



**Kerala
Tenders**

eTendering System Government of Kerala

Tender Details

Date : 15-Sep-2023 02:56 PM

Print

Basic Details

Organisation Chain	ANERT		
Tender Reference Number	ANERT-EKM/31/2023-DE(EKM)		
Tender ID	2023_ANERT_602088_1	Withdrawal Allowed	Yes
Tender Type	Open Tender	Form of contract	EPC Contract
Tender Category	Works	No. of Covers	2
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

Online Bankers	S.No	Bank Name
	1	SBI MOPS

Cover Details, No. Of Covers - 2

Cover No	Cover	Document Type	Description
1	Fee/PreQual/Technical	.pdf	Technical Bid
		.pdf	All other documents
2	Finance	.xls	Financial Bid
		.pdf	Financial Bid

Tender Fee Details, [Total Fee in ₹ * - 2,900]


Tender Fee in ₹	2,900		
Fee Payable To	Nil	Fee Payable At	Nil
Tender Fee Exemption Allowed	Yes		

EMD Fee Details

EMD Amount in ₹	50,000	EMD through BG/ST or EMD Exemption Allowed	Yes
EMD Fee Type	fixed	EMD Percentage	NA
EMD Payable To	Nil	EMD Payable At	Nil

Work /Item(s)

Title	Request for Proposal for Design, Supply, Installation, Testing and Commissioning of standalone Solar Power Plants at Therakkudy Tribal Hamlets Under Malayattoor Forest Division, Ernakulam, Kerala, India				
Work Description	Request for Proposal for Design, Supply, Installation, Testing and Commissioning of standalone Solar Power Plants				
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	Tender	Bid Validity(Days)	90	Period Of Work(Days)	30
Location	Malayattoor Forest Division,	Pincode	683544	Pre Bid Meeting Place	NA

 Pre Bid Meeting Address	Ernakulam, Kerala, Ind NA	Pre Bid Meeting Date	NA	Bid Opening Place	Online
Should Allow NDA Tender	No	Allow Preferential Bidder	No		

Critical Dates

Publish Date	12-Sep-2023 05:00 PM	Bid Opening Date	25-Sep-2023 11:00 AM
Document Download / Sale Start Date	12-Sep-2023 05:00 PM	Document Download / Sale End Date	23-Sep-2023 05:00 PM
Clarification Start Date	NA	Clarification End Date	NA
Bid Submission Start Date	12-Sep-2023 05:00 PM	Bid Submission End Date	23-Sep-2023 05:00 PM

Tender Documents

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

Work Item Documents	S.No	Document Type	Document Name	Description	Document Size (in KB)
		1	Tender Documents	Thera.pdf	Tender Document
	2	BOQ	BOQ_895358.xls	Financial Bid	352.00

Tender Inviting Authority

Name	CEO ANERT
Address	Office of CEO, 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

***Request for Proposal for Design, Supply, Installation,
Testing and Commissioning of standalone Solar Power
Plants at Therakkudy Tribal Hamlets Under Malayattoor
Forest Division, Ernakulam, Kerala, India***

Ref. No.: ANERT-EKM/31/2023-DE(EKM)

PART – 1: GENERAL CONDITIONS

Date of Publishing of Bids : - 11/09/2023

Last Date of Submission of Bids : - 23/09/2023

CONTENTS

E-TENDER NOTICE	1
TENDER ABSTRACT	2
GENERAL TERMS AND CONDITIONS FOR E-PROCUREMENT	3
1. ONLINE BIDDER REGISTRATION PROCESS:	3
2. ONLINE TENDER PROCESS:	3
3. DOCUMENTS COMPRISING BID:	4
4. TENDER DOCUMENT FEES AND EARNEST MONEY DEPOSIT (EMD)	5
5. SUBMISSION PROCESS:	8
6. VALIDITY	8
7. DEVIATIONS	8
8. BLACK LIST	8
9. BIDDER'S LOCATION	9
10. CORRUPT AND FRAUDULENT PRACTICES	9
11. CONFLICT OF INTEREST	9
12. CONFIDENTIALITY	10
13. APPLICABLE LAW	11
14. AMENDMENT OF TENDER DOCUMENT	11
15. COMMENCEMENT OF WORKS	11
16. GOVERNMENT OF KERALA – CORRUPT AND FRAUDULENT PRACTICES	11
17. BID QUALIFICATION REQUIREMENTS	12
18. GENERAL CONDITIONS	15
19. SPECIAL CONDITIONS	20
20. INVITATION TO BID	23
21. SITE - “Therakkudy Tribal Hamlet, Ernakulam, Kerala, India”	23
22. SCOPE OF WORK	24
23. SELECTION PROCEDURE	26
24. SCHEDULE OF SUPPLY	26
25. PERFORMANCE SECURITY	27
26. PAYMENT	27
27. SERVICE AND MAINTENANCE	28
28. TECHNICAL SPECIFICATIONS	30
29. SOLAR STREET LIGHTS	48
30. HOUSEHOLD INTERNAL WIRING	49
31. WARRANTY	49
32. OPERATION MANUAL	50
33. DISPLAY BOARD	50
34. INSURANCE	50
35. STANDARDS	51
36. TRANSPORTATION	51
36. ENGINEERING DRAWINGS	51
37. PACKING	52

FORMAT FOR COVERING LETTER	53
ANNEXURE A – SUMMARY OF BID QUALIFICATION REQUIREMENTS	54
ANNEXURE B – GUARANTEED TECHNICAL PARAMETERS	56
ANNEXURE C - AGREEMENT	62
ANNEXURE D – DECLARATION BY THE BIDDER.....	64
ANNEXURE E – DECLARATION OF RELATIONSHIP WITH ANERT EMPLOYEE	65
FORMAT A – UNDERTAKING FOR NO BLACKLISTING & NO BANNING.....	66
FORMAT B – CERTIFICATE OF BIDDER’S FINANCIAL QUALIFICATION	67
FORMAT C – COMPONENT	68

E-TENDER NOTICE

Competitive e-tenders in two cover system with Earnest Money Deposit (EMD) and Price Bid in accordance with the ANERT approved technical specifications are invited from reputed Manufacturers/System Integrators with relevant experience for the ***Request for Proposal for Design, Supply, Installation, Testing and Commissioning of standalone Solar Power Plants at Therakkudy Tribal Hamlets Under Malayattoor Forest Division, Ernakulam, Kerala, India.*** 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

11/09/2023

TENDER ABSTRACT

Ref. No.	ANERT-EKM/31/2023-DE(EKM)
Name of Work	Request for Proposal for Design, Supply, Installation, Testing and Commissioning of standalone Solar Power Plants at Therakkudy Tribal Hamlets Under Malayatoor Forest Division, Ernakulam, Kerala, India
Building Site and Requirements	Therakkudy Settlement, Ernakulam
Download of Tender Form	http://www.etenders.kerala.gov.in
Last date of submission of Tender	23/09/2023 @ 5.00 PM
Date and Time of opening the Tender	25/09/2023 @ 11.30 AM
Cost of Tender form	Rs. 2,900/- (Including GST)
EMD	Rs. 50,000
Warranty period	5 years from the date of Commissioning the system.
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

11/09/2023

Sd/-
CEO

GENERAL TERMS AND CONDITIONS FOR E-PROCUREMENT

This e-Tender is being published for the Request for Proposal for Design, Supply, Installation, Testing and Commissioning of standalone Solar Power Plants at Therakkudy Tribal Hamlets Under Malayattoor Forest Division, Ernakulam, Kerala, India. The tender is invited in two 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: (not applicable)
- 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 - Part-I Pre- Qualification cum Technical Bid with Commercial terms without Price Bid

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

Envelop -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. Agreement in the prescribed format (Annexure B) on Govt. of Kerala stamp paper worth Rs.200/-
- iv. Copy of Registration Certificate of the bidder firm
- v. Copy of GST Certificate

- vi. Copy of PAN card
- vii. Documents to prove the annual Turnover of the bidder along with a certificate from Chartered Accountant regarding net worth. (Capital + Reserves)
- viii. Copy of the work orders and certification from the purchase regarding execution of the order, to prove the experience in executing similar orders, as specified
- ix. Bill of Material
- x. Details of the technical offer, including test certificates issued in the name of the bidder
- xi. Declaration by the bidder (format as in Annexure – C)
- xii. Declaration of relationship with ANERT employee (format as in Annexure - D)

3.1 (b) The Second Stage (Financial Cover as per two cover system):

Envelop -2: shall contain the Price Schedule as per BOQ in Excel format for this tender to be downloaded from e-tender website, duly digitally signed by the tenderer/authorized signatory of the tender.

- 3.2 The department doesn't take any responsibility for any technical snag or failure that has taken place during document upload.
- 3.3 The Bidder shall complete the Price bid as per format given for download along with this tender.

Note: The blank price bid should be downloaded and saved on bidder's computer without changing file-name otherwise price bid will not get uploaded. The bidder should fill in the details in the same file and upload the same back to the website.

- 3.4 Fixed price: Prices quoted by the Bidder shall be fixed during the bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable/ variable price quotation will be treated as non-responsive and rejected.

4. TENDER DOCUMENT FEES AND EARNEST MONEY DEPOSIT (EMD)

- 4.1 The Bidder shall pay, a tender document fee of Rs. 2,900/- and Earnest Money Deposit or Bid Security of Rs. 50,000/-. The Bid security is required to protect the

purchaser against risk of Bidder's conduct, which would warrant the forfeiture of security.

4.2 Bidders who are registered as or under MSME / MSE / NSIC / Udyog Aadhar OR Central/State PSE are exempted from paying EMD and Tender Fee.

4.3 Online Payment modes: The tender document 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** option to 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 and Financial bid online on www.etenders.kerala.gov.in along with online payment of tender document fees and EMD.
- 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

- 6.1 The tender offer shall be kept valid for acceptance for a period of 6 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 of the Bids 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 and/or Financial 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. The Financial Proposal shall remain securely stored online till the

technical evaluation is completed and the results intimated to all successful bidders

13. APPLICABLE LAW

The work order 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. COMMENCEMENT OF WORKS

The successful bidder should sign the contract agreement within 7 days of issue of work order. The successful bidder should start the services as defined in the scope of work within 15 days of Issue of work order.

16. 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.

BID QUALIFICATION REQUIREMENTS

17. BID QUALIFICATION REQUIREMENTS

- 17.1 Every tenderer should submit along with his e-tender an Earnest Money Deposit (EMD). This may be done electronically from any of the Nationalized/Schedule Banks. The EMD of the disqualified tenderers will be returned automatically through e-procurement system. The EMD of the successful tenderers may be adjusted towards the security deposit. No interest shall be paid for the earnest money deposited.
- 17.2 An agreement in Rs.200/- Kerala stamp paper as per the format given in Annexure B must be submitted along with e-tender document.
- 17.3 Declaration regarding the use of components. The bidder must use PV modules listed in the ALMM list issued by MNRE from time to time. A detailed BoM in the letter head of the bidder is to be provided along with the bid.
- 17.4 The bidder should have service centres/authorised service providers in Ernakulam district of Kerala. 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
- 17.5 Price Bid in excel format, for this tender to be downloaded from e-tender website, duly digitally signed by the tenderer/authorized signatory of the tender.

17.2 Eligibility Requirement

- 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
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1.1	<p>The Bidder should have any of the following legal status:</p> <p>a) Body incorporated in India under the Companies Act, 2013 including any amendment thereto; OR</p> <p>b) Body incorporated in India under the Limited Liability Partnership (LLP) Act, 2008 including any amendment thereto; OR</p> <p>c) Firm registered under Partnership Act, 1932 in India; OR</p> <p>d) Sole Proprietor</p> <p>In case of JV, all the members must fulfil this requirement and submit the documents as per the Tender Document.</p>	<p>a) In case of Company – Copy of Registration/ Incorporation Certificate</p> <p>b) In case of LLP – Copy of Deed of Partnership</p> <p>c) In case of Partnership – Copy of Deed of Partnership</p> <p>d) In case of Sole Proprietor – Duly notarized Undertaking from Sole proprietor</p>
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	<p>Bidder shall have experience in the execution of supply, Installation and Maintenance of grid connected / off-grid Solar Photovoltaic Systems with battery backup of an aggregate capacity of 500 kW during last Five financial years</p> <p style="text-align: center;">OR</p> <p>The bidder must have completed Solar installations of at least 150 kW in Kerala</p>	Statutory Documents substantiating this requirement along with Documents submitted in Clause 1.4 of this Section above.
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.

10.3 Qualification Requirement

The details of qualification requirements are 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.	Technical Criteria	
	Bidder shall have experience in the execution of supply, Installation and Maintenance of grid connected / off-grid Solar Photovoltaic Systems OR Solar-Wind hybrid system with battery backup of an aggregate capacity of 300 kW during last Five financial years OR The bidder must have completed Solar installations of at least 150 kW in Kerala	The details of projects executed during period mentioned above should be listed. Copy of work orders and a certificate issued by the SNA/ Govt. Organization / SECI / PSUs towards the satisfactory work completion to be furnished by the bidder. In absence of any one, it will not be considered for qualifying in technical bid.
1.2.	Financial Criteria	
1.2.1.	The Bidder should have positive net worth in at least 2 years out of the last five Financial Years (FY 18-19, FY19-20, FY20-21, FY21-22 & FY 22-23).	1. Certificate fulfilling required financial criteria in the name of Bidder duly certified by Practicing Chartered Accountant as per the format provided Format B, duly mentioning UDIN
1.2.2.	Minimum Average Annual Turnover (MAAT) during any 2 best out of last five financial years (FY 18-19, FY19-20, FY20-21, FY21-22 & FY 22-23) of the bidder shall not be less than 1 Cr.	2. Firm's Annual Audit Report, Balance sheet, Profit & Loss and Income Tax Returns / CA certificate for last Five years i.e., F.Y: FY 18-19, FY19-20, FY20-21, FY21-22 & FY 22-23

CONDITIONS OF CONTRACT

18. GENERAL CONDITIONS

- 18.1 The tenders should be submitted online at www.etenders.kerala.gov.in
- 18.2 The tenders should be as per the prescribed form which should be downloaded from the e-tender website. The cost of tender forms 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.
- 18.3 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.
- 18.4 The rates quoted should be only in Indian currency. Tenders in any other currency are liable to rejection. The rates quoted should be for the unit specified in the schedule attached.
- 18.5 Tenders subject to conditions will not be considered. They are liable to be rejected on that sole ground.
- 18.6 Every tenderer should send along with his tender an Earnest Money Deposit. This may be paid online at the e-tenders website.
- 18.7 If any tenderer withdraws from his e-tender before the expiry of the period fixed for keeping the rates firm for acceptance, the earnest money if any, deposited by him, will be forfeited.
- 18.8 The final acceptance/rejection of the tenders rests entirely with CEO, ANERT who do not bind themselves to accept the lowest or any tender.
- 18.9 In the case of materials of technical nature, the successful tenderer should be prepared to guarantee satisfactory performance for a period of guarantee under a definite penalty. Communication of acceptance of the e-tender normally constitutes a concluded contract. Nevertheless, the successful tenderer shall also execute an agreement for the due fulfilment of the contract within the period to be specified in the letter of acceptance. The contractor shall have to pay all stamp duty, Lawyer's charges and other expenses incidental to the execution of the agreement. Failure to execute the agreement within the period specified will entail the penalties set out below:

- a) A non-refundable licensing fee of 2.5% has to be remitted by tenderer. This will be deducted from the payment of tenderer while releasing payment. The successful tenderer shall before sign the agreement and within the period specified in the letter of acceptance of his tender, deposit a sum equivalent to 3% of the value of the contract as security for the satisfactory fulfilment of the contract less the amount of money deposited by him along with his tender. The amount of security may be deposited in the manner prescribed to be specified in the work order issued by ANERT.
- b) There will be no exemption for MSE's in depositing this security amount. If the successful tenderer fails to deposit the security and execute the agreement as stated above, the earnest money deposited by him will be forfeited to ANERT and contract arranged elsewhere at the defaulter's risk and any loss incurred by ANERT on account of the purchase will be recovered from the defaulter who will however not be entitled to any gain accruing thereby.
- c) In cases where a successful tenderer, after having made partial supplies fails to fulfil the contracts in full, all or any of the materials not supplied may at the discretion of the Purchasing Officer be purchased by means of another tender/quotation or by negotiation or from the next higher tenderer who had offered to supply already, and the loss if any caused to ANERT shall thereby together with such sums as may be fixed by ANERT towards damages be recovered from the defaulting tenderer.
- d) If the contractor fails to deliver all or any of the stores or perform the service within the time/period(s) specified in the contract, the purchaser shall without prejudice to its other remedies under the contract, deduct from the contract prices, as liquidated damages, a sum equivalent to 0.5 % of the delivered price of the delayed stores or unperformed services for each week of delay until actual delivery or performance, up to a maximum deduction of 10% of the contract price of the delayed stores and services. Once the maximum is reached, the purchaser may consider termination of the contract at the risk and cost of the contractor.

18.10 The Security deposit shall, subject to the conditions specified herein be returned to the contractor within three months after the expiration of the contract but in the

event of any dispute arising between ANERT and the contractor, ANERT shall be entitled to deduct out of the deposits or the balance thereof, until such dispute is determined the amount of such damages, costs, charges and expenses as may be claimed. The same may also be deducted from any other sum which may be due at any time from ANERT to the contractor. In all cases where there are guarantee for the goods supplied, the security deposit will be released only after the expiry of the guarantee period.

- 18.11 (a) All payments to the contractors will be made by ANERT in due course
(b) All incidental expenses incurred by ANERT for making payments outside the State in which the claim arises shall be borne by the contractor.
- 18.12 Payments will be made only after the supply, Installation and Commissioning of the items and certification by the competent Technical personnel of ANERT.
- 18.13 The contractor shall not assign or make over the contract on the benefits or burdens thereof to any other person or body corporate. The contractor shall not underlet or sublet to any person or persons or body corporate the execution of the contract or any part thereof without the consent in writing of the purchasing officer who shall have absolute power to refuse such consent or to rescind such consent (if given) at any time if he is not satisfied with the manner in which the contract is being executed and no allowance or compensation shall be made to the contractor or the subcontractor upon such rescission. Provided always that if such consent be given at any time, the contractor shall not be relieved from any obligation, duty or responsibility under this contract.
- 18.14 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.

18.15 In case the contractor fails to supply and deliver any of the said articles 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 or 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.

18.16 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.

- 18.17 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.
- 18.18 The tenderer shall undertake the installation and commissioning of the system according to the standards and specification.
- 18.19 No representation for enhancement of rate once accepted will be considered.
- 18.20 The prices quoted should be inclusive of GST and all other expenses which are or may become payable by the contractor under existing or future laws or rules of the country of origin/supply or delivery during the course of execution of the contract.
- 18.21 Special conditions, if any, of the tenderers attached with the tenders will not be applicable to the contract unless they are expressly accepted in writing by the purchaser.
- 18.22 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 C to this tender. Tenders without the agreement in stamped paper will be rejected outright.
- 18.23 **Conditions in the technical document, technical specifications and special conditions of this tender document would override these general conditions, wherever applicable.**
- 18.24 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.
- 18.25 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.

- 18.26 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.
- 18.27 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.

19. SPECIAL CONDITIONS

- 19.1 Each bidder should submit only one (1) bid. Any bidder who submits / participates in more than one bid for the work shall be disqualified.
- 19.2 The tenders will be opened in the presence of bidders present at the date and time advised in the Bidding Document. If the due date for receiving and 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.
- 19.3 If the bidder has NOT submitted the requisite EMD OR Agreement, OR if the price bid is not submitted along with the tender, such tenders will be summarily rejected.
- 19.4 **During the tender evaluation, ANERT may seek more clarifications/details from any or all of the tenderers, if felt necessary.**
- 19.5 The price bids of the tenderers, which submitted the required documents only will be opened and the L1 bidder will be awarded the work of supply and installation of items after fulfilling all the requirements.
- 19.6 **ANERT reserves the right, in the interest of completion of work within the time limit, to award portion/portions of the Work order to next higher bidders, called for negotiation in the increasing order of their price offers, if they agree to supply at the L1 price.**
- 19.7 **The rate quoted should be all inclusive including delivery of materials at the locations to be specified, and the cost of materials and labour for the civil works, installation and commissioning, warranties, fee for approval from the Electrical Inspectorate if any, GST and all other expenses.**
- 19.8 **The price quotes should be inclusive of initial cost of supply, installation and commissioning, support during the warranty period of 5-years.**

- 19.9 The tender offer shall be kept valid for acceptance for a period of 3 months from the date of opening of bid. The offers with lower validity period are liable for rejection.
- 19.10 The evaluation of the price bid will be based on the grand total of all-inclusive amount quoted excluding GST.



**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

***Request for Proposal for Design, Supply, Installation,
Testing and Commissioning of standalone Solar Power
Plants at Therakkudy Tribal Hamlets Under Malayattoor
Forest Division, Ernakulam, Kerala, India***

Ref. No.: ANERT-EKM/31/2023-DE(EKM)

PART – 2: SCOPE OF WORKS

Date of Publishing of Bids : - 11/09/2023

Last Date of Submission of Bids : - 23/09/2023

SCOPE

20. 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.
- 20.2 In order to meet the requirements, ANERT proposes to invite bids from Manufacturers of SPV modules / System Integrators of Solar Power Plants / Solar-Wind hybrid systems 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.

21. SITE - "Therakkudy Tribal Hamlet, Ernakulam, Kerala, India"

The power plants are to be installed for the **28** tribal homes within the Therkkudy Tribal community under Malayattoor Forest Division, Ernakulam. As the houses are not strongly built, the whole system is to be installed on the ground with provision to safe

storing of Inverter and battery. Therakkudy is only accessible by 4WD ride for 18 KM through the dense forest.



22. SCOPE OF WORK

The Scope of works are as below:

- Supply, Installation and Commissioning of **28** Nos of 670 Wp Standalone Solar Power Plant with battery backup as described below and shall be executed by the EPC contractor under the supervision of ANERT.
- The detailed proposal for Design of the system proposed including 3D diagrams along with detailed Engineering specifications and foundation requirements must be submitted along with the bid. The Power plant is being installed outdoor, the battery and inverter units need to be housed beneath the PV module and hence, suitable IP rated enclosures for the same are also to be considered under the design. The whole package must be designed as a single unit, so that an aesthetic appealing is achieved. The content, its technical clarity and supportive diagrams in the document should provide a clear idea of the proposed system.

- The system is to be designed to be installed at a minimum 4m height mounting from the ground with proper platform and housing to place inverter, battery bank and other controls. There should be proper accessibility and serviceability to the solar power system.
- The area is having continuous Elephant movement and hence, the Pole design must consider protection of the same from Elephant snatching like wounded with Barbed Wires or other means, without which the poles may get uprooted and the plant will be damaged.

The power plants are to be installed near to individual households of at Therakkudy Tribal Hamlet Under Malayattoor Forest Division, Ernakulam, Kerala, India. The following are the systems proposed:

22.1 Stand-alone - Solar PV Power plant: (670 Wp Solar Power plant upgradable to 1kwp in future)

The Stand-alone Solar PV System is proposed with the following components:

1. Solar Array: Min 670Wp
2. Inverter: Min 1.5 kVA MPPT Inverter
3. Battery Bank: 3600 Wh VRLA GEL battery bank | 2400 Wh Li Fe Po4 battery bank with required BMS. The rates for both are to be quoted and ANERT will finalise the type to be used.
4. The inverter should be capable of adding another 670 Wp solar panel and battery bank as per above #3 in future for upgradation.
5. Cabinet enclosure of adequate IP rating for housing Battery and Inverter as these are to be placed outdoor. This should be easily extendable for future upgradation.
6. The Mounting structure frame should be easily extendable to accommodate additional upgradation of 500wp panel. (Bidder must demonstrate this in the proposal). The single or double pole structure must have enough strength and durability along with foundation to handle the additional load in future.
7. Other BoS include Mounting Structures, Cables, Junction Boxes, DCDB, ACDB, Control & Protections etc. All the equipment should conform to the BIS or IEC or equivalent international specifications, wherever such specifications are available and applicable.

22.2 Supply of components for households

- LED tube lights of 20 W – 2 Nos
- LED bubs of 7 W – 2 Nos
- Provision of fan connection [supply of fan not included] – 1
- Mobile charging point load and an additional plug socket

23. SELECTION PROCEDURE

ANERT will evaluate all the proposals to determine whether these are complete in all respects as specified in the tender document. Evaluation of the proposals shall be done in three stages as:

23.1 Level - I (Technical Evaluation):

ANERT shall evaluate the technical bid(s) to determine whether these qualify the essential eligibility criteria, whether the bidder has submitted the EMD whether any computational errors have been made, whether all the documents have been properly signed & stamped, whether all the documents as mentioned / or required to submitted with technical bid are submitted and whether bids are completed and generally in order. A detailed proposal to be submitted as part of the bid including proper site survey details.

After evaluation of technical bid(s), a list of the qualifying bidder(s) shall be made. Short-listed bidder(s) shall be informed of the date, time and place of opening of financial bid(s) (online).

23.2 Level – II (Allocation of works)

- i. The financial bids of all the technically qualified bidders will be opened and shall be evaluated. The work will be awarded to the lowest bidder complying

24 SCHEDULE OF SUPPLY

- 24.1 The items should be delivered and installed at the sites of institution for which work order shall be given and specified by ANERT, under prior intimation and supervision of ANERT.

- 24.2 The successful bidder should complete the Supply, Installation, Testing and Commissioning of the whole system within 60 days from the date of issue of work order.
- 24.3 Order will be cancelled if the delay of service is more than this time period and work will be issued to the second successful bidder
- 24.4 Supply of the SPV module must be from the ALMM list issued by MNRE from time to time. Hybrid Inverter, Battery etc must have the requisite certification as per this tender document and test reports as per this to be submitted for approval.
- 24.5 Penalty for delay in supply and installation will be imposed at 0.5 % per week up to a maximum 10%. In case of delay in supply and installation, CEO, ANERT may cancel the contract and take recourse to other action as deemed appropriate.

25 PERFORMANCE SECURITY

The successful bidder has to remit an amount @ 5% of the total amount quoted by them as performance security deposit in terms of Bank Guarantee/Deposit having validity for 6 months from the date of agreement. The bank guarantee/deposit will be released/refunded to the successful bidder after completion of the contract period after deducting the penalties if any.

26 PAYMENT

- 26.1 No advance payment will be given. All the documents submitted should be certified by the concerned District Office of ANERT. This will be applicable for works issued through individual work order for installations done through Plan and Deposit work scheme of ANERT.
- 26.2 The terms of payment shall be:
- i. 2.5 % of the invoice amount shall be charged by ANERT as non-refundable license fee and the remaining amount shall be treated as contract value for further payment.
 - ii. Upon delivery of major components (PV Modules, Inverter, battery bank etc) at the site, 60 % of the contract value will be released as first part payment, if

requested. The supplier shall submit the invoice for the materials (including serial numbers and delivery chalan) duly certified by the concerned District Office along with a report regarding the supply of materials.

- iii. On commissioning of the system, 30% of the contract value will be released. All documents related to the completion of the work including commissioning report and commissioning certificate shall be submitted for the release of the amount. The supplier shall submit the invoice for the materials supplied and all documents related including the Project Completion Report to the completion of the work certified by the district office shall be submitted for the release of the amount.
- iv. The remaining 10% shall be retained as performance security and will be released in parts of 2% after completion of each year.
- v. The security deposit of 3% furnished along with the contract agreement shall be released on successful completion of supply, installation and commissioning.

26.3 Income tax, contribution to workers' welfare fund and other statutory deductions shall be made from the payment as per prevailing norms.

27 SERVICE AND MAINTENANCE

- 27.1 The faulty system or components should be replaced/ repaired within 10 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 3 months for preventive maintenance even if no faults are reported. **Reports of these preventive maintenance visits and generation data should be submitted to the concerned ANERT District Offices on a quarterly basis.**
- 27.3 Any Delay in servicing beyond 15 days of fault reporting would attract penalty at the rate of at the rate fixed by CEO, ANERT and further actions will be initiated against the agency.
- 27.4 A designated contact Telephone Number and address should be submitted for reporting faults during the warranty period.

28. TECHNICAL SPECIFICATIONS

Stand-alone - Solar Hybrid PV Power plant: (670 Wp Solar Power plant upgradable to 1kWp in future)

The Stand-alone Solar PV System is proposed with the following components:

1. Solar Array: 670Wp
2. Inverter: Min 1.5 kVA MPPT Inverter
3. Battery Bank: 3600 Wh VRLA GEL battery bank | 2400 Wh Li Fe Po4 battery bank with required BMS.
4. The inverter should be capable of adding another 670 Wp solar panel and battery bank as per above #3 in future for upgradation.
5. Cabinet enclosure of adequate IP rating for housing Battery and Inverter as these are to be placed outdoor. This should be easily extendable for future upgradation.
6. The Mounting structure frame should be easily extendable to accommodate additional upgradation of 500wp panel. (Bidder must demonstrate this in the proposal). The single or double pole structure must have enough strength and durability along with foundation to handle the additional load in future.
7. Other BoS include Mounting Structures, Cables, Junction Boxes, DCDB, ACDB, Control & Protections etc. All the equipment should conform to the BIS or IEC or equivalent international specifications, wherever such specifications are available and applicable.

Each of the above components are described as given below:

28.1 Solar Array (670Wp) – Mono PERC modules

The EPC Company/ Contractor shall use only the PV modules that are listed under latest MNRE's Approved List of Manufacturers and Models of Solar PV Modules (ALMM Order 2019, updated from time to time. The PV modules must be included in the list at the time of commissioning.

However, the specifications for the PV Module are detailed below:

- i. Total PV Module capacity should be of minimum nominal capacity of 670Wp.

- ii. The PV modules must be PID compliant, salt, mist & ammonia resistant and should withstand weather conditions for the project life cycle.
- iii. 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
- iv. 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
- v. 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.
- vi. 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.
- vii. 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.
- viii. Shading correction/ bypass diode for optimizing PV out to be incorporated in each solar module or panel level.

- ix. 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, I_M , V_M and FF for the module.
 - g. Unique Serial No. and Model No. of the module.
 - h. Date and year of obtaining IEC PV module qualification certificate.
 - i. Name of the test lab issuing IEC certificate.
- x. Other relevant information on traceability of solar cells and module as per ISO 9000 series.
 - a. The following details should be provided on the module
 - b. Name of the manufacture.
 - c. Month and year of manufacture.
 - d. Rated Power at STC.
 - e. V_{MP} , I_{MP} , V_{OC} , I_{sc} .
- xi. 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.
- xii. 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.
- xiii. 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.

- xiv. 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
- xv. Original Equipment Manufacturers (OEM) Warrantee of the PV Modules shall be submitted by the successful bidder when the materials delivered at site.
- xvi. 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)
- xvii. 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.

28.2 Solar MPPT Inverter (Minimum 1.5 kVA)

The Solar MPPT Inverter should be with minimum 1.25 kVA capacity and not more than 1.5 kVA capacity and shall be capable of connecting the regulated DC output from the Solar Hybrid System.

- i. 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
- ii. The Hybrid inverter output shall be 415 VAC, 50 Hz, 3 phase or 230 VAC, 50 Hz, 1 phase.
 - iii. The Hybrid inverter should have all the technical requirements for connecting to the Grid and provision of Intentional Islanding with facility for connecting to a battery bank
 - iv. The Hybrid 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.
 - v. The Technical Specification of Hybrid Inverters are summarized below:

Specifications of Inverter	
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 >95%
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

Specifications of Inverter	
Parameters	Detailed specification
Operation	Completely automatic including wakeup, synchronization (phase locking) and shut down
MPPT	MPPT range must be suitable to individual array voltages
Hybrid Type	The Inverter should be capable of connecting a battery bank with the Intentional Islanding capability
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 20 / IP 21
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)

vii. The Technical Specification for Interconnection are summarized below:

S/N	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

S/N	Parameters	Requirements	Reference
3	Equipment	Applicable industry standards	IEC/EN standards
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

S/N	Parameters	Requirements	Reference
		61000 or other equivalent Indian standards if any	connectivity of the 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	

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

Standard	Description
IEC 61683	Photovoltaic systems – Power conditioners – Procedure for measuring efficiency
IEC 61727 or VDE-AR-N 4105	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 /IEEE 1547 or IEEE 1547.1 / UL 1741	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

Standard	Description
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**

28.3 Battery Bank (3600 Wh VRLA GEL Battery | 2400 Wh Li Fe PO4 battery bank with BMS)

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

Standard	Description
IEC 62620:2014	IEC 62620 defines marking, tests and requirements for lithium secondary cells and batteries used in industrial applications including stationary applications.
IS 16046	IS 16046 (Part 2): 2018/ IEC 62133-2 for safety requirement for sealed lithium secondary batteries

28.4 Module Mounting Structure

- i. 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.
- ii. 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.
- iii. 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 maximum 10 degree based on the location’s latitude.
- iv. The PV module mounting structure shall have a capacity to withstand a wind velocity of 150 km/hr.
- v. 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.

- vi. 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.
- vii. The minimum thickness of galvanization for hot dip Galvanized Mild Steel should be at least 120 microns as per IS 4759.
- viii. The Bolts, Nuts, fasteners, and clamps used for panel mounting shall be of Stainless-Steel SS 304.
- ix. No Welding is allowed on the mounting structure
- x. Aluminium structures used shall be protected against rusting either by coating or anodization.
- xi. Aluminium frames should be avoided for installations in coastal areas.
- xii. 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.
- xiii. Screw fasteners shall use existing mounting holes provided by module manufacturer. No additional holes shall be drilled on module frames
- xiv. The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m².
- xv. Minimum height between the lower level of PV Module and the ground shall be 3 m from the ground level.
- xvi. The PV Panel area shall be accessible for cleaning and for any repair work.
- xvii. Sufficient gap need 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.
- xviii. Adequate spacing shall be provided between any two modules secured on PV panel for improved wind resistance.
- xix. Installation of structure for solar PV mounting should not tamper with the water proofing of the roofs.
- xx. The Structural Drawing of the Module Mounting Structure must be provided with the proposal. A certified structural engineer should approve the same

28.5 ENERGY METER

Energy Meter:

A separate DC Energy Meter shall be provided at the output of Wind System to get the generation data from Wind Energy. However, an Energy Meter shall also be provided at the output of PCU to record the energy generation from the Wind Solar Hybrid System, (This energy meter should not be integrated with PCU). This energy meter shall be a separate unidirectional meter to be installed at the delivery point of the wind -solar hybrid system to measure the electricity generated. The energy meters shall be provided with necessary ports like RS485 for communications.

28.6 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)

- i. 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
- ii. 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
- iii. In any case, the cross-section area or the earthing conductor for PV equipment should not be less than 6 mm² if copper, 10 mm² if aluminium or 70 mm² if hot-dipped galvanized iron. For the earthing of lightning arrestor, cross-section of the earthing conductor should not be less than 16 mm² of copper or 70 mm² if hot-dipped galvanized iron. The complete Earthing system shall be mechanically & electrically connected to provide independent return to earth
- iv. 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.

- v. 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.
- vi. 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
- vii. 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.
- viii. 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.
- ix. 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.
- x. Necessary provisions shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
- xi. For each earth pit, a necessary test point shall be provided.
- xii. Total no of Earth pits for solar plants: Up to 50kWp: AC-01, DC-02, LA-01

28.7 LIGHTNING PROTECTION

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.

- i. 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.
- ii. Lightning system shall comprise of air terminations, down conductors, test links, earth electrode etc. as per approved drawings.
- iii. 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.
- iv. 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.

28.8 ARRAY JUNCTION BOX (AJB)/ STRING COMBINER BOX (SCB)

AJB shall be provided as per the design requirement of the Inverter, if required. AJB comprises of an enclosure, copper busbars, Fuses, Surge Protection Device (SPD) and Isolator. DC generated by the solar modules is transmitted through the appropriate cables from Array Yard to Control facility. AJB bus & panel shall be provided for the incoming DC supply from array yard.

AJB, if required, should be equipped with an adequate capacity indoor DC circuit breaker along with control circuit, protection relays, fuses, etc.

AJB, if required, shall have sheet from enclosure of dust and vermin proof, the bus bar / cables are to be made of copper of desired size.

The Array Junction Boxes are to be provided in the PV array for termination of connecting cables. The Array Junction Boxes shall be made of GRP/FRP/with full dust, water& vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands.

- i. Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.
- ii. Copper bus bars/terminal blocks housed in the junction box with suitable termination threads conforming to IP 65 standard to prevent water entry, Single/

double compression cable glands, provision of earthing. It should be placed at a height suitable for ease of accessibility.

- iii. Each Junction Box shall have high quality Suitable capacity Metal Oxide Varistors (MOVs)/ SPDs. The Surge Protective Device shall be of Type 2 as per IEC 60364-5-53
- iv. The junction Boxes shall have suitable arrangement for the followings (typical):- Combine groups of modules into independent charging sub-arrays that will be wired into the controller. The Junction Boxes shall have arrangements for disconnection for each groups and attest point for sub-group for fault location. AJB/SCB shall be wired with optical fibre cables for enabling data collection for PV Plants from 100kWp onwards.
- v. The current carrying ratings of the string combiner box/ junction box shall be suitable with adequate safety factor, to inter connect the Solar PV array.
- vi. All fuses shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP65 enclosures with transparent covers.
- vii. Fuse for both positive and negative inputs of each strings, Isolator of MCB, SPD of type 2 shall be provided.
- viii. The surge arresters shall be type 2 (with reference to IEC 61643-1) rated at a continuous operating voltage of at least 125 percentage of the open-circuit voltage of the PV string, and a flash current of more than 5A.
- ix. Not more than two strings can be connected in parallel to a single input of SCB/AJB. One spare input terminal along with connector shall be provided for each SCB/AJB.
- x. Every SCB/AJB input shall be provided with fuses on both positive and negative side.
- xi. DC switch disconnecter of suitable rating shall be provided at AJB/SCB output to disconnect both positive and negative side simultaneously.

28.9 AC DISTRIBUTION BOARD

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

- i. 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.
- ii. 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.
- iii. 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.
- iv. 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
- v. 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.
- vi. Junction boxes, enclosures, panels for inverters/ Controllers shall meet IP 54 (for outdoor)/ IP 65 (for indoor) as per IEC 529.

28.10 AC/DC CABLING

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.

- i. 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
- ii. 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%).
- iii. 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.

- iv. For the AC cabling, PVC or XLPE insulated and PVC sheathed single or, multi-core flexible copper cables shall be used. However, for above 25kWp 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.
- v. All LT XLPE cables shall conform to IS:7098 part I&II.
- vi. The total voltage drop on the cable segments from the solar PV modules to the solar grid inverter shall not exceed 2.0%
- vii. The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 2.0%
- viii. 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
- ix. Cables and wires used for the interconnection of solar PV modules shall be provided with solar PV connectors (MC4) and couplers
- x. 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.
- xi. 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
- xii. Cables and conduits that have to pass through walls or ceilings shall be taken through PVC pipe sleeve.
- xiii. 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.

- xiv. 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.
- xv. Bending radii for cables shall be as per manufactures recommendations and IS: 1255.
- xvi. For laying/termination of cables latest BIS/IEC Codes/ standards shall be followed.

28.11 CIVIL WORKS (Ground Mounted)

The foundation of the pole should be of PCC of required size. The pole with foundation plate of suitable size should be fixed on the PCC foundation using foundation bolts. The pole should be GI with Rubber coated paint. The foundation plate should be fixed 150 mm above ground level. The battery box should be fitted in the bottom side of the Module/ top of the pole

28.12 BILL OF MATERIALS

The format for the Bill of Materials is given below:

S/N	Item	Make (if any)	Model & Individual Capacity (If any)	Quantity (Nos)	Rating / Capacity
1.	PV Module				
2.	MPPT Hybrid Inverter				
3.	Battery				
4.	DC Cables				
5.	AC Cables				
6.	AJB/SCB				

7.	Module Mounting Structure (MMS)				
8.	ACDB				
9.	Lightning Arrester				
10.	Earthing System Details and No. of Earth pits				
11.	Data Acquisition System				

29. SOLAR STREET LIGHTS

Solar Streetlights for lighting the Power Plant and control room area to be provided separately so that ample light will be available in case, the power plant is not functional. The detailed specification of Solar Streetlighting System is below:

Solar Module	:	120 Wp
Battery (Lithium Ferro Phosphate)	:	700 Wh (+20% permissible)
Luminary	:	20 W (+25% permissible)
Pole (GI pole with Rubber coated paint)	:	Height - 4m, Dia -4"

White Light Emitting Diode (W-LED) is a solid-state device which emits light when forward electric current passes through it. A LED based solar street lighting system consists of a PV Module, control electronics, battery, and W-LED based Luminaire, all suitably mounted on a Pole. The battery is charged by electricity generated through the PV module during day time and the luminaire provides light from dusk to dawn.

LED	White Light Emitting Diode (W-LED) (SMD LED) with minimum luminous efficacy 150 lumen/watt
Luminaire	Minimum luminaire efficacy should be 100 lumen/watt
Colour Temperature	White colour (colour temperature 5000°-6500°K), the illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred. Uniformity should be greater than 30%.
Lux level	Minimum 14 lux within a rectangle when measured at a distance of 5m from the pole along (on either side of the road) and 4m from the pole across
Electronics Efficiency	Min 85% total.

Duty cycle	Dusk to dawn.
Make of LED	NICHIA/ CREE/ OSRAM/ PHILIPS or equivalent
Charge Controller	MPPT / PWM

30. HOUSEHOLD INTERNAL WIRING

- i. MCBs shall be used as load limiters as incoming protection device of 0.5A Single Pole Type C MCB for 100 W for domestic consumers which may vary as per the load of the consumer. MCBs of appropriate ratings are to be installed as the main incomers for other loads.
- ii. One circuit with 1 sq. mm cable can be used for installations up to 1kW. The wire shall be of 600 V grade insulation.
- iii. Standard switches designed for 230 V AC shall be used.
- iv. PVC Conduits should be used wherever mechanical protection is needed for the wires and it can be clipped onto the wooden parts for running on the roof section.
- v. The following bill of material to provide internal wiring, and switches:

S/N	Item / Specification
1	6 Amp One Way Switch
2	6 Amp, 2 in 1, Five-point socket
3	6 Amp Angle Holder
4	PVC conduit / pipe ½" 10'
5	PVC L / T Bend, box
6	0.5 Sq. mm, CU, PVC Wire

31. 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.

32. 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.

33. DISPLAY BOARD

- a. The logo of ANERT and details of the scheme as specified in the work order are to be provided in each of of the households.
- b. The board shall be made of GI/SS of min thickness 20 SWG having size 60cm x 30 cm. The matter is to be printed in RGB combination

34. INSURANCE

34.2 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)**. Also, the damages from wildlife and natural calamity are to be covered in addition,

34.3 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.

35. STANDARDS

The Design, Engineering, Manufacture, Supply, Installation, Testing and performance of the equipment shall be in accordance with latest appropriate IEC/ Indian Standards and as detailed in the Technical Specifications Section as per the MNRE / ANERT requirements of the bid document. The goods supplied under this contract shall confirm to the Standards mentioned, where appropriate Standards and Codes are not available, other suitable standards and codes as approved by the authoritative Indian Standards shall be used.

36. TRANSPORTATION

Where the Contractor/Agency is required under the contract to transport the goods to specified locations defined as Project sites, transport to such places including insurance, as shall be specified in the contract, shall be arranged by the Contractor / Agency, and the contract price shall include transportation costs.

36 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.

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

37 PACKING

- i. The Bidder shall provide such packing of the goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the contract.
- ii. The packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures/ vibration or any other parameters during transit and open storage.
- iii. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the good's final destination and the absence of heavy handlings facilities at all points in transit.
- iv. The packing, marking and documentation within and outside the item shall comply strictly with such special requirements as shall be provided for in the contract including additional requirements, if any and in any subsequent instructions ordered by the ANERT
- v. Security of goods at site location are sole responsibility of bidder.

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:

Signature

Date:

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						
7.	Total number and Aggregate capacity of solar power plants installed for the last 5 Years (On-Grid/Hybrid) (Proof to be enclosed)	Year Criteria	2017	2018	2019	2020	2021
		Number of systems					
		Capacity (kW)					
8.	Annual turnover of the firm during last five years (Rs.) (Proof to be enclosed)	2021-22 2020-21 2019-20 2018-19 2017-18					

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 – GUARANTEED TECHNICAL PARAMETERS

PV Module			
#	Particulars	Required	Offered
1	PV Module Manufacture Name & Country of origin	manufacture name to be specified)	
2	PV Module type	Poly/Mono Crystalline, Mono/Poly PERC	
3	Product Code		
4	No. of PV cells per Module		
5	Total number of PV modules		
6	Max. Power, Pmp @STC	400 Wp or above	
7	Max. Power tolerance (%)	Not more than 3%	
8	Max. Power voltage (Vmp)@STC	To be specified	
9	Max. Power current (Imp) @STC	To be specified	
10	Open circuit voltage, Voc@STC	To be specified	
11	Short circuit current, Isc@STC	To be specified	
12	Nominal voltage	To be specified	
13	Nominal Wattage	To be specified	
14	Fill Factor	Not less than 0.7	
15	Temp. coefficient of Voc (%/C)		
16	Temp. coefficient of Pmp (%/C)		
17	Temperature Co-efficient of Isc (%/°C)		
18	Normal Operating Cell Temperature (NOCT) (°C)		

PV Module			
#	Particulars	Required	Offered
19	Operating Temperature (°C)		
20	Max Temperature rise of solar cells under severe working conditions over Max. Ambient Temp.	To be specified	
21	Module is suitable to operate at 500 ambient	Yes/No	
22	Cell efficiency	%	
23	Module efficiency	>=17% (Document to prove efficiency shall be furnished with the offer)	
24	Maximum System Voltage		
25	No. of By-pass Diodes		
26	Mounting arrangement for Solar Module	Fixed Arrangement	
27	Solar Module frame material	Anodized Aluminum	
28	Finish		
29	Types of Sections used		
30	Module dimensions cms (LxWxH)	To be specified	
31	PV panel Weight (kg)	To be specified	
32	Module Life (minimum)	25 years	

PV Module			
#	Particulars	Required	Offered
33	PV array area(sqm)		
34	Standards/Approvals from International Agencies	IEC 61215/IEC 61730/ IEC 61701	
35	Guaranteed output confirm	Yes	
36	Output Cables	Polarized, UV protected & Weather Proof DC rated multi-contact connector	
37	Output Terminal	PV Connectors	
38	Junction Box	Weather resistant HDPE (IP65)	
39	Construction Front, Back	High transmittance glass. Polyester Ethyl Vinyl Acetate (EVA) encapsulate	
40	Glass	Low iron tempered	
43	Copies of test certificates	IS 14286/IEC 61215,61730 part 1&2, IEC 61701	

INVERTER			
#	Particulars	Required	Offered
1	Manufacturer		
2	Model name/No.		
3	Number of units		
5	Nominal AC power		
6	Nominal AC voltage		

INVERTER			
#	Particulars	Required	Offered
7	Nominal AC Current		
8	AC grid Frequency range	50Hz ± 0.5%	
9	AC grid voltage range		
10	Power Factor (+ and -)		
11	Total Harmonic Distortion	As per IEEE-519 2014	
12	AC over / under voltage over / under frequency protection		
13	Max PV input power		
14	Maximum DC voltage	Less than 1000 V	
15	MPPT voltage range		
16	Maximum DC current		
17	No. of DC input ports		
18	Maximum Efficiency	as per IEC61683	
19	DC voltage ripple		
20	Ambient temperature range		
21	Humidity (non-condensing)	95%, non-condensing	
22	Degree of protection		
23	Dimensions approx. (HxWxD)		
24	Weight		
25	Protective functions		

INVERTER			
#	Particulars	Required	Offered
	AC over/under voltage, AC over/under frequency, overtemperature, AC and DC overcurrent, DC over-voltage, against Islanding		
26	Communication Interface	RS485. MPI Profi Bus/Telephone Modem/WiFi	
27	User-display standard	LCD panel with membrane keypad	
28	Enclosure environment rating		
29	Safety and EMC		
30	Anti-islanding feature	IEEE1547/UL1741/IEC62116	

BATTERY			
#	Particulars	Required	Offered
1	Manufacturer		
2	Model name/No.		
3	Number of units		
5	Nominal Capacity (Ah) @ C10		
6	Nominal voltage (V)		
7	Nominal Voltage per Cell (V)		

BATTERY			
#	Particulars	Required	Offered
8	Float Voltage		
9	Temperature compensation required for proper operation		
10	Dimensions L X W X H (mm)		
11	Weight (kg)		
12	Operating temperature (X)		
13	Shelf Life		

Include GTP of alternate proposed technology separately

ANNEXURE C - AGREEMENT

ARTICLES OF AGREEMENT executed on this the day of
Two thousand andbetween the **Agency for
New & Renewable Energy Research and Technology** (hereinafter referred to as
ANERT) of the one part and Sri
(Name and Address of the tenderer) hereinafter referred to as “the Bounden”) of the other
part.

WHEREAS in response to the Notification No.
dated the bounden has submitted to ANERT a e-tender for the ***Request for
Proposal for Design, Supply, Installation, Testing and Commissioning of standalone
Solar Power Plants at Therakkudy Tribal Hamlets Under Malayatoor Forest Division,
Ernakulam, Kerala, India*** specified therein subject to the terms and conditions contained
in the said e-tender.

AND WHEREAS the bounden has furnished to ANERT a sum of Rs. as
Earnest Money Deposit for execution of an agreement undertaking the due fulfilment of
the contract in case his e-tender is accepted by ANERT. NOW THESE PRESENTS WITNESS
and it is hereby mutually agreed as follows: -

In case the e-tender submitted by the bounden is accepted by ANERT and the contract
for is
awarded to the bounden, the bounden shall within Fifteen days of acceptance of this e-
tender, execute an agreement with ANERT incorporating all the terms and conditions
under which ANERT accepts this e-tender.

In case the bounden fails to execute the agreement as aforesaid incorporating the terms
and conditions governing the contract, ANERT shall have power and authority to recover
from the bounden any loss or damage caused to ANERT by such breach as may be
determined by ANERT by appropriating the moneys inclusive of Earnest Money deposited

by the bounden and if the Earnest Money is found to be inadequate the deficit amount may be recovered from the bounden and his properties movable and immovable in the manner hereinafter contained.

All sums found due to ANERT under or by virtue of this agreement shall be recoverable from the bounden and his properties movable and immovable under the provisions of the Revenue Recovery Act for the time being in force as though such sums are arrears of land revenue and in such other manner as ANERT may deem fit.

In witness whereof Sri (Name and Designation) for and on behalf of the Agency for New & Renewable Energy Research & Technology and Sri the bounden have hereunto set their hands the day and year shown against their respective signature.

Signed by Sri Signed by Sri

(Date) (Date)

in the presence of witnesses in the presence of witnesses

1. 1.

2. 2.

ANNEXURE D – DECLARATION BY THE BIDDER

e-Tender Notification No:, dtd for Request for Proposal for Design, Supply, Installation, Testing and Commissioning of standalone Solar Power Plants at Therakkudy Tribal Hamlets Under Malayatoor Forest Division, Ernakulam, Kerala, India

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 3 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 3 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 E – DECLARATION OF RELATIONSHIP WITH ANERT EMPLOYEE

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

Tender Notification No.:

Request for Proposal for Design, Supply, Installation, Testing and Commissioning of standalone Solar Power Plants at Therakkudy Tribal Hamlets Under Malayattoor Forest Division, Ernakulam, Kerala, India

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

Name

Date

FORMAT A – 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: Request for Proposal for Design, Supply, Installation, Testing and Commissioning of standalone Solar Power Plants at Therakkudy Tribal Hamlets Under Malayattoor Forest Division, Ernakulam, Kerala, India

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 B – CERTIFICATE OF BIDDER’S FINANCIAL QUALIFICATION

(On Letterhead of the respective entity for which the below details are provided.)

Financial Qualification Certificate

(Rupees in Crores)

S/N	Financial parameters	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22
1.	Net Worth					
a)	Paid up Capital					
b)	Free Reserves and Surplus*					
c)	Misc expenses to the extent not written off					
	Net Worth (a+b-c)					
2.	Annual Turnover **					

* Free Reserve and Surplus shall be Exclusive of Revaluation Reserve, written back of Depreciation Provision and Amalgamation.

** Annual total Income/ turnover as incorporated in the Profit and Loss Account excluding non-recurring income, i.e., sale of fixed asset etc.

It is certified that all the figures are based on audited accounts read with auditors report and Notes to Accounts etc.

(Signature & Seal of Authorized Signatory

Name of Authorized Signatory:

Certifying Chartered Accountant:

Designation:

Name of Firm:

Date:

UDIN No:

Place:

Date:

Place:

Note:

1. In addition to above certificate from Chartered Accountant, Bidder is required to submit Firm's Annual Audit Report, Balance sheet, Profit & Loss and Income Tax Returns / CA certificate for last Five years i.e., F.Y: 2017-18, 2018-19, 2019-20, 2020-21 & 2021-22.

FORMAT C – COMPONENT

BID SECURITY BANK GUARANTEE

BG No. :
Amount :
Date :
Valid up to :

This guarantee is made on this day of 20.... by (Complete postal address of the bank) hereinafter called 'the **Bank**', which expression shall unless repugnant to the context or meaning thereof shall include its successors and assigns.

WHEREAS the **ANERT**, having its registered office at PMG-Law College Rd, Vikas Bhavan PO, Thiruvananthapuram, Kerala, PIN – 695 033, hereinafter called as **ANERT**, which expression shall unless repugnant to the context or meaning thereof shall include its successors and assigns in having agreed to exempt(hereinafter called “**contractor(s)**” which expression unless repugnant to the context and meaning thereof shall include its successors and assigns) from depositing with **ANERT**, a sum of Rs. towards Security Deposit in lieu of the said **contractor(s)** having agreed to furnish a bank guarantee for the said sum of Rs. as required under the terms and conditions of Tender No. dated (hereinafter referred as the 'bid') placed by the **ANERT**, on the said **contractor(s)** and on specific request on the part of the said **Contractor(s)**, we the **Bank** hereby unconditionally and irrevocably affirm and undertake-

On production of the Bank Guarantee for Rs..... (Rupees..... only) we,Bank having our Head Office at (herein after referred to as “the Bank”) at the request of M/s.(name of contractor) do hereby undertake to pay to the **ANERT** an amount not exceeding Rs..... (Rupees only), against any loss or damage

caused to or suffered or would be caused to or suffered by the ANERT by reason of any breach by the said contractor of any of the terms and conditions contained in the said agreement

We,Bank, do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on a demand from the ANERT stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the ANERT by reasons of breach by the said contractor of any of the terms or conditions contained in the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. (Rupees only).

This guarantee will not be discharged due to change in the constitution of the bank or the contractor/supplier.

Notwithstanding anything contained hereinbefore:

- 1) Our liability under this Bank Guarantee shall not exceed Rs.....(Rupees only)
- 2) This Bank Guarantee shall be valid upto
- 3) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee amount only and only if you serve us a written claim or demand on or before.....

Dated at this day of 2023

SIGNATURE OF THE BANK _____

SEAL OF THE BANK _____

SIGNATURE OF THE WITNESS _____

Name and Address of the Witness _____

The bank guarantee shall be issued by a bank (Nationalized/Scheduled) located in India