

Invitation of Expression of Interest for Empanelment of Agencies
for Supply /installation of Solar Powered Devices (below 1kW) in
Kerala under Distributed Power Generation. (Off Grid)

EMPANELMENT DOCUMENT

Notification No. ANERT-TECH/179/2020-TO(MJ)

Dated 12.10.2020

PART-I



Agency for New & Renewable Energy Research and Technology

Vikas Bhavan (PO), Thiruvananthapuram – 695 033, Kerala

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Contents

PART – I	1
I.A NOTICE	3
I.B ABSTRACT.....	5
I.C IMPLEMENTATION PLAN.....	6
1. General.....	6
2. ANERT and LSGD Programmes.....	6
3. Scope of work	7
4. Role of ANERT.....	7
I.D BIDDING PROCEDURE.....	8
5. Bid document.....	8
6. Bid Submission.....	8
7. Envelopes and contents.....	8
I.E EMPANELMENT PROCEDURE.....	12
8. Steps for Empanelment – General.....	12
9. Steps for Empanelment – ANERT/LSGD Programmes.....	13
10. General Terms and Conditions.....	14
I.F ELIGIBILITY CRITERIA.....	15
11. Pre-Qualification criteria.....	15
12. Experience criteria.....	16
13. Financial criteria.....	17
ANNEXURE I-A - Format for Covering letter.....	19
ANNEXURE I-B – Undertaking by the Agency.....	20
ANNEXURE I-C – Details of Solar Lantern supplied.....	21
ANNEXURE I-D – Details of Solar Home lighting systems installed.....	22
ANNEXURE I-E – Details of Solar LED Street lighting systems installed	23
ANNEXURE I-F – Details of Service Centres.....	24
PART	–
II	25
II-A- TECHNICAL SPECIFICATION FOR SOLAR DEVICES.....	26
14. Technical qualification criteria.....	26
15. Technical specification for Solar lantern.....	26
16. Technical specification for Soura Suvidha Kit.....	29
17. Technical specification for Solar Home Lighting System.....	33
18. Technical specification for Solar LED Street Lighting System.....	38
ANNEXUREII.A- Technical Bid Submission for Solar Powered Devices.....	44
ANNEXUREII.B- Details of System Component form for Solar Powered Devices.....	45
19. Solar Lantern.....	45
20. Soura Suvidha Kit.....	47
21. Solar Home Lighting System.....	49
22. Solar LED Street Lighting System.....	55
PART	–
III	64
III.A Price Schedule.....	64

I.A – Notice

Notification No. ANERT-TECH/179/2020-TO(MJ)

Dated : 12.10.2020

As per Circular No.DA1/244/2017-LSGD dated 2.6.2017, Local Self-Government Department, Government of Kerala, has given guidelines for the implementation of solar projects and also informed that quotation/ Tender for Solar projects should be invited from the empanelment list of ANERT. Based on this, ANERT has decided to prepare the list of empanelled agencies for implementation of solar devices below 1 kW SPV capacity. Hence Expression of Interest in accordance with the attached Pre-qualification criteria, Technical specifications and financial terms and conditions are invited from reputed and experienced EPC contractors, reputed public sector undertakings and State Government Agencies for the supply / installation of solar photovoltaic devices.

Empanelment List of Agencies will be published for each category only if minimum 3 Agencies are available for enlistment in each category. The Agencies which ever qualify the empanelment criteria will be included in the Empanelment List for supply / installation of SPV devices for two years within the State. EoI is invited for the supply / installation of the following four category of products.

1. Solar Lanterns
2. Soura Suvidha Kit
3. Solar Home Lighting Systems
4. Solar Street lighting Systems

The offers have to be submitted based on the qualification criteria and as per the bid submission guidelines. This empanelment list will be valid for the procurement of the above devices for all programmes implemented by ANERT including State Plan Programmes, MNRE aided programmes, Deposit work, Consultancy work and for the projects of LSG Department and Govt. Institutions.

Price offers have to be submitted for the Solar Lantern, Soura Suvidha Kit, Solar Home Lighting System and Solar Street Lighting system proposed to be implemented by ANERT. The guidelines

and documents for Expression of Interest can be downloaded from the website (www.anert.gov.in) of ANERT. The bids should be received on or before 12 noon, 30th October 2020 in the office of Director, ANERT, Vikas Bhavan (PO), Thiruvananthapuram - 695 033 by post or by hand, along with application fee of Rs.50,000/- as Demand Draft in favour of Director, ANERT, Thiruvananthapuram. The bidders can also submit the bids with all documents on or before 25th of December 2020 and before 25th of March, June, September and December 2021 and qualified bidders will be included in the list subsequently. The submitted documents will be evaluated and qualified bidders shall be included in the empanelment list. ANERT will not be responsible for any postal delays in receiving the bids. The validity of the list will be for two years. This list will be updated as and when required.

Thiruvananthapuram
12-10-2020

DIRECTOR

I.B – Abstract

Notification No.	<i>Notification No. ANERT-TECH/179/2020-TO(MJ)</i>
Superscription	Invitation of Expression of Interest for Empanelment of Agencies for supply/installation of solar powered Devices (below 1kW) in Kerala under Distributed Power generation (Off Grid)
Date of release of Invitation	12.10.2020
Date of submission EOI by the agencies	12:00 Noon, 3 th November 2020
Date and time of opening of bids	12.00 pm, 4 th November 2020
Place of opening of bids	Office of the Director, ANERT, Vikas Bhavan. PO, Thiruvananthapuram – 695 033, Kerala
Application fee	Rs.50,000/-
How to obtain the application form for submitting Eoi	To be downloaded from the website of ANERT www.anert.gov.in
Contact Details	
1. Technical Clarifications	Shri. Rajesh R, Programme Officer +91 9188119426, rajesh@anert.in
2. Tender Clarifications	Smt. Santhi A, projects@anert.in

Thiruvananthapuram

DIRECTOR

12-10-2020

I.C –Implementation plan

1. General

- 1.1 This Expression of Interest is being invited for preparing the list of Empanelled Agencies for installation of Solar devices (Below 1kW) in Kerala. Only the agencies listed through this process will be eligible for the implementation of projects with LSGD, State and Central Financial Assistance/ fund. The validity of the list will be two years. The list of Empanelled Agencies qualified through this process will be published for the information of proponents for installation of Solar devices (Below 1kW). The status of empanelment of any agencies in this list shall be terminated without notice, in case of any violations.
- 1.2 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 powered devices. This list will be the base list for the procurement of solar powered devices through ANERT. However, for Government funded programmes, necessary formalities based on store purchase rules / any other relevant guidelines in force have to be observed.
- 1.3 The installation of solar devices should be as per the technical compliance and installation practices of MNRE and ANERT. Any amendments/ modification issued from time to time, in this regard will be incorporated.
- 1.4 The Central & State Financial Assistance will be as per the guidelines of MNRE & ANERT respectively and its amendments from time to time.

2. ANERT and LSGD programmes

- 2.1 ANERT and LSGD Programmes shall include supply and installation of solar devices for any intended LSGD institutions within the State, which invite Quotation/ Tender for such supply at the proposed locations found suitable for the same. These supply/installations could be with or without Government Subsidy.
- 2.2 Price offers are invited for various solar products along with this EoI so as to enable time-bound supply and installation .The Agencies technically qualified for empanelment would be short - listed based on the price offered for supply of such products.
- 2.3 Deposit work/ Consultancy work entrusted to ANERT by various institutions / firms for the supply/ installation of Solar lantern, Solar LED street lighting systems and Solar Home lighting systems would be another category of ANERT programme. The Agencies empanelled in this process will be eligible for undertaking such work also and price

offers will be collected separately through a bidding process based on site specific conditions.

3. Scope of Work

- 3.1 On empanelment, the Empanelled Agency has to provide wide publicity and awareness to the public throughout Kerala regarding the programme.
- 3.2 All the Solar devices should have 5 year comprehensive warranty including battery.
- 3.3 Agency should have at least one service centre for two adjacent districts of Kerala. A service agreement in the given format along with copy of MoU / Agreement with the service centres has to be submitted along with EoI. Failure to fulfil this will make them ineligible from getting included in the list of Empanelled Agencies.
- 3.4. Any complaint or service call from the beneficiary has to be attended within 48 hours and the defective devices has to be repaired and reconditioned within 7 days.

4. Role of ANERT

- 4.1 Empanelment of agencies for the supply and installation of solar powered Devices
- 4.2 Listing of components to be used for installation, based on the technical compliance and service facility.
- 4.3 Listing of agencies with price for the solar devices as per requirement.
- 4.4 Monitoring the performance of agencies based on supply, installation and maintenance.
- 4.5 Co-ordinating with Agency and LSGD institutions for smooth and speedy implementation of the programme.

I.D – Bidding Procedure

5. Bid document

- 5.1 Bid documents can be downloaded from the website of ANERT (www.anert.gov.in). The bid document is in 3 parts, and has to be submitted in 3 separate envelopes as specified herein.

6. Bid submission

- 6.1 Bids shall be submitted in three envelopes named:
- i) Envelope A - Pre-qualification
 - ii) Envelope B - Technical Bid
Envelope B may consists of Technical bid for Empanelment for Solar devices
 - iii) Envelope C- Financial offer
Envelope –C may contain, financial offer for Empanelment for Solar devices
- 6.2 If the bid does not contain the offer in 3 separate sealed envelopes Envelope - A, Envelope-B and Envelop C, the bid will be summarily rejected.
- 6.3 Wherever necessary, the formats given may be prepared in separate sheets and attached with the submission. These attachments should be clearly indicated (with flags) in the main document (downloaded form).
- 6.4 Envelope –A (Pre-qualification), Envelope-B (Technical bid) , Envelope-C (Financial Offer) should be submitted separately in respective covers , serially numbered and tagged or filed as a bundle with Index and flagged in order, as detailed in next section.

7. Envelopes and contents

7.1 Envelope-A

Envelop A shall contain.

1. Covering letter for submission as per format (given in page 20) on firm's letterhead- **Flag-1**
2. Application fee of Rs.50000/-(Rupees fifty thousand only) as Demand Draft in favour of Director, ANERT payable at Thiruvananthapuram.- **Flag-2**

3. Attested copy of valid GST registration certificate. –**Flag-3**
4. Power of attorney for the authorized signatory to sign the documents.- **Flag-4**
5. Attested copy of registration certificate issued by registrar of companies or other competitive authority under which the firm is registered. **Flag-5**
6. Part-I of the document downloaded from website, duly filled, signed and stamped by the bidder on all pages. **Flag-6**
7. Undertaking by the Agency in stamp paper worth Rs.200/- as per Annexure I-B **Flag-7**
8. List of installed systems (Annexure I-C, I-D and I-E) along with certificate regarding satisfactory working from the customer **Flag- 8**
9. Documentary evidence such as MoU /Agreement with service centre. (Annexure- I-F). **Flag 9**
10. Addendum to the EoI document, if any, Sealed and signed by the bidder on all pages.**Flag-10**
11. Agency should have a minimum turnover of 1 crore per year for the last 3 years. Documentary evidence should be submitted with a pre-qualification document. Last 3 years' audited statement should be submitted with the document. **Flag-11**

The documents attached should be arranged in the above order with flags to identify the document easily. All the pages should be numbered serially.

7.2 Envelope-B

Envelope-B shall contain:

1. Technical bid submission form (Format II-A) fully filled up. Flag-1
2. Technical compliance certificates/ Test reports for solarl Lanterns (as per ANNEXURE II-B). Certificates/test report should be complete and valid as on date of submission Flag- 2
3. Technical compliance certificates/ Test reports for Soura Suvidha Kit (as per ANNEXURE II-B). Certificates/test report should be complete and valid as on date of submission Flag- 3
4. Technical compliance certificates / Test report for Solar Home lighting Systems (as per ANNEXURE II-B). Certificates should be complete and valid as on date of submission. Flag- 4
5. Technical compliance certificates / Test report for Solar Street lighting Systems (as per ANNEXURE II-B). Certificates should be complete and valid as on date of submission. Flag- 5
6. Part-II of the downloaded bid document duly filled, signed and stamped by the bidder on all pages. Flag-6.

7.3 Envelope-C

- C1- Price offer for Solar Lantern Programme (Format- III- A)
- C2- Price offer for Soura Suvidha Kit Programme (Format- III- B)
- C3- Price offer for Solar Home lighting system Programme (Format III-C)

C4- Price offer for Solar Street lighting Programme (Format III-D)

Superscription on envelopes

Envelope –A- Pre-Qualification

Notification No. ANERT-TECH/179/2020-TO(MJ) Dated 12.10.2020

Invitation of Expression of Interest for Empanelment of Agencies for Supply /installation of Solar Powered Devices (below 1kW) in Kerala under Distributed Power Generation. (Off Grid)

From

[Name and address of Agency]

To

THE DIRECTOR,
ANERT, Vikas Bhavan(PO) ,
Thiruvananthapuram Pin-695 033

Envelope B- Technical Bid(Solar powered Devices(Off grid) Programme)

Notification No. ANERT-TECH/179/2020-TO(MJ).Dated 12.10.2020

Invitation of Expression of Interest for Empanelment of Agencies for Supply /installation of Solar Powered Devices (below 1kW) in Kerala under Distributed Power Generation. (Off Grid)

From

[Name and address of Agency]

To

THE DIRECTOR,
ANERT, Vikas Bhavan(PO) ,
Thiruvananthapuram Pin-695 033

Envelope –C1-Financial Bid for Solar Lantern

Notification No. ANERT-TECH/179/2020-TO(MJ) Dated 12.10.2020

Invitation of Expression of Interest for Empanelment of Agencies for Supply /installation of Solar Powered Devices (below 1kW) in Kerala under Distributed Power Generation. (Off Grid)

From

[Name and address of Agency]

To

THE DIRECTOR,
ANERT, Vikas Bhavan(PO) ,
Thiruvananthapuram Pin-695 033

Envelope –C2-Financial Bid for Soura Suvidha Kit

Notification No. ANERT-TECH/179/2020-TO(MJ)

Dated 12.10.2020

Invitation of Expression of Interest for Empanelment of Agencies for Supply /installation of Solar Powered Devices (below 1kW) in Kerala under Distributed Power Generation. (Off Grid)

From

[Name and address of Agency]

To

THE DIRECTOR,
ANERT, Vikas Bhavan(PO) ,
Thiruvananthapuram Pin-695 033

Envelope –C3-Financial Bid for Solar Home lighting system.

Notification No. ANERT-TECH/179/2020-TO(MJ) Dated 12.10.2020

Invitation of Expression of Interest for Empanelment of Agencies for Supply /installation of Solar Powered Devices (below 1kW) in Kerala under Distributed Power Generation. (Off Grid)

From

[Name and address of Agency]

To

THE DIRECTOR,
ANERT, Vikas Bhavan(PO) ,
Thiruvananthapuram Pin-695 033

Envelope –C4-Financial Bid for Solar Street lighting system.

Notification No. ANERT-TECH/179/2020-TO(MJ) Dated 12.10.2020

Invitation of Expression of Interest for Empanelment of Agencies for Supply /installation of Solar Powered Devices (below 1kW) in Kerala under Distributed Power Generation. (Off Grid)

From

[Name and address of Agency]

To

THE DIRECTOR,
ANERT, Vikas Bhavan(PO) ,
Thiruvananthapuram Pin-695 033

- 7.4 All these three sealed covers shall be put in another cover and sealed, with superscription as follows:

Notification No. ANERT-TECH/179/2020-TO(MJ) Dated 12.10.2020

Invitation of Expression of Interest for Empanelment of Agencies for Supply /installation of Solar Powered Devices (below 1kW) in Kerala under Distributed Power Generation. (Off Grid)

From

[Name and address of Agency]

To

THE DIRECTOR,
ANERT, Vikas Bhavan(PO) ,
Thiruvananthapuram Pin-695 033

I.E – Empanelment Procedure

8 . Steps for empanelment-General

- 8.1 Expression of interest from pre-qualified agencies (agencies that satisfy prequalification criteria) as decided by ANERT will be invited.
- 8.2 The notification for expression of interest will be made available on ANERT's website
- 8.3 The bids should be received on or before 12 noon, 3rd November 2020 in the office of Director, ANERT. The bidders can also submit the bids / revised bids with all documents on or before 25th of December 2020, and on or before 25th of March, June, September and December of 2021.
- 8.4 The qualified agencies shall also enter into an agreement (on Kerala Stamp Paper) with ANERT agreeing to implement projects in Kerala including service facility.
- 8.5 For Deposit works executed by ANERT, separate price offers may be invited based on the site specific requirements. The list finalized by this empanelment process based on the technical qualification will be the base list for this process.

9 . Steps for empanelment –ANERT/LSGD programmes

- 9.1 In addition to (8 above), following additional steps are involved in the empanelment of agencies for undertaking projects initiated by ANERT/LSGD with Central Financial assistance/ State Financial assistance.
- 9.2 The price offers for the projects has to be submitted by the agencies in the prescribed format.
- 9.3 For the LSGD/Other Govt. Dept. works separate price bid may have to be submitted.
- 9.4 The price offers to be submitted in Govt Depts. and other institutions should not exceed the approved price of ANERT

The bench mark price for a configuration is listed below.

Solar Lantern

Module Capacity (Wp)	Bench mark cost(Rs)
10	3,300/-

Soura Suvidha Kit

Module Capacity (Wp)	Bench mark cost(Rs)
15	4,000/-

Solar Home Lighting System

Model	Benchmark cost(Rs)
Model-I	21,000/-
Model - II	31,000/-

The cost of wiring for more than 15m length, cost customisation of structure other than on a flat roof etc. are applicable, may be collected additionally, if required after convincing the beneficiary.

Solar Street Lighting System

	Module Capacity	Benchmark cost(Rs)
Model –I	60 W	27,000/-
Model – II	120 W	49,000/-
Model – III	200 W	70,000/-
Model - IV	500 W	1,80,000/-

10. General Terms and Conditions

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

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

10.3 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.

10.4. The Registration of Empanelled Agencies for the installation of solar devices all over Kerala shall be invited by ANERT and a list of qualified firms will be published, and will be intimated to Local self Government institutions along with the approved price list.

10.5 The Empanelment is mainly based on State wide. Agency should have at least one service centre for two adjacent districts in Kerala. Name, Address and contact number of the Service Centres are required to be furnished.

10.6 Each Agency should quote their allowable rate of each product / each model State wide inclusive of transportation, installation and taxes. The rate quoted should not exceed the benchmark cost specified for each category. The bidders can also submit the bids with all documents on or before 25th of December 2020 and before 25th of March, June, September and December 2021 and qualified bidders will be included in the list subsequently. In case if the above date is a public holiday, the next office working day will be considered for acceptance of the bids.

10.7. All the Empanelled Agencies should submit the details of installation in the prescribed format to concerned District ANERT office and ANERT HQ before 5th of every month. Renewal of Empanelment registration for every 2 year should be done based on this report.

I F- Eligibility Criteria

11 Pre-qualification Criteria

- 11.1 The Agency should have a **valid GST registration certificate in Kerala -Attested Copy has to be enclosed.**
- 11.2 Power of attorney for the signatory authorised to sign the tender document and future documentation during implementation process has to be submitted along with the EoI. 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 power of attorney has to be submitted.
- 11.3 Registration certificate of the firm 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.*
- 11.4 The Agency should submit the application fee of Rs. 50,000/- (Rupees fifty thousand only) (Nonrefundable) as Demand Draft in favour of Director, ANERT payable at Thiruvananthapuram. The firms which are already included in the Empanelment List for solar lanterns, solar home lighting systems and solar street lighting systems by remitting Rs.50,000/- are exempted from remitting the application fee.
- 11.5 The experience and financial criteria for each programme are listed below for the empanelment of solar devices.
- 11.7 Only offers that meet the above criteria shall be considered for technical evaluation.

12.Experience Criteria

Table 12-1: Solar Lanterns

Sl.No	Capacity of Solar Module	Experience
1	3- 15 W	Bidder must have supplied at least 500 Nos of solar lanterns as on date of submission of bid. Copy of work order and Bills/ Certification from the purchaser regarding the execution of order should be submitted as proof of executing the supply. 50% of the total quantity should be supplied to Government Department/agencies.

Table 12-2: Soura Suvidha Kit

Sl.No	Capacity of Solar Module	Experience
1	3- 15 W	The bidder must have supplied at least 500 nos. of Solar Kits (solar lanterns) as on date of submission of bid. Copy of work order/bills and certification from the purchaser regarding execution of the order should be submitted as proof of executing the supply.

Table 12-3: Solar Home lighting system

Sl.No	Capacity of Solar module	Experience
1	40W- 1kW	Bidder must have supplied/ installed at least 100 Nos of solar home lighting systems as on date of submission of bid. Copy of work order and Bills/ Certification from the purchaser regarding the execution of order should be submitted as proof of executing the supply and installation. 50% of the total quantity should be supplied to Government department/agencies.

Table12-4: Solar Street Lighting System

Sl.No	Capacity of Solar module	Experience
1	30W- 600W	Bidder must have supplied and installed at least 100 Nos of solar street lighting systems as on date of submission of documents. Copy of work order and Bills/ Certification from the purchaser regarding the execution of order should be submitted as a proof of executing the supply. 50% of the total quantity should be supplied to Government department/agencies.

13.Financial Criteria

- 13.1 The system installed should be insured against possible damages due to natural calamities, theft, burglary, electrical and mechanical breakdown etc. during the warrantee period and the cost for the same has to be included in the financial bid of the agency. The documentation in this regard has to be done by the agency.
- 13.2 The price quoted by the bidder for each configuration shall be all inclusive of taxes (GST) and duties, and shall cover the pre-installation survey report, transportation, handling charges, supply and commissioning of a standard installation and cost of insurance. In the case of Solar Home lighting system, Cabling of 15metres length each for AC and DC side shall be included in the costing. If the structure requires additional customization 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.
- 13.3 Empanelment of agencies will be made for each SPV Device separately. For a particular solar device, **the agencies which quote less than or equal to the bench mark cost will be considered.**
- 13.4 For other works executed by ANERT, separate price bids will be invited based on the site specific requirements. The list finalised by this empanelment process based on the technical qualification will be the base list for this process.
- 13.5 The collection of the beneficiary share or the system cost and the warranty agreement for the system shall be between the beneficiary and the Empanelled Agency that supplied, installed and commissioned the system.

ANERT will not be responsible for delays in payment of beneficiary share by the beneficiary.

- 13.6 If the Empanelled Agency claim any subsidy/incentive from MNRE/ any other organisation for the projects sanctioned by ANERT the same subsidy amount should be transferred to the beneficiary. An undertaking to this effect has to be submitted with each completion report.

ANNEXURE I A - Format for Covering Letter

Sir,

I/We hereby express my/our interest to be included as an Empanelled Agency for the Supply/Installation Solar Powered Devices (below 1kWp) in Kerala, as per the terms and conditions and the technical specifications, decided by Agency for New & Renewable Energy Research and 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.

I am/we are remitting herewith the required amount of Rs. 50000/- as application fee as DD No. Dateddrawn on bank in favour of Director, ANERT payable at Thiruvananthapuram.

Yours faithfully

Place:

Signature

Name

Date:

Designation

(Office Seal)

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

Annexure I B – Undertaking by the agency

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

I (Name, Designation) authorised signatory of
..... (Name and full
address of the EPC contractor /Public sector undertaking) hereby undertake that

1. The solar devices supplied/installed in various Govt. departments in Kerala shall be as per technical specification stipulated by ANERT/ MNRE . The wiring and installation shall be done as per the recommended installation practices and by using components as per the prescribed Technical Specifications.
2. All the Solar Devices supplied and installed should be given warranty for 5 years.
3. Solar modules will have a performance warranty of 90% of rated output at the end of 10 years and 80% of the rated output at the end of 25 years.
5. The rates quoted for solar home lighting system and solar street lights include transportation and installation.
6. At least one service centre will be maintained for two districts. List of service centres provided are true and correct.
7. **No alteration in the downloaded document is made. If any alterations are detected at any stage, my offer is liable to be rejected.**
8. All the components of solar devices supplied should be approved by ANERT.
9. The rate of solar devices quoted in LSG institutions, Government departments and other beneficiaries will not exceed the approved empanelment rate of ANERT.
10. All the above terms and conditions are acceptable to me/us.

Date

Signature of the authorized signatory

Name

Designation

(Office Seal)

Annexure I -C - Details of Solar Lanterns Supplied

Sl. No.	Capacity of lantern PV module	Name & address of beneficiary	Mobile/ Land Phone No.	Email ID	Total No of systems supplied

It is certified that the details furnished above are true and correct to my knowledge and belief and all the systems are installed / supplied by our agency.

Date

Signature of the authorized signatory
Name
Designation

(Office Seal)

Annexure I-D –Details of Solar HLS Installed

Sl. No.	Capacity of the PV module installed	Name and Address of beneficiary	Mobile/ Land Phone No.	Email ID	Nos. of systems supplied/ installed
				Total	

It is certified that the details furnished above are true and correct to my knowledge and belief and all the systems are installed by our agency.

Date

Signature of the authorised signatory

Name

Designation

(Office Seal)

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for supply/installation of solar powered devices (below 1kW)
in Kerala under Distributed Power generation. (Off Grid)

ANERT-TECH/179/2020-TO(MJ)

Dated 12.10.2020

PART-II



Agency for Non-conventional Energy & Rural Technology

Vikas Bhavan (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

II A- Technical Specification of Devices

14. Technical Qualification Criteria

- 14.1 The system installed should conform to the minimum technical requirements by ANERT (undertaking by the agency to be submitted as per Annexure I-B.)
- 14.2 All the components of the system should comply with the minimum technical requirements of the ANERT. Technical compliance certificate/ Test report from the approved laboratory of MNRE, NABL, IEC accredited Test Centres has to be submitted for the complete system including module & battery of all the models and brands proposed. The certificate should be valid as on the date of submission of bid.
- 14.3 The Agency should have completed the installation of at least an aggregated minimum capacity as per the experience criteria (Table 12-1, 2, 3 and 4) for each category of empanelment. The list of installed systems should be provided in the enclosed format (Annexure I-C, I-D, I-E) along with certificate of satisfactory performance issued by the user.

15. Technical Specifications for Solar Lantern

A Solar Lantern is a portable lighting device consisting of a PV module, battery, lamp, and electronics. Battery, lamp, optics and electronics are placed in a suitable housing, made of metal or plastic or fiber glass. The Solar lantern is suitable for either indoor or outdoor lighting, covering a full range of 360 degrees.

PV module converts sun light into electricity, charges the battery which powers the luminaire. Luminaire consists of White Light Emitting Diode (W-LED), a solid state device which emits light when an electric current passes through it.

15.1 BROAD PERFORMANCE SPECIFICATIONS

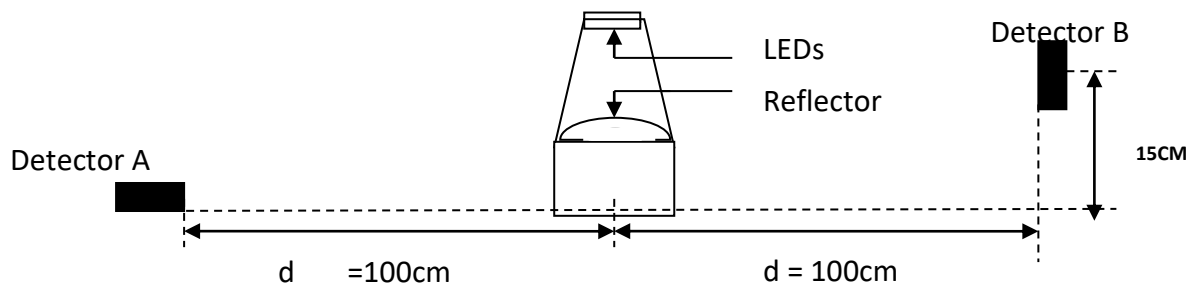
The broad performance specifications of a W-LED light source based solar lantern system are given below:

PV Module	10Wp under STC
Battery	84 Wh minimum, Lithium Ferro Phosphate battery (IEC/IS test certificate should be submitted with the document.)
LED	150 Lumen/watt W-LED's (as per LM- 80 certificate) luminaire, top mounted facing down, dispersed beam, soothing to eyes without dark patches with the use of proper dome shaped reflector. Maximum power consumption of luminaire should be 5 watts (Including driver). Minimum power consumption of the LED's should be 4 watts.

Light Output Minimum level of illuminance from W-LED lantern should be as follows

S No.	Horizontal distance (d) of detector from centre of light source (cm)	Illumination level when detector[A] is placed horizontally on the same plane as lantern base.(Lux)	Illumination level when detector[B] is placed vertically at a height of 15cm from plane of lantern base (Lux)
1	100	10	40

Test certificate regarding light output from MNRE approved or NABL accredited test centres should be submitted with tender.



Note : The shape/ design of Lantern is indicative only.

Duty cycle 4 hours a day under average daily insolation of 5.5 kWh/ sq. m on a horizontal surface or 12 operating hours per permissible discharge
 Facility for mobile phone charging: USB port for mobile charging to be provided. Duty cycle for lighting will be adjusted accordingly.

15.2 TECHNICAL DETAILS

PV MODULE

- (i) Indigenously manufactured PV modules should be used in the solar lantern.
- (ii) **The PV module should have crystalline silicon solar cells, and should have a test certificate conforming to IEC 61215 Edition II / BIS 14286** from an NABL or IECQ accredited Laboratory. In case the certificate for the offered module is not available, a test certificate for higher capacity module of same make and series produced by the same PV module manufacturer should be available. Test certificate should be submitted with tender.
- (iii) The PV module must have a minimum of 10 Wp at a load voltage* of 16.40 V under the standard test conditions (STC) of measurement.
- (iv) The open circuit voltage* of the PV modules under STC should be at least 21.0 Volts.
- (v) **The module efficiency should not be less than 10%.**
- (vi) The terminal box on the module should have a provision of opening it for replacing the cable, if required.
- (vii) There should preferably be an arrangement (stand) for mounting the module at an optimum angle in the direction facing the sun.
- (viii) A foil/ strip containing the following details should be fixed inside the module so as to be

clearly visible from the front side:-

- a) Name of the Manufacturer and/ or distinctive Logo
- b) Model and/ or Type No.
- c) Serial No.
- d) Year of manufacture

- (ix) The cable connecting module to the lantern should be good quality 2 core, 1 sq. mm double sheathed copper cable suitable for outdoor use and having a length of minimum 10 metres.

**The load and open circuit voltage conditions of the PV module are not applicable for the system having MPPT.*

BATTERY

- (i) Minimum 84 Wh capacity), Lithium Ferro Phosphate battery (**IEC 62133 test certificate should be submitted with the document**)

LIGHT SOURCE

- i. The light source will be of White Light Emitting Diode (W-LED) type, minimum Luminous efficacy 150 Lumen/watt.
- ii. The colour temperature of W-LED(s) used in the system should be in the range of 5000°K –6500°K.
- iii. W-LED(s) should not emit ultra violet light.
- iv. The light output from the W - LED should be constant throughout the duty cycle.
- v. **LM 80 test certificate of the LED should be submitted with the document.**

ELECTRONICS

- (i) Efficiency of the electronic system should be at least 85%.
- (ii) Electronics should have temperature compensation for proper charging of the battery throughout the year.
- (iii) The idle current should be less than 1 mA
- (iv) The PCB containing the electronics should be capable of solder free installation and replacement.
- (v) Necessary switches suitable for DC use and other protections should be provided.
- (vi) The system should have a USB port for mobile charging
- (vii) A dual sheathed 2 core copper cable of 1 sq.mm and minimum length of 10 metre should be provided for inter-connection between the module and the lantern.

ELECTRONIC PROTECTIONS

- (i) Adequate protection is to be incorporated for “No Load” condition, e.g. when the lamp is removed and the lantern is switched ON.
- (ii) The system should have protection against battery overcharge and deep discharge conditions.

- (iii) The load reconnect should be provided at around 80% of the battery capacity status.
- (iv) Adequate protection should be provided against battery reverse polarity.
- (v) A fuse should be provided to protect against short circuit conditions.
- (vi) Protection for avoiding reverse flow of current through the PV module should be provided.
- (vii) During the charging, lamp cannot be Switched "ON".

INDICATORS

- The system should have two indicators, green and red.
- The green indicator should indicate the charging under progress and should glow only when the charging is taking place. It should stop glowing when the battery is fully charged.
- Red indicator should indicate the battery "Load Cut Off" condition

15.3 QUALITY AND WARRANTY

- (i) The complete Solar lantern unit with W-LED including battery will be warranted for five years.
- (ii) The Warrantee/ Guarantee Card to be supplied with the Solar Lantern must contain the details of the system supplied.

15.4 OTHER FEATURES

An Operation, Instruction and Maintenance Manual, in English and Malayalam, should be provided with the Solar Lantern. The following minimum details must be provided in the Manual:

- a. Basic principles of photo voltaics.
- b. A small write-up (with a block diagram) on Solar Lanterns - its components, PV module, battery, electronics and luminaire and expected performance.
- c. Significance of indicators.
- d. Type, Model number, Voltage, capacity of the battery, used in the system.
- e. The make, model number, country of origin and technical characteristics (including IESNA LM-80 report) of W -LEDs used in the lighting system.
- f. Clear instructions on mounting, operation, regular maintenance and trouble shooting of the Solar Lantern.
- g. Instructions on replacement of battery.
- h. DO's and DONT's.
- i. Name and address of the contact person for repair and maintenance during the warranty.

16. Technical specifications for Soura Suvudha Kit.

Soura Suvudha Kit is a portable lighting device consisting of a PV module, lithium ferro-phosphate battery, LED lamp, FM radio, mobile phone charging port and electronics. Battery, LED lamp optics and electronics should be enclosed in a suitable housing, made of ABS or plastic

or fiber glass with handle for easy carrying. The Soura Suvidha Kit is suitable for either indoor or outdoor lighting, covering a full range of 360 degrees illuminance.

PV module converts sunlight into electricity, charges the battery which powers the luminaire. Luminaire consists of White Light Emitting Diode (W-LED), a solid state device which emits light when an electric current passes through it.

1. BROAD PERFORMANCE SPECIFICATIONS

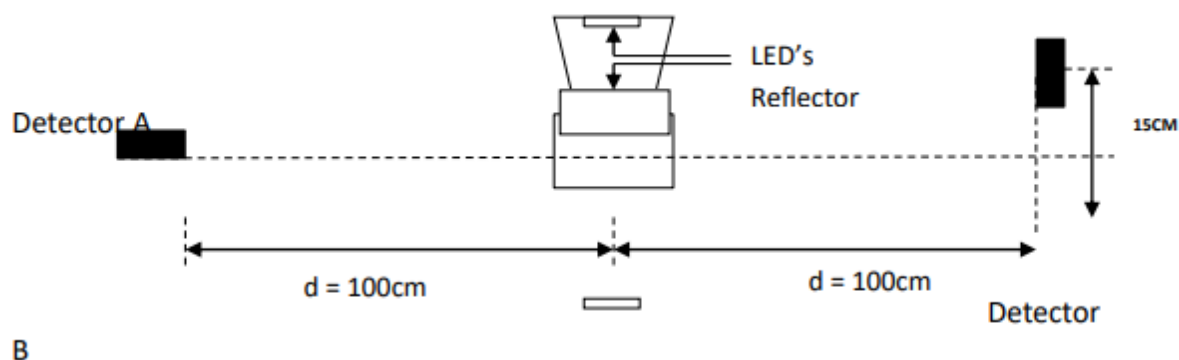
The broad performance specifications of a W-LED light source based soura suvidha kit are given below:

PV Module	15Wp under STC
Battery	84 Wh(minimum), Lithium Ferro Phosphate battery
LED	150 Lumen/watt or higher W-LEDs (as per LM- 80 certificate) luminaire, top mounted facing down, dispersed beam, soothing to eyes without dark patches, with the use of proper dome shaped reflector. Maximum power consumption of luminaire should be 4 watts(Including driver).

Light Output: Minimum level of illuminance from W-LED lantern should be as follows.

S No.	Horizontal distance (d) of detector from centre of light source (Feet)	Illumination level when detector [A] is placed horizontally on the same plane as lantern base.(Lux)	Illumination level when detector [B] is placed vertically at a height of 15cm from plane of lantern base (Lux)
1	1	250	300
2	2	45	125
3	3	17	55
4	4	4	28
5	5	2.5	16

Test certificate regarding light output from MNRE approved or NABL accredited test centres should be submitted with tender.



Note : The shape/ design of soura suvidha kit is indicative only.

PV MODULE

- I. Indigenously manufactured PV modules should be used in the Soura Suvidha kit.
- II. The PV module should have crystalline silicon solar cells, and should have a test certificate conforming to IEC 61215 Edition II / BIS 14286 from an NABL or IECQ accredited Laboratory. In case the certificate for the offered module is not available, a test certificate for higher capacity module of same make and series produced by the same PV module manufacturer should be available. Test certificate should be submitted with tender.
- III. The PV module must have a minimum of 15 Wp at a load voltage* of 16.40 V under the standard test conditions (STC) of measurement.
- IV. The open circuit voltage* of the PV modules under STC should be at least 21.0 Volts.
- V. The module efficiency should not be less than 10%.
- VI. The terminal box on the module should have a provision of opening it for replacing the cable, if required.
- VII. There should preferably be an arrangement (stand) for mounting the module at an optimum angle in the direction facing the sun.
- VIII. A foil/ strip containing the following details should be fixed inside the module so as to be clearly visible from the front side:-
 - a) Name of the Manufacturer and/ or distinctive Logo
 - b) Model and/ or Type No.
 - c) Serial No.
 - d) Year of manufacture
- IX. The cable connecting module to the lantern should be good quality 2 core, 1 sq. mm double sheathed copper cable suitable for outdoor use and having a length of minimum 10 metres.

BATTERY

Capacity: 84 Wh (minimum), Lithium Ferro Phosphate battery (IEC /IS/international test certificate should be submitted with the document)

LIGHT SOURCE

1. The light source will be of White Light Emitting Diode (W-LED) type, minimum Luminous efficacy 150 Lumen/watt
2. The colour temperature of W-LED(s) used in the system should be in the range of 5500°K – 6500°K.
3. W-LED(s) should not emit ultraviolet light.
4. The light output from the W - LED should be constant throughout the duty cycle.
5. LM 80 test certificate of the LED should be submitted with the document.

ELECTRONICS

- I. Efficiency of the electronic system should be at least 85%.
- II. Electronics should have temperature compensation for proper charging of the battery throughout the year.
- III. The PCB containing the electronics should be capable of solder free installation and replacement.
- IV. Necessary switches suitable for DC use and other protections should be provided.
- V. A dual sheathed 2 core copper cable of 1 sq.mm size and minimum length of 10 metre should be provided for inter-connection between the module and the lantern.

ELECTRONIC PROTECTIONS

- a. Adequate protection is to be incorporated for “No Load” condition, e.g. when the lamp is removed and the lantern is switched ON.
- b. The system should have protection against battery overcharge and deep discharge conditions.
- c. The load reconnect should be provided at around 80% of the battery capacity status.
- d. Adequate protection should be provided against battery reverse polarity.
- e. A fuse should be provided to protect against short circuit conditions.
- f. Protection for avoiding reverse flow of current through the PV module should be provided.
- g. During the charging, lamp cannot be Switched “ON”.

INDICATORS

- The system should have two indicators, green and red.
- The green indicator should indicate the charging under progress and should glow only when the charging is taking place. It should stop glowing when the battery is fully charged.
- Red indicator should indicate the battery “Load Cut Off” condition

FM RADIO

FM radio with antenna should be provided in the lantern

MOBILE PHONE CHARGING PORT

5.1 V, 2A USB port should be provided for charging mobile phone

6. QUALITY AND WARRANTY

- I. The W-LED luminaire and electronics, Battery, Solar PV Module should be warranted for five years.
- II. The FM Radio and electronic circuit should be warranted for two years
- III. The Warranty/ Guarantee Card to be supplied with the system must contain the details of the system supplied.

7. OTHER FEATURES

An Operation, Instruction and Maintenance Manual, in English and Malayalam, should be

provided with the Soura Suvidha Kit. The following minimum details must be provided in the Manual:

- a) Basic principles of solar photo voltaics.
- b) A small write-up (with a block diagram) on the device, its components, PV module, battery, electronics and luminaire and expected performance.
- c) Significance of indicators.
- d) Type, model number, voltage, capacity of the battery, used in the system.
- e) The make, model number, country of origin and technical characteristics(including IESNA LM-80 report) of W -LEDs used in the lighting system.
- f) Clear instructions on mounting, operation, regular maintenance and trouble shooting of the device.
- g) Instructions on replacement of battery.
- h) DO's and DONT's.
- i) Name and address of the contact person for repair and maintenance during the warranty.

17. Technical Specification for Solar Home Lighting System

17. 1. WHITE LED BASED SOLAR HOME LIGHTING SYSTEM . Model .1

A Solar Home Lighting System provides comfortable level of illumination in two or three rooms of a house. The system consists of a PV module, Lithium Ferro Phosphate battery, three LED luminaires, a DC fan, charge controller and a DC sockets. The system could also be used to power a 12-V DC television along with the W-LED Lamps. There should be provision for mobile phone charging. PV module converts sun light into electricity, charges the battery which powers the luminaires and fan. Luminaire consists of White Light Emitting Diode (W-LED), a solid state device which emits light when an electric current passes through it.

BROAD PERFORMANCE SPECIFICATIONS

The broad performance specifications of a W-LED light source based solar home lighting system are given below:

SPV Module	: 75 W _p under STC
Battery	: Minimum 500 Wh capacity, Lithium Ferro Phosphate battery (IEC 62133 test certificate should be submitted with the document)
Light Source	: 5 W White Light Emitting Diode (W-LED)- 3 Nos
DC Fan	: A DC fan of power rating in the range of 18 W to 20 W to be provided.
Light Output	: Minimum 25 Lux when measured at the periphery of 2.5 metre diameter from a height of 2.5 metre. The illumination should be

uniform without Dark Bands or abrupt variations and soothing to the eyes. Higher output would be preferred.

Mounting of light : Wall or ceiling

Electronics : Minimum 85 % efficiency

Average duty cycle : Luminaires and fan :5 hours a day and TV: 2 hours a day under average daily insolation of 5.5 kWh/ sq.m. on a horizontal surface.

Facility for mobile phone charging: USB port for mobile phone charging

The system should have a socket to provide power for a 12V DC TV set (TV set is excluded from the system to be supplied).

Autonomy : Minimum 10 operating hours without TV per permissible discharge

TECHNICAL DETAILS – SPV Module

- (i) Indigenously manufactured PV modules should be used
- (ii) The PV modules should have crystalline silicon solar cells, and should have humidity, freeze and damp heat tests certificate conforming to IEC 61215 Edition II / BIS 14286 from an NABL or IECQ accredited Laboratory. **Copy of test certificate to be provided along with the bid**
- (iii) The power output of the module(s) under STC should be 75 Wp minimum.
- (iv) The Load voltage* of 16.40 V for 12 V battery or appropriate voltage for charging of battery used, under the standard test conditions (STC) of measurement.
- (v) The module efficiency should not be less than 12%.
- (vi) The terminal box on the module should have a provision for opening, for replacing the cable, if required.
- (vii) There should be a Name Plate fixed inside the module which will give:
 - a. Name of the Manufacturer or Distinctive Logo.
 - b. Model Number
 - c. Serial Number
 - d. Year of manufacture
- (viii) A distinctive serial number starting with NSM will be engraved on the frame of the module or screen printed on the tedlar sheet of the module.

*The Load voltage conditions of the PV modules are not applicable for the system having MPPT.

BATTERY

- (i) Lithium Ferro Phosphate battery bank of minimum 500 Wh capacity to be used
- (ii) 80 % of the rated capacity of the battery should be between fully charged & load cut off conditions.
- (iii) Battery should conform to the latest BIS/ International standards for capacity.
Copy of test report of the battery to be provided along with the bid

LIGHT SOURCE

- (i) The light source will be of white LED type.
- (ii) The colour temperature of W-LEDs used in the system should be in the range of 5500°K–6500°K.
- (iii) LEDs should not emit ultraviolet light.
- (iv) The light output from the W-LED light source should be constant throughout the duty cycle.
- (v) The lamps should be housed in an assembly suitable for indoor use.
- (vi) **Attested copy of IESNA LM-80 test report of W-LEDs used in the luminaire to be provided along with the bid document.**

ELECTRONICS

- i. The total electronic efficiency should be at least 85 %.
- ii. Electronics should have temperature compensation for proper charging of the battery throughout the year. The idle current should be less than 5 mA.
- iii. The voltage drop from module terminals to the battery terminals should not exceed *0.8 volts* including the drop across the diode and the cable when measured at maximum charging current.
- iv. The PCB containing the electronics should be capable of solder free installation and replacement.
- v. A dual sheathed 2 core copper cable of 1 sq.mm size and minimum length of 10 metre should be provided for inter-connection between the module and the charge controller. Two core cable of minimum length 20 metre to be used for connecting the loads.
- vi. Switches suitable for DC use and fuses should be provided.
- vii. The system should have a USB port for mobile charging
- viii. The system should have a socket to provide power for a 12V DC LED TV set of power rating below 30 watts.

ELECTRONIC PROTECTIONS

- (i) Adequate protection is to be incorporated under “No Load” condition, e.g.

when the lamps are removed and the system is switched ON.

- (ii) The system should have protection against battery overcharge and deep discharge conditions.
- (iii) Load reconnect should be provided at 80% of the battery capacity status.
- (iv) Adequate protection should be provided against battery reverse polarity.
- (v) Fuses should be provided to protect against short circuit conditions.
- (vi) Protection against reverse flow of current through the PV module(s) should be provided.

MECHANICAL COMPONENTS

- (i) Corrosion resistant metallic frame structure (Aluminium / GI) should be provided to hold the SPV module.
- (ii) The frame structure should have provision to adjust its angle of inclination to the horizontal, so that it can be installed at the specified tilt angle.
- (iii) Light source should be either for wall mounted or ceiling mounted or can be hung from the ceiling in a stable manner, as per site requirements.
- (iv) A vented plastic/ wooden/ metallic box with acid proof corrosion resistant paint for housing the storage battery indoors should be provided.

INDICATORS

- The system should have two indicators, green and red.
- The green indicator should indicate the charging under progress and should glow only when the charging is taking place. It should stop glowing when the battery is fully charged.
- Red indicator should indicate the battery "Load Cut Off" condition

QUALITY AND WARRANTY

- (i) The Solar home lighting system including luminaires, control unit, fan and battery will be warranted for a period of five years from the date of supply.
- (ii) The PV module(s) will be warranted for a minimum period of 25 years from the date of supply. PV modules used in Solar Home Lighting System must be warranted for their output peak watt capacity, which should not be less than 90% at the end of Ten (10) years and 80% at the end of Twenty five (25) years.
- (iii) The Warranty Card to be supplied with the system must contain the details of the system. The manufacturers can also provide additional information

about the system and conditions of warranty as necessary.

OPERATION and MAINTENANCE MANUAL

An Operation, Instruction and Maintenance Manual, in English and Malayalam, should be provided with the Solar Home Lighting System. The following minimum details must be provided in the Manual:

- Basic principles of photo voltaics.
- A small write-up (with a block diagram) on Solar Home Lighting System - its components, PV module, battery, electronics and luminaire and expected performance.
- Significance of indicators.
- Type, model number, voltage & capacity of the battery, used in the system.
- The make, model number, country of origin and technical characteristics (including IESNA LM-80 report) of W-LEDs used in the lighting system must be indicated in the manual.
- Clear instructions about mounting of PV module(s).
- Clear instructions on regular maintenance and trouble shooting of the Solar Home Lighting System.
- DO's and DONT's.
- Name and address of the contact person for repair and maintenance.

17. 2. WHITE LED BASED SOLAR HOME LIGHTING SYSTEM - Model .II

Technical specifications are the same as that for White LED based solar home lighting system except the following:

Instead of Lithium-Ferro Phosphate battery of capacity 500 AH, Lead acid SMF VRLA or Gel battery of capacity 12V, 60AH @ C/10 will be used.

Battery should conform to the latest BIS/ IEC standards for capacity. **Copy of test report of the battery to be provided along with the bid**

Autonomy :Minimum 14 operating hours without TV per permissible discharge

Average duty cycle : Luminaires and fan :5 hours a day and TV: 5 hours a day under average daily insolation of 5.5 kWh/ sq.m. on a horizontal surface.

80 % of the rated capacity of the battery should be between fully charged & load cut off conditions.

18. Technical specification for Solar Street Lighting Systems

WHITE LED BASED SOLAR STREET LIGHTING SYSTEM

A stand alone solar photovoltaic street lighting system is an outdoor lighting unit used for illuminating a street or an open area. A solar street lighting system consists of a PV Module, control electronics, storage battery, W-LED based Luminaire, inter connecting cables and module mounting pole including hardware and battery box. The luminaire is based on White Light Emitting Diode (W-LED), a solid state device which emits light when electric current passes through it. The luminaire is mounted on the pole at a suitable angle to maximize illumination on the ground. The PV module is placed at the top of the pole facing South direction at an inclination of 10 degree from horizontal. The system should be installed at a place where direct sunlight falls on the PV modules without any hindrance. There should not be any shadows falling on the PV modules during day time. The battery placed inside the battery box is charged by electricity generated by the PV module during day time and the luminaire provides light from dusk to dawn. The system lights at dusk and switches off at dawn automatically.

There are four models of LED based solar street lighting systems.

18.1 Solar Street Lighting System Model 1

Solar Module	60 Wp
Battery (Lithium Ferro Phosphate)	300 Wh (+20% permissible)
LED Luminaire	10 W (+20% permissible)
Pole (GI pole coated with rubber paint)	Height -4m above ground level, Dia -3"

18.2 Solar Street Lighting System Model 2

Solar Module	120 Wp
Battery (Lithium Ferro Phosphate)	700 Wh (+20% permissible)
LED Luminaire	20 W (+20% permissible)
Pole (GI pole coated with rubber paint)	Height -4m above ground level, Dia -4"

18.3 Solar Street Lighting System Model 3

Solar Module	200Wp
Battery (Lithium Ferro Phosphate)	1100 Wh (+20% permissible)
LED Luminaire	36W (+20% permissible)

DUTY CYCLE

The W-LED solar street lighting system should be designed to operate from dusk to dawn, under average daily insolation of 5.5 kWh /sq.m. on a horizontal surface.

LUMINAIRE

The light source will be a white LED type. Single lamp or multiple lamps can be used. The colour temperature of white LED used in the system should be in the range of 5000°K–6500°K. Use of LEDs which emits ultraviolet light is not permitted.

The light output from the white LED light source should be constant throughout the duty cycle.

The lamps should be housed in an assembly suitable for outdoor use. The temperature of heat sink should not increase more than 20°C above ambient temperature during the dusk to dawn operation.

The make, model number, country of origin and technical characteristics (**including LM-80, LM-79 report**) of white LEDs/LED Luminaire used in the lighting system must be furnished. The enclosure of luminary should be with **IP65** protection.

BATTERY

Lithium Ferro Phosphate Battery.

Battery should conform to the latest BIS/International standards (IEC 62133).

- Battery should have minimum 5 year warranty.
- The battery should be fixed at a height of 3 metre from ground level on the pole in a battery box with IP65 protection.

PV MODULE

- The PV module(s) should be indigenously manufactured and contain crystalline silicon cells. It required to have certificate for the supplied PV module as per IEC 61215, IEC 61730 and IEC 61701 specifications or equivalent BIS specifications.
- The power output of the PV module must be reported under standard test conditions (STC) at 16.4 volt load voltage. I-V curve of the sample module should be submitted.
- The open circuit voltage of the PV modules under STC should be at least 21.0 volt.
- The PV module efficiency should be above 12 %.
- The terminal box on the module should have a provision for opening for replacing the cable, if required.
- Each PV module should be provided with RF identification tag. The following information must be mentioned in the RFID used on each module (This can be

inside or outside the laminate, but must be able to withstand harsh environmental conditions.)

- a) Name of the Manufacturer or distinctive Logo
- b) Model or Type No.
- c) Serial No.
- d) Year of make

ELECTRONICS, INCLUDING PROTECTIONS

- The total electronic efficiency should be at least 85%.
- Electronics should operate at 12 V/24V/36V/48V and should have temperature compensation for proper charging of the battery throughout the year.
- The light output should remain constant with variations in the battery voltages.
- The system should have protection against battery overcharge and deep discharge conditions.
- Fuse should be provided to protect against short circuit conditions.
- A blocking diode should be provided as part of the electronics, to prevent reverse flow of current through the PV module(s). In case such a diode is not provided with the PV module, full protection against open circuit, accidental short circuit and reverse polarity should be provided.
- The charge controller should be incorporate with MPPT/PWM.
- Adequate protection to be provided against battery reverse polarity
- Adequate protection is to be incorporated under No Load conditions.
- Load reconnect should be provided at 80% of the battery capacity status.
- Necessary lengths of wires / cables and appropriate fuses should be provided.

MECHANICAL COMPONENTS AND INSTALLATION

Aluminum frame structure, with anodizing to be fixed on the pole to hold the SPV module. The frame structure should be inclined at an angle of 10 degree from the horizontal to mount the PV module. The luminaire should be fixed to the pole on aluminium arm. The Aluminum arm for holding the luminaire should have suitable length and should be set at a suitable angle to maximize lux of desired level over the specified area.

A vented FRP/ABS/Alluminium box (IP65 protection) with suitable structure to be fixed on the pole for housing the storage battery with locking arrangement facility .

All mechanical metallic parts shall be of aluminium/ stainless steel of suitable thickness to withstand loads including wind loads and should have good aesthetic appearance. All

external parts should be Aluminium/Stainless Steel and should be replaced during the warranty period in case of any defects. All nuts and bolts used should be of stainless steel.

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 of GI with coated with rubber paint.

The foundation plate should be fixed 150 mm above ground level.

INDICATORS

- The system should have two indicators, green and red.
- The green indicator should indicate the charging under progress and should glow only when the charging is taking place. It should stop glowing when the battery is fully charged.
- Red indicator should indicate the battery “Load Cut Off” condition

OTHER FEATURES

There will be a Name Plate (12” X 6”) on the pole(2 m above ground level), which should be displayed with the following details

- a) Name of the supplier.
- b) Phone number of service centres.
- c) Date of installation.
- d) Name of Implementing agency.

Quality stickers with post number will have to be provided on the pole .

QUALITY AND WARRANTY

Components and parts used in White LED solar street lighting systems should conform to the latest BIS/ International specifications, wherever such specifications are available and applicable. A copy of the test report/ certificate stating conformity of BIS/ International standards must be submitted.

White LED solar street lighting system including the battery will be warranted for a period of 5 years from the date of commissioning .

The PV module used should be warranted for its output peak watt capacity, which should not be less than 90% at the end of 10 (ten) years and 80% at the end of 25 (twenty five) years.

DOCUMENTATION

An Operation, Instruction and Maintenance Manual, in English and Malayalam, should be provided with the solar street lighting system. Besides other information the Manual should contain the following minimum details:

- a) About Photo Voltaics. A small write up (with a block diagram) on PV Module, electronics, lamps and battery.
- b) About White LED solar street lighting system - its components and expected performance The make, model number, country of origin and technical characteristics of W-LEDs should be stated in the product data sheet
- c) Clear instructions about mounting of pole, grouting details, fixing of PV module, battery and luminaire., clear wiring instructions with line diagram
- d) About significance of indicators
- e) DO's and DONT's
- f) Clear instructions on regular maintenance and trouble shooting of the system
- g) Name and address of the person or service centre to be contacted in case of failure or complaint.

18.6. Special conditions for solar LED Street Lighting systems

Total system warranty (including luminaire and battery) should be 5 years from date of installation.

- Solar module must have IEC 61215, IEC 61730 & IEC 61701 test certificates or equivalent BIS standard. Copy of the test certificate should be attached with the tender document (for the quoted model of module).
- Lithium ferro phosphate battery must have 5 year warranty. Copy of certificate of IEC 62133/equivalent BIS standard should be provided with the tender document.
- Light unit must have IESNA LM 80 report for LED and LM 79 report for luminary. Copy of the report should be attached with the tender document.

ANNEXURE II.A– Technical bid submission form for solar powered Devices (below 1kW)

(To be submitted by all agencies)

1.	Name of the bidder as in registration certificate (Copy of registration certificate to be enclosed)		Page no. in the offer document
2.	Address in full		Page no. in the offer document
3.	Contact Details	Mobile Phone	
		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.	Name of the authorized signatory (Power of attorney to be enclosed)		Page no. in the offer document
6.	Designation of the authorised signatory		
7.	Service centres in Kerala There should be at least one service centre for two districts. (Undertaking in stamp paper worth Rs.200/-to be submitted)		Page no. in the offer document

ANNEXURE II.B - Details of System Components for Solar powered devices to be submitted by agencies participating in “Empanelment” Programme implemented by ANERT

19. Solar Lantern

21.1	Solar Module					
			IEC61215/IS 14286	IEC61730	IEC61701	
21.1.1	<u>Option-1</u>	1. Make				Page no. in the offer Document
		2. Model No				
		3. Wattage				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			IEC61215/IS 14286	IEC61730	IEC61701	
21.1.2	Option-2	1. Make				Page no. in the offer document
		2. Model No				
		3. Wattage				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			IEC61215/IS14286	IEC61730	IEC61701	
21.2	Solar LED Lantern(Test certificate should be submitted as per ANERT specification)					
			Module	Battery	Luminaire	
21.2.1	<u>Option -1</u>	1. Make				Page no. in the offer document
		2. Model No				
		3. Capacity				

		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			Module	Battery	Luminary	
21.2.2	<u>Option -2</u>	1. Make				Page no. in the offer document
		2. Model No				
		3. Capacity				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				

I have read the technical requirements, warranty conditions and the details furnished above are true, 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)

NOTE: If any more makes and models of system components are proposed, extra pages may be used.

20. Soura Suvidha Kit.

21.1	Solar Module					
			IEC61215/IS 14286	IEC61730	IEC61701	
21.1.1	Option-1	1. Make				Page no. in the offer Docum ent
		2. Model No				
		3. Wattage				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			IEC61215/IS 14286	IEC61730	IEC61701	
21.1.2	Option-2	1. Make				Page no. in the offer docume nt
		2. Model No				
		3. Wattage				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			IEC61215/ IS14286	IEC61730	IEC61701	
21.2	Soura Suvidha Kit(Test certificate should be submitted as per ANERT specification)					
			Module	Battery	Luminary	
21.2.1	Option -1	1. Make				Page no. in the offer docume nt
		2. Model No				
		3. Capacity				
		4. Test Certificate No.				
		5. Name of testing agency				

		6.Validity Up To				
			Module	Battery	Luminary	
21.2.2	<u>Option -2</u>	1. Make				Page no. in the offer document
		2.Model No				
		3.Capacity				
		4.Test Certificate No.				
		5.Name of testing agency				
		6.Validity Up To				

I have read the technical requirements, warranty conditions and the details furnished above are true, 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)

NOTE: If any more makes and models of system components are proposed, extra pages may be used.

21. Solar Home Lighting system

WHITE LED BASED SOLAR HOME LIGHTING SYSTEM - Model .1

22.1.1	Solar Module					
			IEC61215 /IS14286	IEC61730	IEC61701	
22.1.1.1	<u>Option-1</u>	1. Make				Page no. in the offer Document
		2. Model No				
		3. Wattage				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			IEC61215 /IS14286	IEC61730	IEC61701	
22.1.1.2	<u>Option-2</u>	1. Make				Page no. in the offer document
		2. Model No				
		3. Wattage				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			IEC61215 / IS14286	IEC61730	IEC61701	
22.1.2	Solar Charge Controller					
			IEC/IS 61683	IEC 60068	IEC6211	IEC 61727
22.1.2.1	<u>Option -1</u>	1. Make				Page no. in the offer

							document
		2.Model No					
		3.Capacity					
		4.Test Certificate No.					
		5.Name of testing agency					
		6.Validity Up To					
			IEC/IS 61683	IEC 60068	IEC6211	IEC 61727	
22.1.2.2	<u>Option -2</u>	1. Make					Page no. in the offer document
		2.Model No					
		3.Capacity					
		4.Test Certificate No.					
		5.Name of testing agency					
		6.Validity Up To					
22.1.3	Luminaires			LM 79		LM 80	
22.1.3.1	<u>Option -1</u>	1. Make					Page no. in the offer document
		2.Model No					
		3.Capacity					
		4.Test Certificate No.					
		5.Name of testing agency					
		6.Validity Up To					
				LM 79		LM 80	
22.1.3.2	<u>Option -2</u>	1. Make					Page no. in the offer document
		2.Model No					
		3.Capacity					
		4.Test Certificate No.					

		5.Name of testing agency			
		6.Validity Up To			
22.1.4		Battery			
22.1.4.1	<u>Option -1</u>	1. Make			Page no. in the offer document
		2.Model No			
		3.Capacity			
		4.Test Certificate No.			
		5.Name of testing agency			
		6.Validity Up To			
22.1.4.2	<u>Option -2</u>	1. Make			Page no. in the offer document
		2.Model No			
		3.Capacity			
		4.Test Certificate No.			
		5.Name of testing agency			
		6.Validity Up To			

I have read the technical requirements, warranty conditions and the details furnished above are true, 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)

NOTE: If any more makes and models of system components are proposed, extra pages may be used.

WHITE LED BASED SOLAR HOME LIGHTING SYSTEM . Model .II

22.1.1	Solar Module					
			IEC61215 /IS14286	IEC61730	IEC61701	
22.1.1.1	<u>Option-1</u>	1. Make				Page no. in the offer Document
		2. Model No				
		3. Wattage				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			IEC61215 /IS14286	IEC61730	IEC61701	
22.1.1.2	<u>Option-2</u>	1. Make				Page no. in the offer document
		2. Model No				
		3. Wattage				
		4. Test Certificate No.				
		5. Name of testing agency				
		6. Validity Up To				
			IEC61215 / IS14286	IEC61730	IEC61701	
22.1.2	Solar Charge Controller					
22.1.2.1	<u>Option -1</u>	1. Make				Page no. in the offer document
		2. Model No				
		3. Capacity				
		4. Test Certificate				

		No.					
		5.Name of testing agency					
		6.Validity Up To					
22.1.2.2	<u>Option -2</u>	1. Make					Page no. in the offer document
		2.Model No					
		3.Capacity					
		4.Test Certificate No.					
		5.Name of testing agency					
		6.Validity Up To					
22.1.3	Luminaires		LM 79	LM 80			
22.1.3.1	<u>Option -1</u>	1. Make					Page no. in the offer document
		2.Model No					
		3.Capacity					
		4.Test Certificate No.					
		5.Name of testing agency					
		6.Validity Up To					
			LM 79	LM 80			
22.1.3.2	<u>Option -2</u>	1. Make					Page no. in the offer document
		2.Model No					
		3.Capacity					
		4.Test Certificate No.					
		5.Name of testing agency					
		6.Validity Up To					
			LM 79	LM 80			
22.1.4	Battery						
22.1.4.1	<u>Option -1</u>	1. Make					Page no. in the offer

		2.Model No		document
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		
22.1.4.2	<u>Option -2</u>	1. Make		Page no. in the offer document
		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		

I have read the technical requirements, warranty conditions and the details furnished above are true, 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)

NOTE: If any more makes and models of system components are proposed, extra pages may be used.

22.Solar LED Street Lighting Systems

1. Solar LED Street Lighting System (Model -1)

23.1.1	Solar Module				
			IEC61215/IS 14286	IEC61730	IEC61701
23.1.1.1	<u>Option-1</u>	1. Make			
		2.Model No			
		3.Wattage			
		4.Test Certificate No.			
		5.Name of testing agency			
		6.Validity Up To			
			IEC61215/IS 14286	IEC61730	IEC61701
23.1.1.2	Option-2	1. Make			
		2.Model No			
		3.Wattage			
		4.Test Certificate No.			
		5.Name of testing agency			
		6.Validity Up To			
23.1.2	Battery				
			IEC 62133		
23.1.2.1	<u>Option -1</u>	1. Make			
		2.Model No			
		3.Capacity			
		4.Test Certificate No.			
		5.Name of testing agency			

		6.Validity Up To		
			IEC 62133	
23.1.2.2	<u>Option -2</u>	1. Make		
		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		
23.1.3	Luminaire		LM 79	LM 80
23.1.3.1	<u>Option -1</u>	1. Make		
		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		
			LM 79	LM 80
23.1.3.2	<u>Option -2</u>	1. Make		
		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		

2. Solar LED Street Lighting System (Model 2)

23.2.1	Solar Module				
			IEC61215/IS 14286	IEC61730	IEC61701
23.2.1.1	<u>Option-1</u>	1. Make			
		2. Model No			
		3. Wattage			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			
			IEC61215/IS 14286	IEC61730	IEC61701
23.2.1.2	Option-2	1. Make			
		2. Model No			
		3. Wattage			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			
23.2.2	Battery				
			IEC 62133		
23.2.2.1	<u>Option -1</u>	1. Make			
		2. Model No			
		3. Capacity			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			
			IEC 62133		
23.2.2.2	<u>Option -2</u>	1. Make			

		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		
23.2.3	Luminaire		LM 79	LM 80
23.2.3.1	<u>Option -1</u>	1. Make		
		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		
			LM 79	LM 80
23.2.3.2	<u>Option -2</u>	1. Make		
		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		

3. Solar LED Street Lighting System (Model 3)

22.3.1	Solar Module				
			IEC61215/IS 14286	IEC61730	IEC61701
23.3.1.1	<u>Option-1</u>	1. Make			
		2. Model No			
		3. Wattage			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			
			IEC61215/IS 14286	IEC61730	IEC61701
23.3.1.2	Option-2	1. Make			
		2. Model No			
		3. Wattage			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			
23.3.2	Battery				
			IEC 62133		
23.3.2.1	<u>Option -1</u>	1. Make			
		2. Model No			
		3. Capacity			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			

			IEC 62133	
23.3.2.2	<u>Option -2</u>	1. Make		
		2. Model No		
		3. Capacity		
		4. Test Certificate No.		
		5. Name of testing agency		
		6. Validity Up To		
23.3.3 Luminaire			LM 79	LM 80
23.3.3.1	<u>Option -1</u>	1. Make		
		2. Model No		
		3. Capacity		
		4. Test Certificate No.		
		5. Name of testing agency		
		6. Validity Up To		
			LM 79	LM 80
23.3.3.2	<u>Option -2</u>	1. Make		
		2. Model No		
		3. Capacity		
		4. Test Certificate No.		
		5. Name of testing agency		
		6. Validity Up To		

4. Solar LED Street Lighting System (Model 4)

23.4.1	Solar Module				
			IEC61215/IS 14286	IEC61730	IEC61701
23.4.1.1	<u>Option-1</u>	1. Make			
		2. Model No			
		3. Wattage			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			
			IEC61215/IS 14286	IEC61730	IEC61701
23.4.1.2	Option-2	1. Make			
		2. Model No			
		3. Wattage			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			
			IEC61215/ IS14286	IEC61730	IEC61701
23.4.1.3	Option-3	1. Make			
		2. Model No			
		3. Wattage			
		4. Test Certificate No.			
		5. Name of testing agency			
		6. Validity Up To			
23.4.2	Battery				

			IEC 62133	
23.4.2.1	<u>Option -1</u>	1. Make		
		2. Model No		
		3. Capacity		
		4. Test Certificate No.		
		5. Name of testing agency		
		6. Validity Up To		
			IEC 62133	
23.4.2.2	<u>Option -2</u>	1. Make		
		2. Model No		
		3. Capacity		
		4. Test Certificate No.		
		5. Name of testing agency		
		6. Validity Up To		
			IEC 62133	
23.4.2.3	<u>Option -3</u>	1. Make		
		2. Model No		
		3. Capacity		
		4. Test Certificate No.		
		5. Name of testing agency		
		6. Validity Up To		
23.4.3	Luminaire		LM 79	LM 80
23.4.3.1	<u>Option -1</u>	1. Make		
		2. Model No		
		3. Capacity		
		4. Test Certificate No.		
		5. Name of		

		testing agency		
		6.Validity Up To		
			LM 79	LM 80
23.4.3.2	<u>Option -2</u>	1. Make		
		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		
			LM 79	LM 80
23.4.3.3	<u>Option -3</u>	1. Make		
		2.Model No		
		3.Capacity		
		4.Test Certificate No.		
		5.Name of testing agency		
		6.Validity Up To		

Invitation of Expression of Interest for Empanelment of Agencies
for supply/installation of solar powered Devices (below 1kW)
in Kerala under Distributed Power generation. (Off Grid)

PRICE SCHEDULE

ANERT-TECH/179/2020-TO(MJ)

Dated 06.10.2020

PART-III

Submitted by (Name and address of bidder)	:
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Agency for Non-conventional Energy & Rural Technology

Vikas Bhavan (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

III-A. Price Schedule

C1- Price offer for Solar Lantern (Format- III- A)

- 1. Name of the Agency :
- 2. Address in Full :

Solar Lantern

Capacity of the Module	Price/ Unit all-inclusive in Rupees	
	In digits	In words
10		

- 1. The price quoted by the bidder for solar lantern shall be inclusive of cost of, transportation, handling, and supply of a standard item and cost of insurance, taxes if any and including 5 year warranty etc.
- 2. The price quoted is applicable for any location in all districts of Kerala.

Date:

Signature of the authorised signatory
Name
Designation

(Office Seal)

C2- Price offer for Soura Suvidha Kit (Format- III- B)

1.Name of the Agency :

2.Address in Full :

Soura Suvidha Kit (Solar Lantern with FM radio and Mobile Charging unit)

Capacity of the Module	Price/ Unit all-inclusive in Rupees	
	In digits	In words
15 Wp		

1. The price quoted by the bidder for solar lantern shall be inclusive of cost of, transportation, handling, and supply of a standard item and 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)

C3- Price offer for Solar Home Lighting system Model I &II (Format III-C)

1. Name of the Agency :
2. Address in Full :

Solar Home Lighting System

Model	Price/ Unit all-inclusive in Rupees	
	In digits	In words
Model I		
Model II		

1. The price quoted by the bidder for each configuration shall be inclusive of cost of pre-installation survey report, transportation, handling, supply and commissioning of a standard installation and 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)

C4- Price offer for Solar Street Lighting System (Format III-D)

1. Name of the Agency :

2. Address in Full :

Solar Street light

Model	Capacity of Module	Price/ Unit all-inclusive in Rupees	
		In digits	In digits
Model 1	60 W		
Model 2	120 W		
Model 3	200 W		
Model 4 Solar Mini High mast light	500 W		

1. The price quoted by the bidder for each configuration shall be inclusive of cost of pre-installation survey report, transportation, handling, supply and commissioning of a standard installation and 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)