**

21.2.1 The detail of eligibility requirements is provided in the table below. The bidders are required to furnish the required supporting documents along with the Technical Bid.

S. No.	Criteria	Documents Required
1.1	The Bidder should have any of the following legal status: a) Body incorporated in India under the Companies Act, 2013 including any amendment thereto; OR b) Firm registered under Partnership Act, 1932 in India; OR c) Sole Proprietor In case of JV, all the members must fulfill this requirement and submit the documents as per the Tender Document.	a) In case of Company – Copy of Registration/ Incorporation Certificate b) In case of LLP – Copy of Deed of Partnership c) In case of Partnership – Copy of Deed of Partnership d) In case of Sole Proprietor – Duly notarized Undertaking from Sole proprietor
1.2	The Bidder must have the required GST Registration	Copy of GST registration certificate with legible GSTIN.
1.3	The Bidder must have valid PAN Number	Copy of Pan Card
1.4	Grading certificate Issued by ICRA Analytics Limited	Certificate issued after 01/11/2021
1.5	The bidder should be having unblemished record and must not be blacklisted or declared ineligible for corrupt & fraudulent practices by "any state/ central government" department/ company / entity" as on date of bid opening.	The bidder shall provide an Undertaking as per the format provided as Format A.

22. ALLOCATION OF CAPACITY

The capacity of Solar Power Plant that can be allotted to a particular vendor depends on their grading issued by ICRA Analytics Limited, which is determined using the experience and financial strength of the vendor. Based on the grading, the vendors will be listed in certain categories as below:

Grading Scale		Financial Strength				
		Strong	Above Average	Average	Below Average	Weak
Performance capability	Strong	1A	1B	1C	1D	1E
	Above Average	2A	2B	2C	2D	2E
	Average	3A	3B	3C	3D	3E
	Below Average	4A	4B	4C	4D	4E
	Weak	5A	5B	5C	5D	5E

Only agencies obtaining grades 5C and above will be eligible for listing

With reference to the grading allotted, the single plant capacity and the total volume of works that can be allotted at a time is

Grade Allotted	Maximum Single plant capacity- kW	Total Volume in kW by Batch
1A	3000	5000
1B	2000	3500
1C	250	1000
1D	50	500
1E	10	100
2A	500	2500
2B	250	2000
2C	200	1000
2D	50	200
2E	10	100
3A	300	1000
3B	100	500
3C	50	300
3D	5	50
3E	5	50
4A	10	100
4B	10	100
4C	5	50
4D	3	25
4E	3	25
5A	3	25
5B	2	15
5C	2	10

CONDITIONS OF CONTRACT

23. GENERAL CONDITIONS

23.1 The bids should be submitted online at www.etenders.kerala.gov.in

23.2 The tenders should be as per the prescribed form which should be downloaded from the e-tender website. The cost of tender forms if any, should be paid online, and once paid will not be refunded. Tender forms are not transferable. Tenders that are not in the prescribed form are liable to be rejected.

23.3 Intending tenderers should submit their tenders on or before the due date and time mentioned in the tender abstract. Late tender will not be accepted.

23.4 Tenders subject to conditions will not be considered. They are liable to be rejected on that sole ground.

23.5 The final acceptance/rejection of the bids rests entirely with CEO, ANERT who do not bind themselves to accept the lowest or any tender.

23.6 In case the contractor becomes insolvent or goes into liquidation, or makes or proposes to make any assignment for the benefit of his creditors or proposes any composition with his creditors for the settlement of his debts, carries on his business or the contract under inspection or behalf of or his creditors or in case any receiving order(s) for the administration of his estate are made against him or in case the contractor shall commit any act of insolvency or in case in which under any clause or clauses any act of insolvency or in case in which under any clause(s) of this contract the contractor shall have rendered himself liable to damages amounting to the whole of his security deposits, the contract shall, thereupon, after notice given by the Purchasing Officer to the contractor, be determined and ANERT may complete the contract in such time and manner and by such persons as ANERT shall think fit. But such determination of the contract shall be without any prejudice to any right or remedy of ANERT against the contractor or his sureties in respect of any breach of contract committed by the contractor. All expenses and damages caused to ANERT by any breach of contract by the contractor shall be paid by the contractor to ANERT and may be recovered from him under the provisions of the Revenue Recovery Act in force in the State.

23.7 In case the contractor fails to supply and deliver any of the said articles/services and things within the time provided for delivery of the same, or in case the contractor commits any breach of any of the covenants, stipulations and agreements herein contained, and on his part to be observed and performed, then and in any such case, it shall be lawful for ANERT (if they shall think fit to do so) to arrange for the purchase of the said articles and things from elsewhere of on behalf of ANERT by an order in writing under *the* hand of the CEO put an end to this contract and in case ANERT shall have incurred sustained or been put to any costs, damages or expenses by reason of such purchase or by reason of this contract having been so put an end to or in case any difference in price, compensation, loss, costs, damages, expenses or other moneys shall then or any time during the continuance of this contract be payable by the contractor to ANERT under and by virtue of this contract, it shall be lawful for ANERT from and out of any moneys for the time being payable or owing to the contractor from ANERT under or by virtue of this contract or otherwise to pay and reimburse to ANERT all such costs, damages and expenses they may have sustained, incurred or been put to by reason of the purchase made elsewhere or by reason of this contract having been so put an end to as aforesaid and also all such difference in price, compensation, loss, costs, damages, expenses and other moneys as shall for the time being payable by the contractor aforesaid.

23.8 Any sum of money due and payable to the contractor (including security deposit returnable to him) under this contract may be appropriated by the CEO or any other person authorised by ANERT and set off against any claim of ANERT for the payment of a sum of money arising out of or under any other contract made by the contractor with ANERT or any other person authorised by ANERT. Any sum of money due and payable to the successful tenderer or contractor from ANERT shall be adjusted against any sum of money due to ANERT from him under any other contracts.

23.9 Every notice hereby required or authorised to be given may be either given to the contractor personally or left at his residence or last known place of abode or business, or may be handed over to his agent personally, or may be addressed to the contractor by post at his usual or last known place of abode or business and if

so addressed and posted, shall be deemed to have been served on the contractor on the date on which in the ordinary course of post, a letter so addressed and posted would reach his place of abode or business.

23.10 The tenderer shall undertake the installation and commissioning of the system according to the standards and specification.

23.11 The tenderer should send along with this tender an agreement executed and signed in Kerala Stamp Paper of value Rs.200/-. A specimen form of agreement is given as Annexure IC to this tender. Tenders without the agreement in stamped paper will be rejected outright.

23.12 **Conditions in the technical document, technical specifications and special conditions of this tender document would override these general conditions, wherever applicable.**

23.13 ANERT, by notice sent to the Supplier, may terminate the contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for ANERT's convenience, the extent to which performance of the Supplier under the contract is terminated, and the date upon which such termination becomes effective.

23.14 E-tender shall be opened at the time and date announced in the tender notice, and the price bid will be evaluated on the same day.

23.15 In case any difference or dispute arises in connection with the contract, all legal proceedings relating to the matter shall be instituted in the Court within whose jurisdiction the CEO, ANERT voluntarily resides.

23.16 The Courts situated at the place where the headquarters of ANERT is situated viz, Thiruvananthapuram alone will have jurisdiction to entertain civil suits and all other legal pertaining to this contract.

24. SPECIAL CONDITIONS

23.17 Each bidder should submit only one (1) bid. Any bidder who submits/participates in more than one bid for the work shall be disqualified.

23.18 If the due date for opening the tender happens to be declared holiday, then the tender will be received and opened on the very next day, for which no prior intimation will be given.

23.19 **During the tender evaluation, ANERT may seek more clarifications/details from any or all of the tenderers, if felt necessary.**

AGENCY FOR NEW & RENEWABLE ENERGY RESEARCH AND TECHNOLOGY (ANERT)
Department of Power, Government of Kerala
Thiruvananthapuram, Kerala – 695 033;
www.anert.gov.in , projects@anert.in

E-TENDER DOCUMENT

Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV)

Ref. No.: ANERT-TECH/153/2021-PO(KKG)

PART – 3: SCOPE OF WORKS

Date of Publishing of Bids : - 01/11/2022

Last Date of Submission of Bids : - 15/11/2022

SCOPE

25. INVITATION TO BID

20.1 **ANERT is the State Agency for Renewable Energy in Kerala** having its Headquarters at Thiruvananthapuram, Kerala and various district level offices **This EoI has been issued by the ANERT for the registration of vendors for the installation of Rooftop / Ground mounted Solar Power Plants (On Grid/Off Grid / On Grid with battery backup).**

20.2 In order to meet the requirements, ANERT proposes to invite bids from OEMs / System Integrators / EPC contractors of Solar Power Plants and provide services as per details/**scope of work** mentioned in this tender document.

20.3 Bidder shall mean any entity (i.e. juristic person) who meets the **eligibility criteria** of this tender and willing to provide the Services as required in this bidding document. The interested Bidders who agree to all the terms and conditions contained in this document may submit their Bids with the information desired in this bidding document.

20.4 Address for submission of Bids, contact details including email address for sending communications are given in this tender document.

20.5 This document shall not be transferred, reproduced or otherwise used for purpose other than for which it is specifically issued.

20.6 Interested Bidders are advised to go through the entire document before submission of Bids to avoid any chance of elimination. The eligible Bidders desirous of providing services to ANERT are invited to submit their technical proposal in response to this tender. The criteria and the actual process of evaluation of the responses to this tender and the selection of Bidder will be entirely at ANERT's discretion. This tender seeks proposal from Bidders who have the necessary experience, capability & expertise to provide ANERT the proposed Services adhering to its requirements outlined in this tender.

24. DEFINITION

Solar PV power plant system comprises of C-Si (Crystalline Silicon)/ Thin Film Solar PV modules with intelligent Inverter having MPPT technology and Anti-Islanding feature and associated power electronics, which feeds generated AC power to the Grid. Other than PV Modules and Inverter/Inverters, the system consists of Module Mounting Structures, appropriate DC and AC Cables, Array Junction Boxes (AJB) / String Combiner Boxes (SCB), AC and DC Distribution Box, Lightning Arrester, Earthing Systems, Net meter, etc.

The system should be capable for exporting the generated AC power to the Grid, whenever the Grid is available with all System Protection facilities.

25. SCOPE OF WORK

25.1 The scope includes the Supply, Installation, Testing and Commissioning of On-Grid / Off Grid / Hybrid SPV power plants. All the necessary approvals from KSEBL/Electrical Inspectorate, feasibility study, necessary civil work, Mounting of Module Structures, PV Module Installation, Inverter Installation, DC/AC Cabling and interconnections, Installation of Lightning Arresters and Earthing System as per the standards, Arranging all the necessary inspections from KSEBL/Electrical Inspectorate/ ANERT District Office as part of Pre-Commissioning, if any, Commissioning of the PV Power Plant, are coming under the scope of the bidder.

25.2 The scope includes guidelines and practices for the Supply, Installation, Testing and Commissioning of SPV power plants (Roof-top/Ground Mounted) based on the conditions and specification in-corporated in the tender.

Plant Capacity	Connecting voltage
Up to 5 kWp	Single Phase
Above 5 kWp	Three Phase

26. PERFORMANCE SECURITY

The vendors selected, before award of works, are required to furnish performance security as decided by CEO ANERT in accordance with the terms set forth in the tenders / Rate contracts floated for such works.

27. SERVICE AND MAINTENANCE

27.1 Any sort of service calls must be attended within 48 hours of registration and the faulty system or components should be replaced/ repaired within 7 days of fault reporting. The servicing should be carried out at the site of installation.

27.2 The service personnel should visit the installations at least once in 4 months for preventive maintenance even if no faults are reported. **Reports of these preventive maintenance (Format attached as Annexure – F) visits and generation data should be submitted to the concerned ANERT District Offices on a quarterly basis**.

27.3 A designated contact Telephone Number and address should be submitted for reporting faults during the warranty period.

28. SYSTEM COMPONENTS - TECHNICAL COMPLIANCE FOR SYSTEM COMPONENTS

S/N	System Component	Capacity/ rating	Minimum Technical Compliance
1.	Solar panel	As per the required capacity	IS 14286 - Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
			IEC/IS 61730: Part I & II;
2.	Grid Tied Inverter	As per the required capacity	IS 16221: Part 1 &2 - Safety of Power Converters for use in Photovoltaic Power Systems
			IS 16169 - Test Procedure of Islanding Prevention Measures for Utility-Interconnected Photovoltaic Inverters
3.	Module Mounting Structure	As per the required capacity	IS 2062 - Hot Rolled Medium and High Tensile structural Steel
			IS 4759 - Hot-dip Zinc Coatings on structural steel and other products
4.	Battery	As required	IEC 61427 / IS 15549 / IEC 61056* / IS16220* (Recommended) IEC 62133-2: 2017** IEC 62620:2014** (Recommended)
5.	Cables	As required	IEC 60227 / IS 694
			IEC 60502 / IS 1554 (Pt. I & II)
6.	Switches/ Circuit Breakers	As required	IEC 60947 part I, II, III / IS 60947 Part I, II, III
7.	Connectors		EN 50521
8.	Surge Protection Device		IEC 60364-5-53 / IS 15086-5
9.	Junction Boxes/Enclosures for Inverters/ Charge Controllers	As required	IP 54 (for outdoor) or IP 65 / IP 21(for indoor) as per IEC 529
10.	Energy Meter for Recording Solar Electricity Generated & Two-way meter for Distribution Licensee grid connection		As per CEA Regulations; IEC 60687/ IEC 62052-11 / IEC 62053-22 / IS 14697
11.	Lightning Protection	As required	As per IEC 62305 / IEC 62561
12.	Electrical Grounding (Earthing)	As required	As per IS 3043

29. STANDARDS AND REGULATIONS TO BE COMPLIED

The connectivity should be as per

a. Technical Standards for connectivity of the Distributed generation resources, Regulation, 2013.
b. KSERC (Renewable Energy and Net Metering) Regulations, 2020.
c. KSERC (Grid interactive Distributed Solar Energy Systems) Regulations, 2014.
d. CEA Regulation 2010 has to be followed safety and Electricity supply.
e. Metering should be as per CEA regulation 2006.
f. Any amendments thereof will also be applicable.

30. SPV MODULES

The EPC Company/ Contractor shall use only the PV modules that are available in the ALMM list issued by MNRE from time to time. However, the specifications for the PV Module are detailed below:

30.1 The PV modules must be PID compliant, salt, mist & ammonia resistant and should withstand weather conditions for the project life cycle.

30.2 The back sheet of PV module shall be minimum of three layers with outer layer (exposure to ambience) and shall be made of PVDF or PVF. The Back sheets for PV Module with 2 layered or 3 layered Polyester types or the back sheets with Polyester (PET type) at Air side material are not permitted for the empanelment; The minimum thickness of the core layers (without adhesive and inner EVA coated) must be 300 microns. The maximum allowed water vapor transmission rate shall be less than 2 g / m2/day and shall have a Partial Discharge > / = 1500V DC

30.3 The front glass shall meet the following specifications:

a. The facing glass must be Tempered, PV grade with Low iron and high transmission.
b. The transmission shall be > 93 %
c. Thickness shall be min 3.2 mm
d. Textured to trap more light

e. The glass shall have an Anti-reflective coating for the better transmission and light absorption.

f. Tempered glass to meet the external load conditions

30.4 The encapsulant used for the PV modules should be UV resistant in nature. No yellowing of the encapsulant with prolonged exposure shall occur. The sealant used for edge sealing of PV modules shall have excellent moisture ingress Protection with good electrical insulation and with good adhesion strength. Edge tapes for sealing are not allowed.

30.5 Anodized Aluminium module frames of sufficient thickness shall be used which are electrically & chemically compatible with the structural material used for mounting the modules having provision for earthing.

30.6 UV resistant junction boxes with minimum three numbers of bypass diodes and two numbers of MC4 connectors or equivalent with appropriate length of 4 sq.mm Cu cable shall be provided. IP67 degree of protection shall be used to avoid degradation during Life.

30.7 Shading correction/ bypass diode for optimizing PV out to be incorporated in each solar module or panel level.

30.8 Each PV module used in any solar power project must use a RF identification tag (RFID), which must contain the following information. The RFID can be inside or outside the module laminate but must be able to withstand harsh environmental conditions.

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 cell and module).

e. I-V curve for the module.

f. Peak Wattage, IM, VM 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 series.

30.9 The following details should be provided on the module

a. Name of the manufacture.
b. Month and year of manufacture.
c. Rated Power at STC.
d. VMP, IMP, VOC, Isc.

30.10 The successful bidder shall arrange an RFID reader to show the RFID details of the modules transported to sites, to the site Engineer in charge up to their satisfaction, which is mandatory for the site acceptance test.

30.11 Each PV module used in any solar power project must use a RF identification tag (RFID), which must contain the following information. The RFID can be inside or outside the module laminate but must be able to withstand harsh environmental conditions.

30.12 The PV modules must qualify (enclose Test Reports/Certificates from IEC/NABL accredited laboratory) as per relevant IEC standard. The Performance of PV Modules at STC conditions must be tested and approved by one of the IEC/NABL Accredited Testing Laboratories.

30.13 PV modules used in solar power plant/ systems must be warranted for 10 years for their material, manufacturing defects, workmanship. The output peak watt capacity which should not be less than 90% at the end of 10 years and 80% at the end of 25 years

30.14 Original Equipment Manufacturers (OEM) Warrantee of the PV Modules shall be submitted by the successful bidder when the materials delivered at site.

30.15 The PV Module should be under the DCR (Domestic Content Requirement) category

30.16 The PV modules shall conform to the following standards:

a. IS 14286: Crystalline silicon terrestrial photovoltaic (PV) modules — design qualification and type approval.
b. IEC 61215 / IEC 61646: c-Si (IEC 61215): Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval Thin Film (IEC 61646): Design, Qualification & Type Approval

c. IEC 61730-1: Photovoltaic Module safety qualification- Part 1: Requirements for construction

d. IEC 61730-2: Photovoltaic Module safety qualification- Part 2: Requirements for testing

e. IEC 61701: Salt mist corrosion testing of photovoltaic modules

f. IEC 62716: Test Sequences useful to determine the resistance of PV Modules to Ammonia (NH3)

30.17 The PV module should have IS14286 qualification certification for solar PV modules (Crystalline silicon terrestrial photovoltaic (PV) modules — design qualification and type approval). The exemption of this certification and other details are described, as per MNRE's Gazette Notification No. S.O. 3449 (E). Dated 13th July, 2018.

30.18 PV Module of same Make/ Model in the same series shall be considered as a single product while making the payment as per MNRE Order No. 283/54/2018-Grid Solar (ii) Dt. 06- Feb-2020.

31. POWER CONDITIONING UNIT (PCU)

The Power Conditioning Unit shall be String Inverter with power exporting facility to the Grid. The List of Inverters under On-Grid category approved by ANERT is available in website. The KSEBL is expected to publish a list of grid connected inverters, bidders are permitted to use inverters from such a list as and when it is published for the projects awarded thereafter.

However, the specifications for the ON-Grid Inverters are detailed below:

General Specifications:

31.1 All the Inverters should contain the following clear and indelible Marking Label & Warning Label as per IS16221 Part II, clause 5. The equipment shall, as a minimum, be permanently marked with:

a. The name or trademark of the manufacturer or supplier.

b. A model number, name or other means to identify the equipment.

c. A serial number, code or other markings allowing identification of manufacturing location and the manufacturing batch or date within a three-month time period.

d. Input voltage, type of voltage (A.C. or D.C.), frequency, and maximum continuous current for each input.

e. Output voltage, type of voltage (A.C. or D.C.), frequency, maximum continuous current, and for A.C. outputs, either the power or power factor for each output.

f. The Ingress Protection (IP) rating

31.2 The inverter output shall be 415 VAC, 50 Hz, 3 phase or 230 VAC, 50 Hz, 1 phase.

31.3 The inverter shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of inverter component failure or from parameters beyond the inverter's safe operating range due to internal or external causes.

31.4 The Technical Specification of On-Grid Inverters are summarized below:

Specifications of Inverters	
Parameters	**Detailed specification**
Nominal voltage	230V/415V
Voltage Band	Between 80% and 110% of V nominal
Nominal Frequency	50 Hz
Operating Frequency Range	47.5 to 50.5 Hz
Waveform	Sine wave
Harmonics	AC side total harmonic current distortion < 3%
Ripple	DC Voltage ripple content shall be not more than 1%
Efficiency	Efficiency shall be >90%
Casing protection levels	Degree of protection: Minimum IP-54 for internal units and IP-65 for outdoor units
Operating ambient Temp range	-10 to + 60 degree Celsius
Operation	Completely automatic including wakeup, synchronization (phase locking) and shut down
MPPT	MPPT range must be suitable to individual array voltages

Specifications of Inverters	
Parameters	**Detailed specification**
Protections	Over voltage: both input and output Over current: both input and output Over / Under grid frequency Over temperature Short circuit Lightning Surge voltage induced at output due to external source Islanding
Ingress Protection	IP 65 for Outdoor / IP 54 for Indoor
Recommended LED indications	ON Grid ON Under/ Over voltage Overload Over temperature
Recommended LCD Display on front Panel	DC input voltage DC current AC Voltage (all 3 phases) AC current (all 3 phases) Frequency Ambient Temperature Instantaneous power Cumulative output energy Cumulative hours of operation Daily DC energy produced
Communication Interface	RS485/ RS232/Wi-Fi (with or without USB)

31.5 The Technical Specification for Interconnection are summarized below:

Sl No	Parameters	Requirements	Reference
1	Overall conditions of service	Reference to regulations	Conditions for Supply of Electricity
2	Overall Grid Standards	Reference to regulations	Central Electricity Authority (Grid standards) Regulations 2010
3	Equipment	Applicable industry standards	IEC/EN standards

Sl No	Parameters	Requirements	Reference
4	Safety and Supply	Reference to regulations, (General safety requirements	Central Electricity Authority (Measures of safety and electricity supply) Regulations, 2010 and subsequent amendments
5	Meters	Reference to regulations and additional conditions issued by the commission.	Central Electricity Authority (Installation & operation of meters) regulations 2006 and subsequent amendments
6	Harmonic current	Harmonic current injections from a generating station shall not exceed the limits specified in IEEE 519	IEEE 519 relevant CEA (Technical Standards for connectivity of the distributed generation resource) Regulations 2013 and subsequent amendments
7	Synchronization	Photovoltaic system must be equipped with a grid frequency synchronization device, if the system is using synchronizer inherently built in to the inverter then no separate synchronizer is required	Relevant CEA (Technical Standards for Connectivity of the distributed generation resources) regulations 2013 and subsequent amendments.
8	Voltage	The voltage-operating window should minimize nuisance tripping and should be under operating range of 80% to 110% of the nominal connected voltage. beyond the clearing time of 2 seconds, the Photovoltaic system must isolated itself from the grid	
9	Flicker	Operation of Photovoltaic system should not cause voltage flicker in excess of the limits stated in IEC	Relevant CEA regulations 2013 and subsequent if any, (Technical standards for connectivity of the

Sl No	Parameters	Requirements	Reference
		61000 or other equivalent Indian standards if any	distributed generation resource)
10	Frequency	When the distribution system frequency deviates outside the specified limits (50.5 Hz on upper side and 47.5 Hz on lower side) up to 0.2 sec, the Photovoltaic systems shall automatically disconnect from grid and be in island mode.	
11	DC injection	Photovoltaic system shall not inject DC current greater than 0.5% of full rated output at the interconnection point or 1% rated inverter output current into distribution system under any operating conditions.	
12	Power Factor	While the output of the inverter is greater than 50%, a lagging power factor greater than 0.9 shall be maintained.	
13	Islanding and Disconnection	The photovoltaic system in the event of voltage or frequency variations must island/disconnect itself with the time stipulated as per IEC standards	
14	Overload and Overheat	The inverter should have the facility to automatically switch off in case of overload or overheat and should restart when normal conditions are restored	

31.6 The IEC Certifications of On-Grid Inverters are summarized below:

Standard	Description
IEC 61683	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
IEC 61727	Photovoltaic (PV) systems- Characteristics of the utility interface
IEC/EN 62109-1	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
IEC/EN 62109-2	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
IEC/EN 61000-3-3/ 3-11/ 3-5	Electromagnetic compatibility (EMC) - Part 3-11; Limits; Limitation of Voltage Change, Voltage Fluctuations and Flicker in Public Low- Voltage Supply Systems; Rated Current <16A / >16A and <75A / >75A per Phase respectively
IEC/EN 61000-3-2/ -3-12/ -3-4	Electromagnetic compatibility (EMC) - Part 3-12; Limits; Limits for Harmonic Currents produced by equipment connected to the public low voltage systems with Rated Current <16A / >16A and <75A / >75A per Phase respectively
*IEC/EN 61000-6-1 / 6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for residential and commercial / industrial environments
*IEC/EN 61000-6-3 / 6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for residential and commercial / industrial environments
IEC 62116	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
IEC 60068-2-1	Environmental testing - Part 2-1: Tests - Test A: Cold
IEC 60068-2-2	Environmental testing - Part 2-2: Tests - Test B: Dry heat
IEC 60068-2-14	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
IEC 60068-2-30	Environmental testing - Part 2-30: Tests - Test Db:, Damp heat, cyclic (12 h + 12 h cycle)

***Recommended but not mandatory**

32. BATTERY BANK

32.1. The battery bank can be VRLA (SMF or Gel) or Lithium Ferro Phosphate. The EPC Company/ Contractor shall use only the Batteries that are empanelled with the ANERT. However, the specifications for the Batteries are detailed below:

32.2. **Technical Requirements**

#	Parameters
1.	Nominal Capacity (Ah) shall be rated @C10
2.	Minimum Nominal Cell voltage (V): 2V / Lithium ferro phosphate: 3.2V
3,	Self-discharge (less than 3% per month at 30°C)
4	A 6-hour backup of MNRE requirement is estimated as 7200Wh

32.3. General Specifications:

a. Test certificate submitted should qualify the minimum requirements as per above standards for capacity test, ampere-hour efficiency test, watt-hour efficiency test, self- discharge test.
b. Battery (Lead Acid LMLA/Lead Acid –VRLA or SMF/Lead Acid GEL) shall have a warrantee of minimum 5 years and Lithium Ferro Phosphate Battery shall have a warrantee of minimum 10years
c. Battery capacity is rated C/10 at 27°C
d. Original Equipment Manufacturers (OEM) Warrantee of Battery shall be submitted
e. There should be a separate Battery Management System if the Lithium Ferro Phosphate Battery is used for the PV Power Plant.

32.4. Standards and Certifications

Batteries shall comply with the specified edition of the following standards and codes.

Standard	Description
IEC 61427	IEC 61427 – This series gives general information relating to the requirements for the secondary batteries used in photovoltaic energy systems (PVES) and to the typical methods of test used for the verification of battery performances.
IEC 60896	This part of IEC 60896 applies to all stationary lead-acid cells and Monobloc batteries of the valve regulated type for float charge applications, (i.e. permanently connected to a load and to a d.c.

Standard	Description
	power supply), in a static location (i.e. not generally intended to be moved from place to place) and incorporated into stationary equipment or installed in battery rooms for use in telecom, uninterruptible power supply (UPS), utility switching, emergency power or similar applications.
IEC 61056*	IEC 61056-1:2012 specifies the general requirements, functional characteristics and methods of test for all general-purpose lead-acid cells and batteries of the valve-regulated type
IS16220* (Recommended)	IS 16220 defines the general requirements, functional characteristics and methods of test for all general-purpose lead-acid cells and batteries of the valve- regulated type.
IEC 62133-2: 2017**	IEC 62133 requirements and tests for the safe operation of portable sealed secondary lithium cells and batteries containing non-acid electrolyte, under intended use and reasonably foreseeable misuse.
IEC 62620:2014**	IEC 62620 defines marking, tests and requirements for lithium secondary cells and batteries used in industrial applications including stationary applications.
IS 15549	Stationary valve regulated lead acid batteries – Specification
IS 13369:1992	Stationary Lead Acid Batteries (with Tubular Positive Plates) in Monobloc Containers
IS 1651	Stationary cells and batteries, lead-acid type (with tubular positive plates) – specification

33. DATALOGGING

A dedicated data logging system (Hardware and software) for monitoring the plant shall be provided even if the inverter has embedded data logging system. The following weather parameters are to be measured as part of the datalogging system.

a) Solar Irradiance:

A Pyranometer/ Solar cell-based irradiation sensor (along with calibration certificate) shall be provided, with the sensor mounted in the plane of the array. Readout shall be integrated with data logging system: **from 10kWp to less than 100kWp**

b) Temperature: Integrated temp, sensors for measuring the module surface temp., inverter inside enclosure temp, and ambient temp to be provided complete with readouts integrated with the data logging system.

It is recommended that the following important parameters shall be accessible through the Data Logging Facility.

a) AC Voltage
b) AC Output current
c) Output Power
d) Energy in kWh
e) DC Input Voltage
f) DC Input Current
g) Temperatures (C)
h) Invertor Status
i) Irradiation
j) Module temperature
k) String Voltage & Current (For PV Plants from 100kWp onwards)

Provision for Internet monitoring and download of historical data shall be incorporated. GSM Modem/Wi Fi modem in case GSM connectivity is used or Wireless Router + modem in case Ethernet connection is being used for remote access must be provided. The data collected is to be pushed to ANERT State data server for monitoring and analytics.

34. ELECTRICAL SAFETY, EARTHING AND PROTECTION

a. Internal Faults: In built protection for internal faults including excess temperature, commutation failure, over load and cooling fan failure (if fitted) is obligatory.
b. Over Voltage Protection: Over Voltage Protection against atmospheric lightning discharge to the PV array is required. Protection is to be provided against voltage fluctuations in the grid itself and internal faults in the power conditioner, operational errors and switching transients.

c. Earth fault supervision: An integrated earth fault device shall have to be provided to detect eventual earth fault on DC side and shall send message to the supervisory system.

35. CABLING PRACTICE

Cable Cabling is required for wiring from AC output of inverter/PCU to the Grid Interconnection point. It includes the DC cabling from Solar Array to AJB and from AJB to inverter input.

35.1 All cables of appropriate size to be used in the system shall have the following characteristic:

a. Shall conform to IEC 60227 / IS 694 & IEC 60502 / IS 1554 standards.
b. Temperature Range: -10 degree Celsius to +80 degree Celsius
c. Voltage rating: 660/1000V
d. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation
e. Flexible

35.2 Sizes of cables between any array interconnections, array to junction boxes, junction boxes to inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum (2%).

35.3 For the DC cabling, XLPE or XLPO insulated and sheathed, UV stabilized single core flexible copper cables shall be used; Multi-core cables shall not be used.

35.4 For the AC cabling, PVC or XLPE insulated and PVC sheathed single or, multi-core flexible copper cables shall be used. However, for above 10kWp systems, XLPE insulated Aluminium cable of suitable area of cross section can be used in the AC side subject to a minimum area of cross section of 10 sq.mm. Outdoor AC cables shall have a UV -stabilized outer sheath IS/IEC 69947.

35.5 All LT XLPE cables shall conform to IS:7098 part I&II.

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

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

35.8 The DC cables from the SPV module array shall run through a UV-stabilized PVC conduit pipe of adequate diameter with a minimum wall thickness of 1.5mm

35.9 Cables and wires used for the interconnection of solar PV modules shall be provided with solar PV connectors (MC4) and couplers

35.10 All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermo-plastic clamps at intervals not exceeding 50cm; the minimum DC cables size shall be 4.0mm2 copper; the minimum AC cable size shall be 4.0mm2 copper. In three phase systems, the size of the neutral wire size shall be equal to the size of the phase wires. Conduits for taking outdoor cables shall be UV treated.

35.11 Cable Marking: All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified. The following colour code shall be used for cable wires

a. DC positive: red (the outer PVC sheath can be black with a red line marking
b. DC negative: black
c. AC single phase: Phase: red; Neutral: black
d. AC three phase: phases: red, yellow, blue; neutral: black
e. Earth wires: green

35.12 Cables and conduits that have to pass through walls or ceilings shall be taken through PVC pipe sleeve.

35.13 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.

35.14 All cables and connectors used for installation of solar field must be of solar grade which can withstand harsh environment conditions including high temperatures, UV radiation, rain, humidity, dirt, salt, burial and attack by moss and microbes for 25 years and voltages as per latest IEC standards. DC cables used from solar modules to array junction box shall solar grade copper (Cu) with XLPO insulation and rated for 1.1 kV as per relevant standards only.

35.15 Bending radii for cables shall be as per manufactures recommendations and IS: 1255.

35.16 For laying/termination of cables latest BIS/IEC Codes/ standards shall be followed.

36. FACTORY TESTING

a. PCU shall be tested prior to shipment and factory test certificate for relevant parameters should be provided with the PCU supplied. ANERT or authorised representative of ANERT may be allowed to witness the tests if required.

b. Factory testing shall not only be limited to measurement of phase currents, efficiencies, harmonic content and power factor, but shall also include all other necessary tests/simulation required and requested by the Purchasers Engineers. Tests may be performed at 25, 50, 75 and 100 percent of the rated nominal power.

37. PLANT METERING/ DATA LOGGING

a. Net meter as per CEA standards approved by the utility as per accuracy class has to be supplied and installed.

b. A separate Energy Meter shall be provided at the output of PCU to record the energy generation from the solar system. (This energy meter should not be integrated with PCU). This has to calibrate and installed nearer to the Consumer meter board so that meter reader from Electrical utility could access while meter reader comes to record the meter reading, they have access to the solar meter. In case the solar meter cannot be installed near to the consumer meter board/Net meter facility, an additional display may be provided near the meter board utilising the communication protocols available within this meter.

c. Web based monitoring system for the performance of the system should be provided and the link for access has to be provided to beneficiary and ANERT. GSM Modem/ Wi-Fi Modem in case GSM connectivity is used or Wireless Router + Modem in case Ethernet connection is being used for remote access must be provided. The data collected is to be pushed to ANERT State data server for monitoring and analytics.

d. The username and password for web monitoring should be shared with the concerned District office of ANERT along with the submission of invoice

e. All major parameters should be available on the digital bus and logging facility for energy auditing through the internal microprocessor and can be read on the

digital front panel at any time the current values, previous values for up to a month and the average values.

38. ARRAY SUPPORT STRUCTURE

a. Photovoltaic arrays must be mounted on a stable, durable structure that can support the array and withstand wind, rain, and other adverse conditions. The modules will be fixed on structures with fixed arrangement.
b. The module mounting structures shall have adequate strength and appropriate design suitable to the locations, which can withstand the load and high wind velocities. Stationary structures shall support PV modules at a given orientation, absorb and transfer the mechanical loads to the surface properly.
c. Each structure with fixed tilt should have a tilt angle as per the site conditions to take maximum insolation which will be approximately equal to the latitude of the location facing true South with a North - South orientation. The tilt angle can vary from 9 degree to 12 degree based on the location's latitude in Kerala
d. The PV module mounting structure shall have a capacity to withstand a wind velocity of 150 km/hr unless specified for dedicated requirements
e. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed. The PV array structure design shall be appropriate with a factor of safety of min 1.5.
f. The materials used for structures shall be Hot dip Galvanized Mild Steel conformed to IS 2062:1992 or aluminium of suitable grade minimum alloy 6063 or better.
g. The minimum thickness of galvanization for hot dip Galvanized Mild Steel should be at least 80 microns as per IS 4759.
h. The Bolts, Nuts, fasteners, and clamps used for panel mounting shall be of Stainless-Steel SS 304.
i. No Welding is allowed on the mounting structure
j. Aluminium structures used shall be protected against rusting either by coating or anodization.
k. Aluminium frames should be avoided for installations in coastal areas.

l. The structure shall be designed to withstand operating environmental conditions for a period of minimum 25 years. And shall be free from corrosion while installation.

m. Screw fasteners shall use existing mounting holes provided by module manufacturer. No additional holes shall be drilled on module frames

n. The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m^2.

o. Minimum distance between the lower level of PV Module and the ground shall be 0.6m from the ground level.

p. The PV Panel area shall be accessible for cleaning and for any repair work.

q. Sufficient gap needs to be provided between the rows to avoid falling of shadow of one row on the next row. Seismic factors for the site will be considered while making the design of the foundation.

r. Adequate spacing shall be provided between any two modules secured on PV panel for improved wind resistance.

s. Installation of structure for solar PV mounting should not tamper with the water proofing of the roofs.

39. SURGE PROTECTION

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

40. EARTHING

The Solar PV Plant should have a dedicated earthing system. The Earthing for array and LT power shall be made as per the provisions of **IS:3043-2018** "Code of practice for earthing (Second Revision)," that governs the earthing practices of a PV system and **IS 732:2019** "Code of practice for electrical wiring installations (Fourth Revision)

40.1 Earthing System shall connect all non –current carrying metal receptacles, electrical boxes, appliance frames, chassis and PV module mounting structures in one long run. The earth strips should not be bolted. Earthing GI strips shall be interconnected by proper welding.

40.2 The earthing conductor should be rated for 1.56 times the maximum short circuit current of the PV array. The factor 1.56 considers 25 percent as a safety factor and 25 percent as albedo factor to protect from any unaccounted external reflection onto the PV modules increasing its current

40.3 In any case, the cross-section area or the earthing conductor for PV equipment should not be less than 6 mm^2 if copper, 10 mm^2 if aluminium or 70 mm^2 if hot-dipped galvanized iron. For the earthing of lightning arrestor, cross-section of the earthing conductor should not be less than 16 mm^2 of copper or 70 mm^2 if hot-dipped galvanized iron. The complete Earthing system shall be mechanically & electrically connected to provide independent return to earth.

40.4 Masonry enclosure with the earth pit of size not less than 400mm X 400 mm(depth) complete with cemented brick work (1:6) of minimum 150mm width duly plastered with cement mortar (inside)shall be provided. Hinged inspection covers of size not less than 300mm X 300mm with locking arrangement shall be provided. Suitable handle shall be provided on the cover by means of welding a rod on top of the cover for future maintenance.

40.5 Minimum four (04) numbers of interconnected earth pit needs to be provided in each location. Minimum required gap shall be provided in between earth pits as per relevant standard. Body earthing shall be provided in inverter, each panel frame, module mounting structure, kiosk and in any other item as required.

40.6 Earth pit shall be constructed as per IS: 3043-2018. Electrodes shall be embedded below permanent moisture level. Earth pits shall be treated with salt and charcoal if average resistance of soil is more than 20-ohm meter.

40.7 Earth resistance shall not be more than 5 ohms. Earthing system must be interconnected through GI strip to arrive equipotential bonding. The size of the GI earth strip must be minimum 25mm X 6mm

40.8 In compliance to Rule 11& 61 Of Indian Electricity Rules,1956(as amended up to date), all non-current carrying metal parts shall be Earthing with two separate and distinct earth continuity conductors to an efficient earth electrode.

40.9 The equipment grounding wire shall be connected to earth strip by proper fixing arrangement. Each strip shall be continued up to at least 500mm from the equipment.

40.10 Necessary provisions shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.

40.11 For each earth pit, a necessary test point shall be provided.

40.12 Total no of Earth pits required for solar plants shall be as per the Electrical Inspectorate norms.

41. LIGHTNING PROTECTION FOR PV ARRAY

The SPV power plant should be provided with lightning and over voltage protection. The source of over voltage can be lightning or other atmospheric disturbance. The lightning conductors shall be made as per applicable Indian Standards in order to protect the entire array yard from lightning stroke.

The design and specification shall conform to IS/IEC 62305, "Protection against lightning" govern all lightning protection-related practices of a PV system.

- The entire space occupying SPV array shall be suitably protected against lightning by deploying required number of lightning arresters. Lightning protection should be provided as per IS/ IEC 62305.
- Lightning system shall comprise of air terminations, down conductors, test links, earth electrode etc. as per approved drawings.
- The protection against induced high voltages shall be provided by the use of surge protection devices (SPDs) and the earthing terminal of the SPD shall be connected to the earth through the earthing system.
- The EPC Contractor / Company shall submit the drawings and detailed specifications of the PV array lightning protection equipment to Employer for approval before installation of system.

42. AC DISTRIBUTION PANEL BOARD

a. AC Distribution Board (ACDB) shall control the AC power from inverter and should have necessary surge arrestors.
b. An ACDB panel shall be provided in between PCU and Utility grid. It shall have MCB/MCCB/ACB or circuit breaker of suitable rating for connection and disconnection of PCU from grid.
c. The connection between ACDB and Utility grid shall be of standard cable/ Conductor with suitable termination. It shall have provision to measure grid voltage, current and power.
d. The incomer shall be selected at required rating. The ACDB enclosure shall be of good protection and suitable for mounting on the trenches / on wall.
e. All the 415 V AC or 230 V AC devices/equipment like bus support insulators, circuit breakers, SFU isolators (if applicable), SPD, etc. mounted inside the switch gear shall be suitable for continuous operation
f. Switches/ circuit breakers/ connectors meeting general requirements and safety measurements as per IS 60947 Part I, II, III and IEC 60947 part I, II and III.
g. Junction boxes, enclosures, panels for inverters/ Controllers shall meet IP 54 (for outdoor)/ IP 65 (for indoor) as per IEC 529.

43. DC DISTRIBUTION BOARD

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

44. CABLES, SWITCHES AND GENERAL REQUIREMENTS

a. PVC insulated copper cables with current rating suitable for AC and DC as per the National Electric Code, and meeting:

i. General Test and Measuring Method as per IEC 60189/ IS 694

ii. PVC insulated cables for working voltages up to 1100 V and UV resistant for outdoor installation as per IEC 60502/ IS 1554 (Pt. I & II)

b. Cable Marking: All cable/wires are to be marked in proper manner by good quality ferule or by other means so that the cable can be easily identified.

c. Switches/ circuit breakers/ connectors meeting general requirements and safety measurements as per IS 60947 Part I, II, III and EN 50521 for AC/DC.

d. Junction boxes, enclosures for inverters/ charge controllers shall meet IP 54 (for outdoor)/ IP 21 (for indoor) as per IEC 529.

45. AC/DC WIRING

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

46. CIVIL WORKS

While installing solar power pants on rooftops, the physical condition of the rooftop, chances of shading, chances water level rise in the rooftop during raining due improper drainage in the roof-top should be taken in to consideration.

46.1 PV array shall be installed in the terrace space free from any obstruction and/or shadow and to minimize effects of shadows due to adjacent PV panel rows.

46.2 PV array shall be oriented in the south direction in order to maximize annual energy yield of the plant.

46.3 The solar PV array must be installed on the rooftop in such a way that there is sufficient space on the rooftop for maintenance etc.

46.4 There should not be any damage what so ever to the rooftop due to setting up of the solar power plant so that on a later day there is leakage of rainwater, etc. from the rooftop.

46.5 Some civil works are inevitable for erecting the footings for the module mounting structure as discussed in Module Mounting Structure section. The roof top may be given a suitable grading plaster with suitable leak proof compound so as to render the roof entirely leak proof.

46.6 Ample clearance shall be provided in the layout of the inverter and DC/AC distribution boxes for adequate cooling and ease of maintenance.

46.7 While cabling the array, care must be taken such that no loose cables lie on the rooftops.

46.8 The roof top should look clean and tidy after installation of the array.

46.9 Neatness, tidiness and aesthetics must be observed while installing the systems.

46.10 RCC Works - All RCC works shall be as per IS 456 and the materials used viz. Cement reinforcement, steel etc. shall be as per relevant IS standards. Reinforcement shall be high strength TMT Fe 415 or Fe 500 conforming to IS: 1786-1985.

46.11 Brick Works (If any) - All brick works shall be using 1st class bricks of approved quality as per IS 3102.

46.12 Plastering - Plastering in cement mortar 1:5, 1:6 and 1:3 shall be applied to all.

46.13 Display of mandatory items- Single Line Diagram and layout diagram of modules and interconnection at installation site shall be provided near the inverter for greater than 10 kWp systems.

46.14 For painting on concrete, masonry and plastered surface IS:2395 shall be followed. For distempering IS 427 shall be followed referred. For synthetic enamel painting IS 428 shall be followed. For cement painting IS 5410 shall be followed.

46.15 All Civil works required for the installation of the PV Plant and other civil and electrical work in evacuation infrastructure, wherever necessary, shall be within the scope of the bidder

46.16 The layout of Inverter accommodation shall be designed to enable adequate heat dissipation and availability. Mount within the existing infrastructure available in consultation with the Site in charge. String Inverters may be installed with Canopy type structure over it to protect it from frequent monsoon and weather changes.

47. NET METERING AND UTILITY INTERCONNECTION

a. Net metering equipment (an Import-Export Energy Meter) approved and tested by the electrical utility based on the accuracy class required for the proposed capacity of the system must be provided with the necessary data cables if required.

b. Net Metering and Utility Interconnection should be accomplished according the Kerala State Electricity Regulatory Commission (Grid Interactive Distributed Solar Energy Systems) Regulations 2014 Clauses (8) & (9) (Notification No. 2096/KSERC/CT/2014 dt. 10th June 2014)

48. INTER CONNECTION OF INVERTER OUTPUT WITH UTILITY GRID

a. The interconnection of load with inverter output should be done after obtaining permission from Electrical Inspectorate and Electrical Utility.

b. The plan scheme and drawing related to interconnection details should be submitted to Electrical Inspectorate through a licensed Electrical contractor with the guidance appropriate Engineering Authority.

c. Licenced contractor has to be engaged for preparation of plan scheme to be submitted to the Kerala State Electricity Licensing Board and necessary fee should be remitted for energisation of Solar Power Plant.

d. The panel board and distribution board required for AC interconnection should be done as per specification/ instruction given appropriate Engineering Authority.

e. All the electrical works required for the interconnection of load with inverter output should be done by the successful bidder as a part of the Solar Power Plant installation.

f. Bidder should visit the actual site and ensure the exact place for providing Solar Modules and Inverter etc. in presence of technical representative from the ANERT for works tendered by ANERT.

g. Net Metering Equipment shall be installed and maintained in accordance with the provisions of The Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 as amended from time to time. The Contractor shall

maintain the Metering System as per metering code and CEA guidelines. The defective meter shall be immediately tested and calibrated.

h. The accuracy class of the Net Metering Equipment will be selected so that all levels of energy produced or taken by the Solar Power Plant will be measured accurately, and this equipment has applicable accuracy class.

i. Net Metering Equipment shall be microprocessor based conforming to the relevant IEC standards with Advanced Metering Infrastructure (AMI) with RS232 cable facility.

j. Net Metering Equipment shall measure active energy (both import and export) and reactive energy (import) by 3 ph, 4 wire principle suitable for balanced / un-balanced 3 phase load (With KVAr, KWh, KVA measuring registers). Tri-vector based energy meter shall have an accuracy class of energy measurement of at least Class 0.2 for active energy and at least 0.5 Class for reactive energy according to IEC 60687.

k. Display parameters: LCD test, KWH import, KWH export, MD in KW export, MD in KW import, Date & Time, AC current and voltages and power factor (Cumulative KWH will be indicated continuously by default)

49. PERMISSION FROM KSELB BY BIDDER

a. The procedures for Grid Connectivity of the PV Plants for capacities from 1kWp to 1MWp are governed by the KSEBL Circular No. CE(REES)/Escot/AEE6/Solar-General/16-17/766(1) Dt. 09-09-2016 and its Amendments.

b. The beneficiary/ANERT will obtain a feasibility certificate by submitting an application form along with the documents and a fee of Rs 1000/- as per the Annexure-I form of KSEBL.

c. After submitting all the documents and clarification required by KSEBL, the bidder will pay a Registration fee of Rs 1000/- per kW to KSEBL (Eg: If the plant size is 3.65kW then it will be considered as 4kW and the applicant has to pay a sum of Rs 4000/-) to acquire a SPIN (Solar Plant Identification Number). For example, 5501-00001 where 5501 is the section office code for the locality and 00001 is the solar plant number.

d. 80% of the amount of fee of solar PV plant registration will be refunded by KSEBL if the applicant has installed the PV plant within the term of 6 months from the date of registration.

e. Request for the cancellation of Registration by the applicant will be verified by the Assistant Engineer, KSEBL and a decision will be taken on this by division Executive Engineer, KSEBL and 80% of the amount shall be reimbursed based upon the recommendation of Assistant Engineer.

f. The application for testing of the installed PV power plant has to be submitted at the Electrical Section office by the contractor. For plant capacities above 10kWp the application must be submitted along with Energization Certificate from Electrical Inspectorate and for the plant capacities below 10kWp the application must be submitted along with a Completion Report of a Certified Electrical Contractor. The minimum qualification for carrying out the installation work of a PV Plant shall be a B-Class contractor licensee and depending upon the capacity of installation, eligible contractors can carry out the work. (Circular no. B2-13958/2017/CEI Dtd 24.07.2018.

g. The officials from Electrical Inspectorate and KSEBL will visit the site with prior notice to the beneficiary.

h. Tests shall be conducted as per system capacity norms issued by KSEBL/Electrical Inspectorate

i. Test Certificate for Solar Plant Installation as per annexure 9 of KSEBL order will be issued by the Assistant Engineer, once the PV plants is successfully performing as per the standards

j. Agreement for Connecting Solar Energy System as per Annexure 10 of KSEBL order shall be signed between KSEBL and the applicant as per the Annexure 11 (KSEBL Order) in which the capacity of the net meter should be mentioned. The contractor is required to undertake all the liaison work required for the same.

k. A Net meter shall be installed for the plant within 7 days which shall be either bought by the contractor or rented by the KSEBL. The tariff of rent if rented by KSEBL will be as per Annexure 12 of the KSEBL order. The contractor shall submit Test Certificates from NABL or KSEBL test labs for the Net meter if purchased.

l. The import and export will be calculated based upon the Net meter installed at the site of the consumer for which the reading will be taken on every month from the Net meter and Solar meter.

m. The panel board and distribution board required for AC interconnection should be done as per specification/instruction given by PWD Electrical wing/Electrical Inspectorate Authorities /A.E, L.S.G.D. /appropriate Engineering Authorities

50. WARRANTY

a. 5 years' warranty should be provided by the supplier for the system and components or part of the system has to be provided as per the special conditions of the contract.

b. PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90 % at the end of 10 years and 80% at the end of 25 years

c. The Warranty Card to be supplied with the system must contain the details of the all the components supplied including serial numbers.

51. OPERATION MANUAL

An Operation, Instruction and Maintenance Manual, should be provided with the system. The following minimum details must be provided in the manual:

i. About solar power plant – its components and expected performance.

ii. DO's and DON'T's

iii. Cleaning of Solar PV Modules in regular intervals

iv. Clear instructions on regular maintenance and troubleshooting of solar power plant

v. AS built Drawings for the Installation

vi. OEM Warrantee Certificates of Inverters, PV Modules, Batteries etc.

vii. Specification of PV Plant

viii. Data Sheets of major equipment like PV Module, Inverter etc.

ix. Name and address of the E.P.C Contractor and the contract person in case of non-functionality of the solar power plant.

52. BILL OF MATERIAL

The bidder should provide the bill of material mentioning the quantity of each of the item consisting in the system, along with the offer in the format as show below for each capacity:

Sl. No.	Item	Make (if any)	Model & Individual Capacity (If any)	Qty (Nos)	Rating / Capacity
1.	PV Module				
2.	PCU/Inverter				
3.	DC Cables				
4.	AC Cables				
5.	AJB/SCB				
6.	Module Mounting Structure (MMS)				
7.	ACDB				
8.	Lightning Arrester				
9.	Earthing System Details and No. of Earth pits				
10.	Data Acquisition System				

53. DISPLAY BOARD

a. The logo of ANERT and details of the scheme as specified in the work orders to be issued during any award of works.

54. INSURANCE

54.1 The power plant must be insured at every stage of operation – from Material dispatch, storage, completion of installation and till 5 years after commissioning. The insurance coverage on handing over of the system must include all conditions of **Standard Fire and Special Perils Policy (Material Damage)**.

54.2 The insurance premium for the 5 years of warranty is to be paid by the bidder. Only the system components are to be insured. On handing over of the system, the original insurance policy is to be handed over to the authorised person at the site of installation and a copy to ANERT District Office. The annual premium payment receipt must be handed to the authorised person at the site of installation.

54 ENGINEERING DRAWINGS

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

i. Schematic drawing showing the PV panels, Power conditioning Unit(s)/Inverter, Array Junction Boxes (AJBs)/String Combiner Boxes (SJB), AC and DC Distribution Box, Net meters, MSB etc.
ii. Layout of solar PV Array
iii. Single Line Diagram (SLD) with specification of all components.
iv. Design document for Module Mounting Structure (MMS) including certificate showing wind speed withstanding capacity of the structure (STAAD/Equivalent).
v. Module Mounting Structure (MMS) drawing along with foundation details for the structure.
vi. Sizes and specification of cables for PV Module interconnections, PV Array to Array Junction Boxes, Array Junction Boxes to Inverter, Inverter to ACDB/ Grid Connection point etc. shall be furnished.

The EPC contractor shall submit a PVsyst report for PV power plants from 25kWp and above. All PV plant design should contain the following details which should be approved by the concerned officer before installation.

i. Design of strings including the number of PV modules in series and number of strings
ii. AC Protection (Circuit Breaker, Switches, Fuses, SPD)
iii. DC Protection (Switches, Fuses, SPD)
iv. AJB / SCB details
v. DC Cable size and length from point to point

vi. AC Cable size and length from point to point

vii. Earthing system details and number of pits

viii. Lightning protection details/specification

ix. PV Syst Simulation Report for above 25kWp

FORMAT FOR COVERING LETTER

(This letter to be submitted on the official letter head of the tenderer, signed by the authorised signatory.)

Sir,

I/We hereby e-tender to supply, under annexed terms and conditions of contract, the whole of the articles referred to and described in the attached specification and quantity decided by the Agency for New & Renewable Energy Research and Technology (ANERT), at the rates quoted against each item.

I am/We are remitting herewith the required amount of Rs. ..... towards the cost of e-tender and Earnest Money Deposit by electronic payment vide transaction No ..... dtd.....

Yours faithfully,

Place:

Date:

Signature

Name

Designation

(Office Seal)

ANNEXURE A – SUMMARY OF BID QUALIFICATION REQUIREMENTS

(To be filled in by the bidder)

1.	Name of the bidder	
2.	Address in full	
3.	Contact Details Mobile : Land Phone Fax Email	
4.	Name and Designation of the authorised signatory	
5.	Whether the bidder is a bonafide manufacturer/ integrator of the item tendered (Yes/No)?	
6.	Details of EMD submitted along with the bid in favour of CEO ANERT	
9.	No. of service centres /Authorised service providers in Kerala (Proof to be enclosed)	
10.	Whether Bidder was/is De-barred by ANERT (Yes/No)? If ' Yes' period of De-Barring:	

11.	Agreement submitted (Yes/ No)?	

Documentary evidence for the bid qualification requirements are submitted along with this document and the details furnished above are true and correct.

Signature
of authorised signatory

Name

Designation

Date:

(office seal)

ANNEXURE B – AGREEMENT

(To be provided on Rs.200 Non-Judicial Kerala Stamp paper)

I …….. (Name, Designation) authorised signatory of …….. (Name and full address of the bidder) hereby undertake that

1. The system installed in Kerala under Distributed Solar Programme shall be as per technical specification stipulated by ANERT/ MNRE. The wiring and installation shall be done as per the recommended installation practices and using components as per the prescribed Technical Specifications.
2. All Power Plants supplied and installed shall be given warranty for 5 years.
3. Solar modules will have a performance warranty of 90% of rated output at the end of10 years and 80% of the rated output at the end of 25 years.
4. Necessary clearance from Distribution Licensee will be obtained and submitted to ANERT in association with beneficiary for getting final approval for installing the power plant.
5. At least three service centres will be maintained for North, South, and Central regions of Kerala. List of service centres provided are true and correct.
6. Making available of energy meters, testing will be co-ordinated as an empanelled agency for the programme.
7. Pre-commissioning testing and establishing connectivity will be our responsibility.
8. There are no/do not have any pending litigation with ANERT
9. Our agency has not been blacklisted by MNRE/ Any State Nodal Agencies /ANERT.
10. All the above terms and conditions are acceptable to me/us.

Signed by Sri	Signed by Sri . . . . .
(Date)	(Date) . . . .
in the presence of witnesses	in the presence of witnesses
1.	1.
2.	2.

ANNEXURE C – DECLARATION BY THE BIDDER

e-Tender Notification No: ....., dtd …….. for Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV)

To

The CEO
ANERT

We, the undersigned, declare that:

1. We have examined and have no reservations to the Bidding Document, including Addenda No.: ..... (if any)
2. We offer to supply in conformity with the Bidding Document and in accordance with the delivery schedule
3. Our Bid shall be valid for a period of 13 months from the date fixed as deadline for the submission of tenders in accordance with the Bidding Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
4. If our Bid is accepted, we commit to submit a Security Deposit in the amount of 5 percent of the Contract Price for the due performance of the Contract;
5. We are not participating, as Bidders, in more than one Bid in this bidding process;
6. Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, has not been declared ineligible by the ANERT or Government of Kerala;
7. We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed.
8. Our firm has obtained the certifications from MNRE or NABL approved Test laboratories that the goods and services are satisfying the technical criteria specified in the bid.

Signature

Date

Name

ANNEXURE D – DECLARATION OF RELATIONSHIP WITH ANERT EMPLOYEE

(to be signed and submitted by the bidder along with the bid)

Tender Notification No.: ……..
Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV)

To

The CEO
ANERT

Name of the ANERT employee with Designation:

Name of the bidder related to the employee:

This is to put on record that Shri/Smt …… currently working as …….. in ANERT is related to ……., who is the bidder in the bid. We are aware of the Anti-corruption policy of ANERT and will observe the highest standards during the procurement and the execution of contract and shall retain from corrupt, fraudulent, collusive or coercive practices on competing for the contract.

Signature

Date

Name

ANNEXURE E – UNDERTAKING BY THE AGENCY REGARDING SERVICE CENTRES

Sl.no	Name of the agency	Districts covered	Address of the agency	Mobile No	Email ID	UrjaMithra Yes or No

The details furnished above are true and correct and it is agreed to publish these details by ANERT and any lapse from the part of these service facility is our responsibility.

Signature

Date

Name

ANNEXURE F – LIST OF ACCREDITED INSTALLERS WITH THE AGENCY/EPC CONTRACTOR PROPOSED TO DEPUTE FOR INSTALLATION

Sl. No	Name of the accredited Installer(technician)	ID no allotted by ANERT	Accredited or Not	Remarks

I hereby undertake that the Installers/ Technicians listed above are accredited installers of ANERT and the service of accredited installers will be assured during installation of Solar rooftop Power Plant. I agree to Publish the details accredited installers in ANERT website and this will be updated as when required.

Signature

Date

Name

ANNEXURE G - LIST OF AUTHORISED SUB-CONTRACTORS ENGAGED BY THE EPC CONTRACTOR/ AGENCY

#	Name of the sub-contractor	Complete address and contact details	Districts allotted	Accredited installers available with the sub-contractor	Period of engagement

I hereby undertake that the Sub-contractors listed above are engaged by us and we are responsible for any non-compliance or damages or Loss occurred during installation by our sub-contractors.

Signature

Date

Name

ANNEXURE H – UNDERTAKING FOR NO BLACKLISTING & NO BANNING

(To be provided on Rs.200 Non-Judicial Stamp paper. In Case of JV the following format is to be provided by Each Member of the Joint Venture on their respective letterhead, signed by respective authorized Signatory along with Authorized Signatory for which POA is attached with Bid))

Undertaking for No Blacklisting & No Banning

To

The CEO
ANERT

Sub: Expression of Interest (EoI) for Registration of Vendors for Installation of Solar Projects in the State of Kerala (Phase – IV)

I / We hereby declare that presently our Company/Limited Liability Partnership/ Partnership Firm/ Sole Proprietorship is having unblemished record and is not declared ineligible for corrupt/fraudulent practices by any State/Central Government/PSU on the date of Bid Submission.

I / We further declare that presently our Company/Limited Liability Partnership/ Partnership Firm/ Sole Proprietorship is not blacklisted and not declared ineligible for reasons other than corrupt/fraudulent practices by any State/Central Government/PSU on the date of Bid Submission.

If this declaration is found to be incorrect then without prejudice to any other action that may be taken, our security may be forfeited in full and the tender if any to the extent accepted may be cancelled.

(Signature & Seal of Authorized Signatory for which POA attached)

Name of Authorized Signatory:

Designation:

Date:

Place:

FORMAT A – SERVICE REPORT

(Format of Service Report to be submitted on Quarterly basis to respective District Offices)

SERVICE REPORT

Fault/ Quarterly Service

(Put ✓ on the number of Periodic service & Month from the date of commissioning)

Periodic Service			
1	2	3	4
8	7	6	5
9	10	11	12
16	15	14	13
17	18	19	20

Months after commissioning			
3	6	9	12
15	18	21	24
27	30	33	36
39	42	45	48
51	54	57	60

GENERAL INFORMATION			
Installation Site			
Address			
LSG			
District			
Service Executive Name & Contact :		Inspection Date & Time	

VISUAL INSPECTION DATA

SOLAR MODULE		
Total capacity Solar Array (kW):		
Solar Module size (Watt peak per module) Wp		
Brand of solar module :		
Model of solar module :		
Cracked glass of PV panel	☐ Yes	☐ No

White or Brown spot, bubble of air, moisture behind the glass	☐ Yes	☐ No
Junction boxes at backside loose or without cover?	☐ Yes	☐ No
Physical damage to any PV module	☐ Yes	☐ No
Check for loose cable terminations between PV modules	☐ Yes	☐ No
PV modules are properly grounded with lugs on each module	☐ Yes	☐ No
STRUCTURAL AND ROOF		
Are the modules mounted securely, and level?	☐ Yes	☐ No
Results of module hand lift test?	☐ Secure	☐ Not Secure
Are Conductors loose, touching roof surface or in contact with sharp or abrasive surfaces?	☐ Yes	☐ No
Conductor plug-and-receptacle connectors are fully engaged between junction boxes ?	☐ Yes	☐ No
Are any dissimilar metals being combined?	☐ Yes	☐ No
corrosion/evidence of rust, when encountered apply the cold galvanization spray	☐ Yes	☐ No
Check for proper earthing of structures	☐ Yes	☐ No
Check for physical damage of structures	☐ Yes	☐ No
INVERTER		
Inverter Make & Model		
Power output (kW / kVA) :		
Is the inverter located in an area which is exposed to direct sun?	☐ Yes	☐ No
Proper wire sizes ?	☐ Yes	☐ No
Check all meters and control wiring connected as per drawing	☐ Yes	☐ No
Enclosure cleaned and vacuumed out	☐ Yes	☐ No
Display and indications are working	☐ Yes	☐ No

Check for Noise levels of inverter	☐ Normal	☐ High
Check for ventilation condition (Exhaust fan is working properly or not)	☐ Yes	☐ No
Grounded ?	☐ Yes	☐ No
JUNCTION BOXES		
Check for tightness of clamps, supports, Nut- bolts used for combiner box	☐ Yes	☐ No
Check cables are secured from sharp edges	☐ Yes	☐ No
Check proper conduit fittings used and adequately tightened	☐ Yes	☐ No
Array box is Vermin and dust proof	☐ Yes	☐ No
MAIN ELECTRICAL DISTRIBUTION PANEL		
Electrical Concerns or Code Violations	☐ Yes	☐ No
Check cable terminals for burnt marks, hot spot or loose connection	☐ Yes	☐ No
Check for physical damage	☐ Yes	☐ No
BATTERY BANK (OFF-GRID SYSTEMS ONLY)		
Make & Model		
Type, Voltage & Capacity		
Number of Series and Parallel		
Terminals Protection from shorting	☐ Yes	☐ No
Are there hot battery cells (hand touch each cell)?	☐ Yes	☐ No
Proper insulation around battery-to-battery cables?	☐ Yes	☐ No
Exposed main battery bank combiner terminal?	☐ Yes	☐ No
Main cables exposed to physical damage?	☐ Yes	☐ No
Signs of sulphide flakes at terminals?	☐ Yes	☐ No

Incorrect battery connections?	☐ Yes	☐ No

SPV POWER PLANT MONITORING SHEET

Parameters under Measurement	Data	Remarks if any
GENERATION		
Current Energy Meter Reading (C)		
Previous Energy Meter Reading (P)		
Quarterly Generation (C – P) kWh		
Inverter Cumulative Generation (kWh)		
Number of days without generation (*in case of fault*)		
PV MODULES (AJB Reading using Multimeter)		
i. Watt Peak (Wp)		
ii. Voltage (V)		
iii. Current (A)		
iv. Number of Series		
v. Number of Parallel		
POWER CONDITIONING UNIT (PCU)		
i. PV Voltage (V)		
ii. PV Current (A)		
iii. PV Power (kW)		
iv. AC Voltage (R Phase)		
v. AC Voltage (Y Phase)		
vi. AC Voltage (B Phase)		
vii. Frequency (Hz)		

viii. Error log/Warning log Details		
ix. Connected Load (in kW) *For Off-Grid Installations only*		
BATTERY		
i. Battery Bank Voltage (V)		
ii. Battery Current (A)		
iii. Specific Gravity (E*ach Battery)*		
iv. Electrolyte Level *(Each Battery)*		
v. Physical damage or short circuit		

Special Remarks (if any) Customer / Service Executive :

The above generation data are verified and the power plant is working satisfactorily. The periodic maintenance is regular and no default in inspection is

Signature with Seal

Authorised Representative of LSG

Name:

Designation:

Signature with Seal

Service Executive

Installed Agency

To be issued in Triplicate: Original to ANERT DO, copy to beneficiary & One for the installed agency