Invitation of Expression of Interest for Empanelment of Agencies/ EPC contractors for Solar Rooftop Programme in Kerala under Distributed Power generation. (Grid connected, Off Grid& Hybrid Solar Power Plants)

Reference No. ANERT-TECH/337/2018-PE1(RTS)
Dated. 17.10.2018

PART-I

Agency for Non-conventional Energy & Rural Technology
VikasBhavan (PO), Thiruvananthapuram – 695 033, Kerala
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Contents

I.A – Notice

Expression of Interest in accordance with the attached Pre-qualification criteria invited from reputed & experienced EPC contractors for the empanelment for the implementation solar power plants programme in Kerala.

1. Empanelment of agencies for the implementation of Grid connected, Off Grid & Hybrid Solar rooftop power plants in Kerala.

2. Price offers will be collected based on the programme implementation guidelines.

The offers have to be filed based on the qualification criteria and as per the bid submission guidelines. This list will be valid for all programmes implemented in Kerala with or without Central or State financial assistance in Kerala.

The guidelines and documents for Expression of Interest can be downloaded from the website (www.anert.gov.in) of ANERT. The EoI in sealed envelope has to be submitted at the office of Director, ANERT, VikasBhavan (PO), Thiruvananthapuram, 695 033 by post or by hand.

Thiruvananthapuram
17.10.2018

Sd/-
Director

I.B – Abstract

Reference No.	*ANERT-TECH/337/2018-PE1(RTS)*
Superscription	*Invitation of Expression of Interest for updating the Empanelment of Agencies/EPC contractors for Solar Rooftop Programme in Kerala under Distributed Power generation. (Grid connected , Off Grid& Hybrid).*
Date of release of Invitation	17.10.2018
Place of opening Submission by Agencies	Office of the Director, ANERT, VikasBhavan. PO, Thiruvananthapuram – 695 033, Kerala
Application fee	Nil
How to obtain the application form for submitting EoI	To be downloaded from the website of ANERT www.anert.gov.in

Thiruvananthapuram

17.10.2018

Sd/-
Director

I.C –Implementation plan

General

0.1 This Expression of Interest is being invited for listing agencies for installation of Solar Rooftop Power Plants in Kerala. The validity of the list will be for two years. The list of Empanelled Agencies prepared through this process will be published for the information of proponents for installation of Solar Rooftop Power Plants. The status of empanelment of any agencies in this list shall be terminated if it is found the agency is violating empanelment conditions.

0.2 The applicant for the empanelment should not have any pending litigation with ANERT

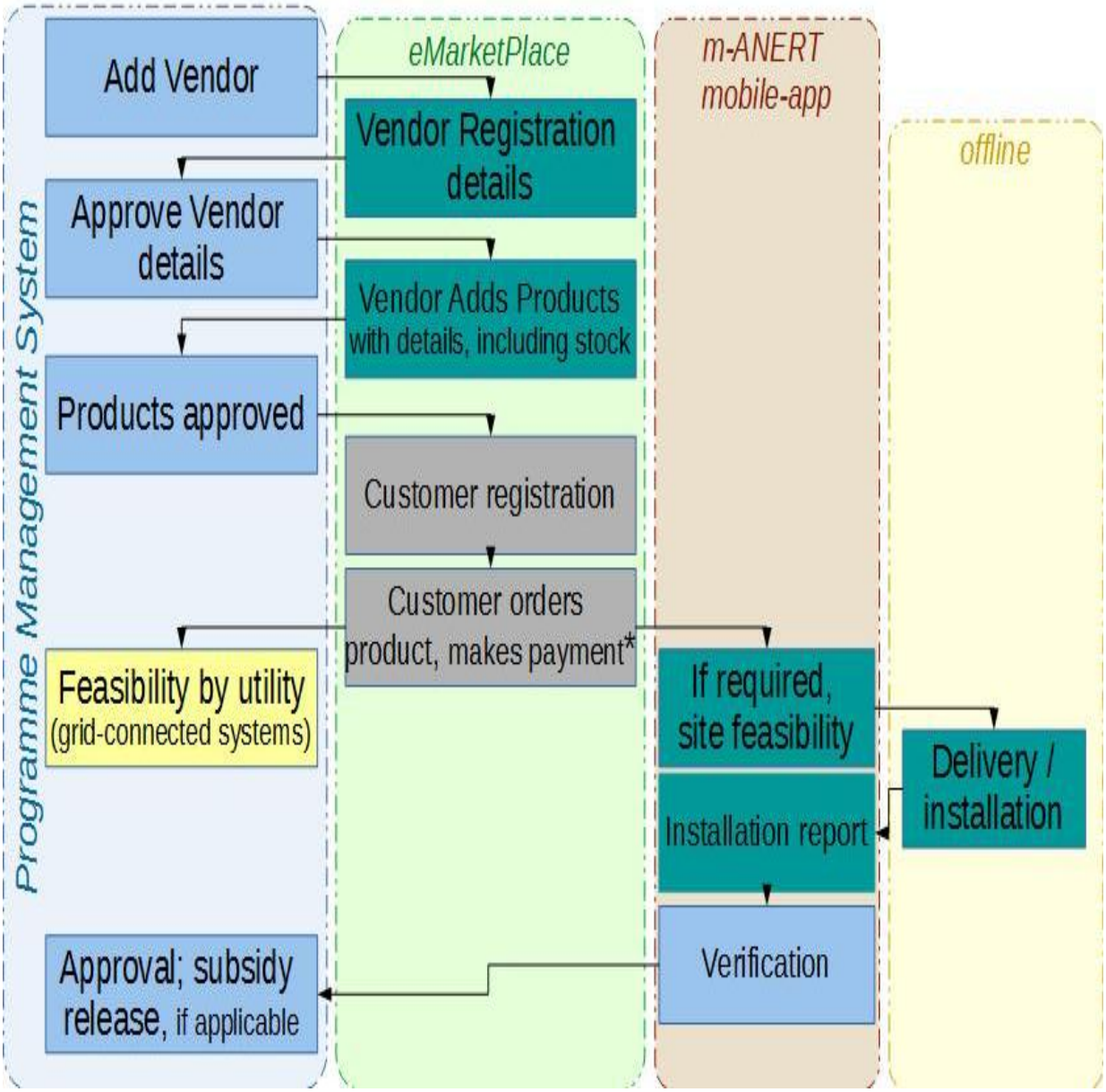
0.3 The beneficiary /Government/any other proponent shall have the freedom to select an agency of their choice from the list of Empanelled Agencies published by ANERT through this process, for installation of the solar power plants. This list will be the base list for the implementation of Solar Rooftop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

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

0.5 The Central & State Financial Assistance will be as per the guidelines of MNRE & ANERT respectively and its amendments from time to time.

0.6 The Field Implementation shall include the following steps:**Work Flow of E – Commerce platform established by ANERT (www.buymysun.com)**

Workflow



Other details:

i. In case of grid connected systems, making available energy meters of required standards through the Distribution Licensee or procurement and testing of energy meters shall be the responsibility of beneficiary. Agency may co-ordinate the purchase and testing of Energy meters for avoiding time delay in this regard.

ii. In the case of grid connected systems the beneficiary has to obtain scheme approval and energisation approval for systems of capacity 10kW and above from Electrical inspector having jurisdiction over the area for commissioning the Solar Energy System. For System below 10kW the connectivity approval only has to be obtained from electrical utility. This

may change as per the guidelines issued by Electrical utility and Electrical Inspectorate time to time.

iii. Pre- commissioning testing shall be the responsibility of selected empanelled agency. The installation shall be considered as completed only after testing and commissioning of the system.

iv. The installation will be verified for compliance by ANERT. Electrical inspectorate and Distribution Licensee (as the case may be) and will provide energisation approval and connectivity. Subsidy due to the beneficiary will be released by ANERT only on receiving completion report and verification certificate.

v. For off grid systems of capacity 10kW, Scheme approval and energisation approval has to be obtained from Electrical inspectorate.

vi. In the case of Off grid programme ANERT will be the inspecting authority

vii. Beneficiary has to select and purchase the solar power plant with or without subsidy through "buy my sun" portal.

viii. Beneficiary has to follow the stages in the portalto complete the installation. For availing subsidy beneficiary should have anAadhar enabled account, Aadhar should be mobile linked and the name in the Aadhar and the consumer name should be same.

ANERT programmes

0.1 ANERT Programmes shall include installation of grid connected, off-grid & Hybrid roof-top mounted solar power plants for any interested beneficiaries within the State, who apply for such installations and the proposed locations found suitable for the same. These installations could be with or without Government Subsidy.

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

0.3 Deposit works entrusted to ANERT by various institutions / firms for installation of grid connected or off-grid roof-top mounted solar power plants would be another category of ANERT programmes during this period. The Agencies empanelled in this process only would be eligible for undertaking such works also and price offers will be collected based on site conditions separately (if required).

0.4 ANERT may also fix rate contract for installation if a particular programme demands so.

Empanelment process

0.1 Agency / EPC Contractor have to express their interest for empanelment to ANERT by submitting application in the prescribed format along with required documents for getting listed as an empanelled agency.

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

0.3 The grading agency empanelled for this purpose is"CRISIL" Securities and Exchange Board of India (SEBI) approved Credit Rating Agency for "Assessing and grading of integrators/ contractors for supporting empanelment process of agencies under Solar Rooftop Programme implemented in the state of Kerala at below mentioned contact details;

CRISIL Ltd
CRISIL House, Plot No.46-Sector-44,
Opposite Provident Fund Office,
Gurgaon-122003, Haryana, India
(D) 0124-6722428 | (M) +91 99990 21752 | (B) +91 124-6722000|
www.crisil.com

Name	Contact Details	Email id
Pranwir Kumar	9582343413 , 0124- 6722431	pranwir.kumar@ext-crisil.com
GautamVerma	9999021752 , 0124-6722428	gautam.verma@crisil.com

Mode of implementation

0.1 On receiving an enquiry from beneficiary, the Empanelled Agency has to visit the site, carry out a feasibility assessment and provide the feasibility report through the e-Market place(Mobile App).However, obtaining the clearance for connectivity from the Distribution Licensee (for grid connected systems) would be the responsibilities of the beneficiary.

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

0.3 Providing Energy meters for recording solar energy generated and net metering, testing /calibration of meters are not coming under the scope of EoI. This has to be co-ordinated by agency with the beneficiary and Distribution Licensee. However pre commissioning testing comes under the scope ofEoI and it has to be done by the empanelled agency/EPC Contractor.

0.4 The specifications and conditions of installation /warranty have to be complied with.

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

0.6 During installation of Solar Plant, the presence of an accredited Solar Installer certified by ANERT is essential. This will be made mandatory from 1 April 2019 onwards. EPC contractor can make use of Training programmes scheduled by ANERT for Installers at a subsidised rate. You can enrol through the link available for this purpose on the website of Centre for Management Development.www.cmdkerala.net

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

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

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

Role of ANERT

0.1 Empanelment of agencies for Solar Rooftop Programme in Kerala.

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

0.3 Listing of agencies with price for the programme as per requirement.

0.4 Registration of beneficiary for allotment of central and state financial assistance

0.5 Monitoring the performance of agencies/EPC contractors.

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

0.7 Monitoring, inspection/ verification of the system installed.

0.8 Co-ordinating with MNRE and State government for the implementation of the programme.

0.9 Release of central and state financial assistance and incentives if any.

I.D – Bidding Procedure

Qualification Criteria

0.1 The agency must have valid grading certificate issued by CRISIL Ltd (SEBI listed agency Empanelled by ANERT) issued after 1st October 2018. Agencies already having listed by ANERT for 2017 -18 programme and having installed solar power plants of minimum aggregated capacity of 50kWmay avail a grace period of 90 days for the submission of grading certificate. From 1 Jan 2019 onwards agencies who could not submit new grading certificate will be removed from the list.

0.2 The Agency should have a **valid GST registration.** Copy to be submitted along with the EoI

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

0.4 Registration certificate of the firm which is issued by registrar of companies or other competent authority under which firm is registered has to be submitted. The details of the bidder should match with registration certificate. *Copy of this certificate has to be submitted.*

0.5 The bidder should meet the criteria related to service facility – Minimum 3 service centres North, Central and South regions

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

1. Allocation of capacity

Allocation of capacity is based on grading allotted by the empanelled rating agency

Grading Scale		Financial Strength				
		Highest	High	Moderate	Weak	Poor
Performance capability	Highest	SP1A	SP1B	SP1C	SP1D	SP1E
	High	SP2A	SP2B	SP2C	SP2D	SP2E
	Moderate	SP3A	SP3B	SP3C	SP3D	SP3E
	Weak	SP4A	SP4B	SP4C	SP4D	SP4E
	Poor	SP5A	SP5B	SP5C	SP5D	SP5E

Grade Allotted	Maximum Single plant capacity-kWp (allotted)	Total Volume in kW by Batch
SPIA	500kW	5000kW
SPIB	500kW	5000kW
SPIC	500kW	2000kW
SPID	50kW	500kW
SPIE	10kW	100kW
SP2A	500kW	3000kW
SP2B	500kW	2000kW
SP2C	500kW	1000kW
SP2D	50kW	200kW
SP2E	10kW	100kW
SP3A	100kW	2000kW
SP3B	100kW	2000kW
SP3C	100kW	1000kW
SP3D	2kW	50kW
SP3E	2kW	50kW
SP4A	10kW	1000kW
SP4B	10kW	1000kW
SP4C	10kW	1000kW
SP4D	2kW	50kW
SP4E	2kW	50kW
SP5A	10kW	1000kW
SP5B	10kW	1000kW
SP5C	2kW	50kW
SP5D	2kW	10kW

1. Financial Criteria

1.1 The maximum price for subsidised programme and non- subsidy programme has to be submitted in the price format enclosed. For subsidised programme maximum cost inclusive of GST should not exceed the bench mark cost fixed by MNRE. This has to be resubmitted as and MNRE changes their bench mark cost. Licensing fee 2.5% shall be additional.

1.2 In the case of Non subsidy programme if the agency/ EPC contractor wishes to supply premium components and they feel the cost is higher than that for subsidy programme, they are provided with option to submit price bid for non-subsidy programme also. The maximum price that can be charged should be limited to this amount (all inclusive)

1.3 In case of incentives, if any, from ANERT for the purchase through E- Market place, www.buymysun.com , the price quoted for subsidy programme shall be considered as base price.

1.4 The system installed should be insured against possible damages due to natural calamities during the warrantee period. The documentation in this regard has to be done by the agency.

1.5 The price quoted by the bidder for each configuration shall be all inclusive of taxes and duties, and shall cover the pre-installation survey report, transportation, handling charges, supply and commissioning of a standard installation, cost of insurance. Cabling of 15meters length for both AC and DC side shall be included in the costing. If the structure requires additional customisation for installation on a roof other than a flat roof or the cabling exceeds 15 metre each for the DC side (not considering the module interconnection cables) and AC side, up to the existing AC distribution board etc. the expense may be charged from the beneficiary.

1.6 Empanelment of agencies will be made for each configuration separately. For a particular configuration, the agencies who quoted lower or equal to bench mark cost fixed by MNRE will be listed.

1.7 The list finalised by this empanelment process will be taken as base list for other procurement process initiated by ANERT if required.

1.8 The collection of cost of the system will be as per the guidelines of e-market place. There will be two modes of payment. Online and offline. In the case of online mode total cost has to be remitted through e-market place. In the case of Off-line mode certain minimum amount has to be remitted through the e-market place and balance can directly paid to the agency/EPC contractor.

1.9 The Empanelled Agency shall not claim any subsidy/incentive from MNRE/ any other organisation for the projects sanctioned by ANERT. An undertaking to this effect has to be submitted with each completion report/ subsidy claim. ANERT shall submit all the subsidy claim details under this programme to MNRE, and also publish the same on ANERT website.

2. Documents to be provided along with EoI

1. Covering letter for submission as per format (Annexure-I) on letterhead- Flag-1
2. Copy of valid GST registration. –Flag-2
3. Authorisation for the authorised signatory to sign the documents.- Flag-3
4. Attested copy of registration certificate issued by registrar companies or other competitive authority under which the firm is registered.-Flag-4
5. Certificate of grading issued by an approved agency. Flag-5
6. Undertaking by the Agency in stamp paper worth Rs.200/- (Annexure-II)Flag-6
7. Undertaking regarding service facility(Annexure-III)- Flag-7
8. Undertaking of List Accredited installers(Annexure-IV) -Flag-8
9. Undertaking regarding subcontractors engaged(Annexure-V) - Flag-9

3. General Terms and Conditions

3.1 Director, ANERT reserves the right to add, remove, and clarify any of the terms and conditions contained herein.

3.2 Any changes/ updates in MNRE guidelines will be binding on all the stakeholders.

3.3 All the lists/ announcements including dates related to the empanelment process, will be published on ANERT's website (www.anert.gov.in) and ANERT will not be responsible for delays or non-receipt of individual communications in this regard, if any.

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Reference No. ANERT-TECH/337/2018-PE1(RTS)
Dated.17.10.2018

PART-II

Agency for Non-conventional Energy & Rural Technology
VikasBhavan (PO), Thiruvananthapuram – 695 033, Kerala
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II.A – Technical requirements- Grid Connected Solar Rooftop Power Plants

Configuration Proposed

3.4 The configuration proposed to be installed under "Solar Rooftop Programme" Scheme implemented by ANERT is as given below.

Sl.No	Capacity	Minimum Module Capacity	PCU capacity Maximum allowable deviation + 20%	Connectivity
1.	1kW	1kWp	1kW	I Phase/ 3Phase
2.	2kW	2kWp	2kW	I Phase/ 3Phase
3.	3kW	3kWp	3kW	I Phase/ 3Phase
4.	5KW	5kWp	5KW	3Phase
5.	10kW	10kWp	10kW	3Phase
6.	15kW	15kWp	15kW	3Phase
7.	20kW	20kWp	20kW	3Phase
8.	25kW	25kWp	25kW	3Phase
9.	30kW	30kWp	30kW	3Phase
10.	40kW	40kWp	40kW	3Phase
11.	50kW	50kWp	50kW	3Phase
12.	60kW	60kWp	60kW	3Phase
13.	70kW	70kWp	70kW	3Phase
14.	80kW	80kWp	80kW	3Phase
15.	100kW	100kWp	100kW	3Phase
16.	150kW	150kWp	150kW	3Phase
17.	200kW	200kWp	200kW	3Phase
18.	250kW	250kWp	250kW	3Phase
19.	300kW	300kWp	300kW	3Phase
20.	350kW	350kWp	350kW	3Phase
21.	400kW	400kWp	400kW	3Phase
22.	450kW	450kWp	450kW	3Phase
23.	500kW	500kWp	500kW	3Phase

3.5 The capacity of the system is defined as the total capacity of solar modules.

3.6 Agency must have an accredited installer and a licensed electrical contractor and to install the Solar Power plant and his/her details has to be furnished for reference and verification.

3.7 Minimum/Maximum capacity of PCU shall be ± 20% of module capacity.

3.8 The grid connected solar PV power plant comprises of solar PV modules with intelligent online inverter which feeds quality AC power to electrical loads taking energy from PV and feeding the excess generated electricity to the grid of Distribution Licensee through net metering facility. The connectivity should be as per CEA (Technical Standards for connectivity of the distributed generation resources) Regulations, 2013 and KSERC (Grid Interactive Distributed Solar Energy Systems) CEA Regulations, 2014 and amendments thereof if any.

3.9 The system installed should conform to the minimum technical requirements by MNRE, CEA, KSERC and ANERT (undertaking by the agency to be submitted as per Annexure II-C.

3.10 The plant should be sized based on the availability of shade free area for installing solar module array and the feasibility to connect to the grid by the distribution licensee. Maximum capacity of solar power plant availed by a beneficiary at a single location is 500 kW

3.11 The connectivity should be as per (Technical Standards for connectivity of the Distributed generation resources) Regulation, 2013.

3.12 KSERC (Grid Interactive Distributed Solar Energy Systems) Regulations, 2014 should be complied.

3.13 CEA Regulation 2010 has to be followed for Safety and Electricity Supply.

3.14 Metering should be as per CEA regulation 2006.

3.15 Any amendments thereof will also be applicable

3.16 The system should be connected to the mains -Single phase/ three phase - through a net/export-import meter tested and approved by a lab approved by the Distribution Licensee. Another Energy meter (Tested in approved labs) also has to be installed between the PCU and the point of interconnection , nearer to the net meter to record electricity generated from Solar power plant

3.17 All the components of the system should comply with the minimum technical requirements of the Grid connected Rooftop solar photovoltaic power plant scheme of MNRE and CEA regulations. Technical compliance certificate/ Test report from the approved laboratory of MNRE, NABL,IEC, BIS accredited has to be submitted for the main system components (solar PV module, Power conditioning unit) of all the models and brands proposed. The certificate should be valid as on the date of submission.

3.18 The test certificate shall be as per the prevailing format/procedure by MNRE. The PV modules must be tested and approved by an IEC/NABL/MNRE /BIS approved test centre

3.19 I –V curves of STC performance of the module should be submitted along relevant test certificates

3.20 The PV module(s) shall contain crystalline silicon solar cells.

3.21 PV modules of capacity 200Wp or higher capacity should be used.

3.22 Each PV module used in any solar power project must use a RF identification tag (RFID), which must contain the following information. The RFID should be inside the module laminate.(This is as per MNRE guidelines)

i. Name of the manufacturer of PV Module
ii. Name of the manufacturer of Solar cells
iii. Month and year of the manufacture (separately for solar cells and module)
iv. Country of origin (separately for solar cell and module)
v. I-V curve for the module
vi. Peak Wattage, I_m, V_m and FF for the module
vii. Unique Serial No. and Model No. of the module
viii. Date and year of obtaining IEC PV module qualification certificate
ix. Name of the test lab issuing IEC certificate
x. Other relevant information on traceability of solar cells and module as per ISO 9000 series.

3.23 In additional to the above following details should be provided on the module as visible to the inspecting person.

a. Name and address of manufacturer
b. Make, model and Serial No
c. Rated Power at STC
d. Vmp,Imp,Voc&Isc

3.24 A display board has to be placed near the PV array. Design and details to be provided will be provided by ANERT.

3.25 PV modules used in solar power plants/ systems must have a warranty 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.

3.26 The PCU (inverter) shall be a single unit for the capacity up to 2 kW and for capacity higher than 2kW it can be multiple also. Technical data sheet of the inverter indicating operating modes, protection, efficiency etc. should be provided by the bidder.

3.27 Hybrid inverters with on grid-off grid modes may also be provided.

3.28 PCU should comply following parameters

Output voltage	3 phase, 415 VAC Below 5kW,it can also be single phase 230VAC depending on the consumer connection. Maximum allowable variation of voltage is +/- 10% Inverter/ PCU should be capable of synchronise with grid voltage between 110% and 80% of the rated output. Beyond this, system has to stop generating.

3.29 Generation data and other important parameters should be accessible through web- based remote monitoring communication link for 5kW and above.

3.30 Full protection against accidental open circuit, reverse polarity and AC /DC bus short-circuit shall be provided.

3.31 The PCU shall not produce Electromagnetic interference (EMI) which may cause malfunctioning of electronic and electrical instruments including communication equipment, which are located within the facility in which the PCU is housed.

3.32 The inverter enclosure shall be weatherproof and capable of surviving climatic changes and should keep the inverter intact under all conditions in the room where it will be housed. The inverter should be either wall/ pad mounted. Moisture condensation and entry of rodents and insects shall be prevented in the inverter enclosure. Components and circuit boards mounted inside the enclosures shall be clearly identified with appropriate permanent designations.

3.33 All doors, covers, panels and cable exists shall be provided with gasket or otherwise designated to limit the entry of dust and moisture.

3.34 The Junction boxes, enclosures for inverters/ Charge controllers should meet general requirements as per IP 54 /IP 65 (for outdoor)/ IP 21 (for indoor) as per IEC 529

3.35 Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.

3.36 The system should have MOV type of arrestors for higher withstand of continuous PV-DC voltage during earth fault condition. SPD shall have safe disconnection and short circuit interruption arrangements.

3.37 Lightning protection should be provided by using metal oxide varistors as per IEC 62305 and suitable groundingsuch that induced transients find an alternate route to earth.

3.38 In built protection for internal faults including excess temperature, commutation failure, and overload and cooling fan failure (if fitted) is obligatory

3.39 Fast acting semiconductor type current limiting fuses at the main bus bar to protect from the grid short circuit contribution.

3.40 All the Electrical Grounding (earthing) should be as per IS 3043. Copper or GI single conductor has to be used.

3.41 A manually operated isolating switch between the distributed generation resource and the electricity system, which shall meet following requirements:

a) Allow visible verification that separation has been accomplished;

b) Include indicators to clearly show open and closed positions;

c) Be capable of being reached quickly and conveniently twenty four hours a day by licensee's personnel without requiring clearance from the applicant;

d) Be capable of being locked in the open position;

e) May not be rated for load break nor may have feature of over-current protection;

f) Be located at a height of at least 2.44 m above the ground level.

3.42 The PCU shall be tested to demonstrate operation of its control system and the ability to be automatically synchronized, operate in parallel with the grid of distribution licensee.

3.43 Factory test certificate of PCU shall be made available as a reference for inspection and testing.

3.44 DC isolation facility has to be provided in the PCU or externally.

3.45 Switches/ Circuits Breakers/ Connectors should meet general requirements and safety requirements as per compliance required

3.46 Cabling practice: Cable connections must be made using PVC insulated copper cables, as per BIS specifications. All cable connections must be made using suitable terminations for effective contact. Cabling should be as per National Electrical Code and technical compliance required for the programme.

3.47 All cables outside of terminal/ panels/ enclosures shall be protected by conduits.

3.48 Cables may be run in UV stabilised PVC conduits in GI trays with covers for protection.

3.49 Cables shall be provided with dry type compression glands wherever they enter junction boxes, panels, enclosures.

3.50 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.

3.51 Structural material shall be corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, nuts and bolts. Galvanizing should meet ASTM A-123 hot dipped galvanizing or equivalent, which provides at least spraying thickness of 70 microns on steel as per IS 5905, if steel frame is used. Any other corrosion resistant material structures with adequate strength can also be used.

3.52 Each structure shall have its angle of inclination to the horizontal as per the site conditions. Solar module should be inclined towards south direction and installed at an angle of 10-15° from the horizontal. If any deviation is required, that has to be conveyed with the beneficiary and the generation loss that may occur may be made aware to the beneficiary and an undertaking from beneficiary may be submitted in this regard along with the project proposal / feasibility report. Maximum loss due to such deviation should not be more than 10% of the actual generation expected.

3.53 Each panel frame structure shall be so fabricated as to be fixed on the rooftop column/ wall structures. The structure should be capable of withstanding a wind load of 150-160 km/hr after grouting & installation. The lower end of the solar array must beminimum30 cm above the rooftop. Grouting material for SPV structures shall be as per M15 (1:2:4) concrete specification.

3.54 The structures shall be designed for simple mechanical and electrical installation.

3.55 The array structure shall support SPV modules at a given orientation and absorb and transfer the mechanical loads to the rooftop column properly.

3.56 5 years warranty for the entire system should be provided by the supplier as per the conditions of the contract.

3.57 Copy of warrantee certificate from manufacturer of module and PCU has to be given to the beneficiary as an attachment to the warrantee certificate of the empanelled agency

3.58 Electrical installation shall be certified by a competent licensee of the Electrical Inspectorate (wherever applicable). Scheme approval and energisation approval has to be obtained from the authority designated for the same.

3.59 The agency shall agree to provide installation details of the PV modules and the support structures with appropriate diagrams and drawings.

3.60 Feasibility report on grid connectivity has to be obtained by the beneficiary from electrical distribution licensee for getting final approval for installation of Solar Power plant.

3.61 The eligible consumer shall obtain necessary sanction for installation and commissioning the solar energy system from Electrical Inspector having jurisdiction over the area, in accordance with provisions of the Central Electrical Authority (Technical standards for connectivity of distributed Generation) Regulations, 2013 and produce the sanction to Distribution Licensee.

3.62 The distribution Licensee shall test the solar energy system in accordance with the provisions of Central Electrical Authority (Technical Standards for Connectivity of Distributed Generation Resources) Regulataion.2013, within fifteen days from the date of submission of approval of Electrical Inspector.

3.63 One copy each of the approved drawing and diagrams showing important equipment, protection and control features shall be signed by the applicant and the licensee and shall be in possession of the applicant and licensee. One copy of this has to be submitted along with commissioning report to ANERT.

3.64 These drawing and diagrams shall be amended as and when any changes are made in the distributed generation resource or interconnection facility.

3.65 The applicant shall provide reasonable access and other required facilities to the appropriate licensee for inspection of the equipment.

3.66 The energy meter for recording Solar electricity generated and the two way meter for net metering has to be got tested from the authorised meter testing facility of the Distribution Licensee before installation. Or tested meter has to be obtained from distribution licensee.

3.67 Necessary formalities like submitting application for the clearance from the Distribution Licensee and providing connectivity have to be done by the beneficiary. Charges for this services if any, has to be remitted by the beneficiary.

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

3.69 The following minimum details must be provided in the manual:

a. How to use
b. DO's and DON'T's
c. Regular maintenance and troubleshooting of solar power plant
d. Name ,address, phone number and E-mail ID of the contact person& service facility

3.70 **Minimum Technical requirements summary**

Table 2.2

S/N	System Component	Capacity/ rating	Minimum Technical Compliance
1.	Solar panel	As per the rating system selected	IEC 61215 / IS14286; IEC 61730 Part 1 & II; IEC 61701
2.	Power conditioning Unit	As per the rating system selected	IEC 61683 / IS 61683 (Efficiency 95% and above) IEC 60068-2 (1, 2, 14, 30) / Equivalent BIS Std. IEC 62116 –for islanding prevention Compliance to CEA (Distributed generation) regulation, 2013, IEC 61727 for utility interface
3.	Cables	For 15m wiring length AC & DC SIDE	IEC 60227 / IS 694 IEC 60502 / IS 1554 (Pt. I & II)
4.	Switches/ Circuit Breakers/ Connectors	As required	IEC 60947 part I,II, III / IS 60947 Part I,II,III EN 50521
5.	Junction Boxes/Enclosuresfor Inverters/ ChargeControllers	As required	IP 54 (for outdoor)or IP 65 / IP 21(for indoor) as per IEC 529

S/N	System Component	Capacity/ rating	Minimum Technical Compliance
6.	Energy Meter for Recording Solar Electricity Generated		As per CEA regulations
7.	Two way meter for Distribution Licensee grid connection		As per CEA regulations
8.	Electrical Grounding (Earthing)	Module array and the PCU	As per IS 3043

II.B – Technical requirements- Off Grid Solar Rooftop Power Plants

4. Configurations Proposed

4.1 The capacity of the system is defined as the total capacity of solar modules.

4.2 The battery capacity should be as per the capacities shown in table 2.3 and subsidy will be as per the norms of MNRE.

4.3 The configuration proposed to be installed under "Solar Smart" off grid power plant programme (1kW, 2kW,3kW,5kW,10kW,15kW,20kW,25kW) implemented by ANERT.

Table 2.3

No	Capacity of the System	Capacity of SPV Module	Capacity of PCU (In KVA)	Battery Bank (minimum) Option-1	Battery Bank(Minimum) Option-2	Battery Bank Option-3
1	1kW	1000 Wp	1	9500Whr	5300Whr	2500Whr
2	2kW	2000Wp	2	19000Whr	10600Whr	5000Whr
3	3kW	3000 Wp	3	28500Whr	15900Whr	7500Whr
4	5kW	5000Wp	5	38000Whr	26500Whr	10000Whr
5	10kW	10000Wp	10	95000Whr	53000Whr	12500Whr
6	15kW	15000Wp	15	142500Whr	79500 Whr	15000 Whr
7	20kW	20000Wp	20	190000 Whr	106000 Whr	17500 Whr
8	25kW	25000Wp	25	237500 Whr	132500 Whr	20000 Whr

5. Technical specification

SPECIFICATION AND CERTIFICATION REQUIREMENTS OF STAND ALONE SOLAR PV POWER PLANTS

5.1 The standalone solar PV power plant system comprises of solar PV modules with, Battery bank, intelligent online inverter which feeds uninterrupted quality AC power to electrical loads taking energy from PV or battery bank as the case may be. Batteries will be charged from solar energy by charge controller integrated in the inverter or by an external charge controller.

5.2 The system should be connected to the load through a change-over switch manual/ automatic. The change-over switch shall be provided to connect the load to the grid (wherever available), in case the battery is deep discharged.

5.3 The PV modules must be tested and approved by one of the MNRE authorised/IEC/NABL test centres for IEC/ IS certification.

5.4 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.

5.5 Structural material shall be corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, nuts and bolts. Galvanizing should meet ASTM A-123 hot dipped galvanizing or equivalent, which provides at least spraying thickness of 70 microns on steel as per IS 5905, if steel frame is used. Any other corrosion resistant material structures with adequate strength can also be used.

5.6 Each structure shall have its angle of inclination to the horizontal as per the site conditions. Solar module should be inclined towards south direction and installed at an angle of 10-15° from the horizontal. If any deviation is required, that has to be brought to the notice of the beneficiary and the generation loss that may occur may be made aware to the beneficiary and an undertaking from beneficiary may be submitted in this regard along with the project proposal / feasibility report.

5.7 Each panel frame structure shall be so fabricated as to be fixed on the rooftop column/ wall structures. The structure should be capable of withstanding a wind load of 150-160 km/hr after grouting & installation. The lower end of the solar array must be minimum 30 cm above the rooftop. Grouting material for SPV structures shall be as per M15 (1:2:4) concrete specification.

5.8 The structures shall be designed for simple mechanical and electrical installation.

5.9 The array structure shall support SPV modules at a given orientation and absorb and transfer the mechanical loads to the rooftop column properly.

5.10 Battery bank comprising of batteries conforming to IEC 61427 and applicable BIS specification and meeting the following specification should be supplied, installed, and commissioned. Flooded type lead acid tubular battery/ VRLA/ Gel battery can be used. CFA will be made available as per MNRE guidelines.(ie CFA may vary based on the battery capacity)

5.11 Suitable ceramic vent plugs with float level indicators shall be provided with the batteries. It has to be installed on a suitable stand duly painted with acid resistant paint.

5.12 Power Conditioning Unit (PCU) shall comprise of charge controller and MPPT unit with power optimiser, inverter, voltage stabilizer, and distribution panel along with necessary displays, indicators and alarms. Power conditioning unit should meet relevant standards proposed by MNRE

a. Output voltage - As per grid standard
b. Frequency 50Hz
c. THD < 5%
d. Efficiency 85% and above at full load

5.13 A Factory Test Report (FTR) shall be supplied with the unit after all tests. The FTR shall include detailed description of all parameters tested.

5.14 Factory testing of the Inverter/ Inverters may be carried out. Beneficiary/ ANERT representative may be allowed to witness it at the manufacturer's premises, if so required.

5.15 All the electrical installation shall be certified by a competent licensee of the Electrical Inspectorate and approval has to be obtained from the authority designated for the same.

5.16 The supplier shall agree to provide installation details of the PV modules and the support structures with appropriate diagrams and drawings.

5.17 Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.

5.18 In-built protection for internal faults including excess temperature, overload is obligatory.

5.19 Over Voltage Protection against atmospheric lightning discharge to the PV array, voltage fluctuations in the load circuit, internal faults in the power conditioning unit, operational errors and switching transients should be provided.

5.20 Cable connections must be made using PVC insulated copper cables, as per BIS specifications. All cable connections must be made using suitable terminations for effective contact.

- Cables used should meet necessary compliance proposed by MNRE.
- All cables to be supplied should have proper current carrying capacity.
- All cables shall be adequately supported.
- Outside of terminal/ panels/ enclosures shall be protected by conduits.
- Cables shall be provided with dry type compression glands wherever they enter junction boxes, panels, enclosures.
- Cable Marking: All cable/wires are to be marked with proper manner by good quality ferule or by other means so that the cable can be easily identified.

5.21 DC combiner box to receive the DC output from the array field with meters (Voltage & Current) shall be provided. Suitable capacity MCBs shall be provided for controlling the DC power output to the inverter along with necessary surge arrestors.

5.22 AC Distribution Board (ACDB) shall control the AC power from inverter and should have necessary surge arrestors, meters, and change over etc.

5.23 Five years warranty for the entire system should be provided by the supplier for the system installed as per the conditions of the contract.

5.24 The Warranty Card to be supplied with the system must contain the details of the system supplied, clauses of warrantee and CMC entered with beneficiary.

5.25 If the supplier/agency is not the manufacturer, copy of the warrantee card from the manufacturer also has to be provided along with warrantee card of the integrator.

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

5.27 The following minimum details must be provided in the manual:

a. How to use
b. DO's and DON'T's
c. Regular maintenance and troubleshooting of solar power plant
d. Name ,address,Phone number and E-mail ID of the contact person& service facility

5.28**Minimum Technical requirements**

Table 2.4

System Component	Capacity	Minimum Technical Compliance
Solar panel	1000 W_p	IEC 61215 / IS14286, IEC 61730 Part 1 & II IEC 61701
Battery	7200Whr ± 4%,	IS1651/IS13369 /IEC 61427/IS15549
Power conditioning Unit	1kW	IEC 61683 / IS 61683 IEC 60068-2 (1, 2, 14, 30) / Equivalent BIS Std Efficiency 85% and above at full load THD <5%
Cables		IEC 60227 / IS 694 IEC 60502 / IS 1554 (Pt. I & II
Switches/ Circuit Breakers/ Connectors		IEC 60947 part I,II, III / IS 60947 Part I,II,III EN 50521
Junction Boxes /Enclosures for Inverters/ Charge Controllers		IP 54 (for outdoor) or IP 65 / IP 21(for indoor) as per IEC 529

II.C–Bid Submission form-Solar Rooftop Power Plant Programme

1.	Name of the bidder as in registration certificate (Copy of registration certificate to be enclosed)			
2.	Address in full			
3.	Contact Details	Mobile		
		Land Phone		
		Fax No		
		Email		
4.	Bank account details of the Bidder	Account No		
		Name of account holder		
		Bank		
		Branch Name		
		Address of the bank		
		IFS code		
5	GST registration No (Copy of registration certificate to be enclosed)			
6	Grading issued by SEBI listed agency Appointed by ANERT (Copy of grading certificate to be enclosed)			
7.	Name of the authorised signatory (Authorisation to be enclosed)			
6.	Designation of the authorised signatory			
	Service centres in Kerala there should be at least Three centres Region wise	North		

	North , South and Central (Undertaking in stamp paper worth Rs.200/-has to be submitted)	Central		
		South		

I have read the technical requirements, warranty conditions and the details furnished above are true and correct and complete to my knowledge and belief. All the details furnished are supported by documentary evidence.

Date

Signature of the authorised signatory
Name
Designation

(Office Seal)

ANNEXURE I - Format for Covering Letter

Sir,

I/We hereby express my/our interest to be included as an Empanelled Agency for the installation Solar Rooftop Power Plants (Off Grid & Grid Connected) in Kerala, as per the terms and conditions and the technical specifications, decided by Agency for Non-conventional Energy and Rural Technology (ANERT) and Ministry of New and Renewable Energy (MNRE). The work allotted to me/us will be completed within the time frame as per the work order from the beneficiary/ Government/any other agency.

.

Yours faithfully

Place:

Date:

Signature
Name
Designation

(Office Seal)

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

ANNEXUREII –Undertaking by the agency

(In stamp paper worth Rs. 200/-(Rupees Two hundred only)

I ……. (Name, Designation) authorised signatory of

…… ……. (Name and full address of the bidder) hereby undertake that

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

Date

Signature of the authorised signatory
Name
Designation

(Office Seal)

ANNEXUREIII –Undertaking by the agency regarding service centres.

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

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

Date

Signature

Authorised signatory

ANNEXURE-IV- List of accredited installers with the Agency/EPC contractor proposed to depute for installation

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

I hereby undertake that the Installers/ Technicians listed above are accredited installers of ANERT and the service of accredited installers will be assured during installation of Solar rooftop Power Plant. Sl.No…….are not accredited and I undertake to complete the accreditation process of these technicians on or before 1st April 2019. I agree to Publish the details accredited installers in ANERT website and this will be updated as when required.

Date

Signature

Authorised Signatory

ANNEXURE-V-List of authorised sub-contractors engaged by the EPC contractor/ Agency

Sl.no	Name of the sub-contractor	Complete address and contact details	Districts allotted	Accredited installers available with the sub-contractor	Period of engagement

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

Date

Signature

Authorised signatory

Invitation of Expression of Interest for Empanelment of Agencies/ EPC contractors for Solar Rooftop Programme in Kerala under Distributed Power generation. (Grid connected, Off Grid& Hybrid)

Reference No. ANERT-TECH/337/2018-PE1(RTS)
Dated.17.10.2018

PART-III

Agency for Non-conventional Energy & Rural Technology
VikasBhavan (PO), Thiruvananthapuram – 695 033, Kerala
Phone: (91-471) 2334122, 2334124, 2331803(office), 2329854 Fax: (91-471)2329853

Web: http://www.anert.gov.in ***email:*** director@anert.in

6. Price offer for Subsidy Programme (Grid Connected)

Sl. No	Capacity of the System in kW	Base price of the system	GST and other taxes	2.5% Non-refundable Licence Fee	Total cost of the system inclusive of GST , other taxes and license fee(Without Subsidy)	MNRE benchmark cost inclusive of taxes and applicable fees	Subsidy Amount	Total cost (Subsidy Scheme)
1	1					60,000	18,000	
2	2					1,20,000	36,000	
3	3					1,80,000	54,000	
4	5					3,00,000	90,000	
5	10					6,00,000	1,80,000	
6	15					8,25,000	2,47,500.00	
7	20					11,00,000	3,30,000.00	
8	25					13,75,000	4,12,500.00	
9	30					16,50,000	4,95,000.00	
10	40					22,00,000	6,60,000.00	
11	50					27,50,000	8,25,000.00	
12	60					33,00,000	9,90,000.00	
13	70					38,50,000	11,55,000.00	
14	80					44,00,000	13,20,000.00	
15	90					49,50,000	14,85,000.00	
16	100					55,00,000	16,50,000.00	
17	150					79,50,000	23,85,000.00	
18	200					1,06,00,000	31,80,000.00	
19	250					1,32,50,000	39,75,000.00	
20	300					1,59,00,000	47,70,000.00	
21	350					1,85,50,000	55,65,000.00	
22	400					2,12,00,000	63,60,000.00	
23	450					2,38,50,000	71,55,000.00	
24	500					2,65,00,000	79,50,000.00	

1. The price quoted by the bidder for solar system shall be inclusive of 2.5% of non-refundable licensing fee, cost of transportation, handling, and supply, installation and commissioning of the system , cost of insurance, taxes if any and including 5 year warranty etc.
2. The price quoted is applicable for any location in all fourteen districts of Kerala.

Date

Signature of the authorised signatory
Name
Designation

(Office Seal)

7. Price Offer for Subsidy Programme (OffGrid)

Sl. No	Capacity of the System in kW	Base price of the system	GST and other taxes	2.5% Non-refundable Licence Fee	Total cost of the system inclusive of GST , other taxes and license fee(Without Subsidy)	Battery Bank Options	MNRE benchmark cost inclusive of taxes and applicable fees	Subsidy Amount	Total cost (Subsidy Scheme)
1	1					Option 1	100000	30000	
	1					Option 2	80000	24000	
	1					Option 3	68000	20400	
2	2					Option 1	200000	60000	
	2					Option 2	160000	48000	
	2					Option 3	136000	40800	
3	3					Option 1	300000	90000	
	3					Option 2	240000	72000	
	3					Option 3	204000	61200	
4	5					Option 1	500000	150000	
	5					Option 2	400000	120000	
	5					Option 3	340000	102000	
5	10					Option 1	1000000	300000	
	10					Option 2	800000	240000	
	10					Option 3	680000	204000	
6	15					Option 1	1350000	405000	
	15					Option 2	1080000	324000	
	15					Option 3	915000	274500	
7	20					Option 1	1800000	540000	
	20					Option 2	1440000	432000	
	20					Option 3	1220000	366000	
8	25					Option 1	2250000	675000	
	25					Option 2	1800000	540000	
	25					Option 3	1525000	457500	

1. The price quoted by the bidder for solar system shall be inclusive of 2.5% of non-refundable licensing fee, cost of transportation, handling, and supply, installation and commissioning of the system , cost of insurance, taxes if any and including 5 year warranty etc.
2. The price quoted is applicable for any location in all fourteen districts of Kerala.

Date

Signature of the authorised signatory
Name
Designation

(Office Seal)

8.Price Offer for Non -Subsidy Programme (Grid Connected)

Sl. No	Capacity of the System in kW	Base price of the system	GST and other taxes	2.5% Non-refundable Licence Fee	Total cost of the system inclusive of GST , other taxes and license fee (Without Subsidy)	MNRE benchmark cost inclusive of taxes and applicable fees- (base cost for incentives)
1	1					60,000
2	2					1,20,000
3	3					1,80,000
4	5					3,00,000
5	10					6,00,000
6	15					8,25,000
7	20					11,00,000
8	25					13,75,000
9	30					16,50,000
10	40					22,00,000
11	50					27,50,000
12	60					33,00,000
13	70					38,50,000
14	80					44,00,000
15	90					49,50,000
16	100					55,00,000
17	150					79,50,000
18	200					1,06,00,000
19	250					1,32,50,000
20	300					1,59,00,000
21	350					1,85,50,000
22	400					2,12,00,000
23	450					2,38,50,000
24	500					2,65,00,000

1. The price quoted by the bidder for solar system shall be inclusive of 2.5% of non-refundable licensing fee, cost of transportation, handling, and supply, installation and commissioning of the system , cost of insurance, taxes if any and including 5 year warranty etc.
2. The price quoted is applicable for any location in all fourteen districts of Kerala.

Date

Signature of the authorised signatory
Name
Designation

(Office Seal)

9.Price Offer for Non -Subsidy Programme (Off Grid)

Sl. No	Capacity of the System in kW	Base price of the system	GST and other taxes	2.5% Non-refundable Licence Fee	Total cost of the system inclusive of GST , other taxes and license fee(Without Subsidy)	Battery Bank Options	MNRE benchmark cost inclusive of taxes and applicable fees
1	1					Option 1	100000
	1					Option 2	80000
	1					Option 3	68000
2	2					Option 1	200000
	2					Option 2	160000
	2					Option 3	136000
3	3					Option 1	300000
	3					Option 2	240000
	3					Option 3	204000
4	5					Option 1	500000
	5					Option 2	400000
	5					Option 3	340000
5	10					Option 1	900000
	10					Option 2	720000
	10					Option 3	610000
6	15					Option 1	1350000
	15					Option 2	1080000
	15					Option 3	915000
7	20					Option 1	1800000
	20					Option 2	1440000
	20					Option 3	1220000
8	25					Option 1	2250000
	25					Option 2	1800000
	25					Option 3	1525000

1. The price quoted by the bidder for solar system shall be inclusive of 2.5% of non-refundable licensing fee, cost of transportation, handling, and supply, installation and commissioning of the system , cost of insurance, taxes if any and including 5 year warranty etc.
2. The price quoted is applicable for any location in all fourteen districts of Kerala.

Date

Signature of the authorised signatory
Name
Designation

(Office Seal)

10. Price Offer for Hybrid Systems (Battery backup: Minimum 4010 Whr/kW)

Sl. No	Capacity of the System in kW	Base price of the system	GST and other taxes	2.5% Non-refundable Licence Fee	Total cost of the system inclusive of GST , other taxes and license fee (Without Subsidy)
1	1				
2	2				
3	3				
4	5				
5	10				
6	15				
7	20				
8	25				

1. The price quoted by the bidder for solar system shall be inclusive of 2.5% of non-refundable licensing fee, cost of transportation, handling, and supply, installation and commissioning of the system, cost of insurance, taxes if any and including 5 year warranty.
2. The price quoted is applicable for any location in all fourteen districts of Kerala.

Date

Signature of the authorised signatory
Name
Designation

(Office Seal)