

TENDER DOCUMENT
FOR
SUPPLY, INSTALLATION & COMMISSIONING OF SPV POWER PLANTS
IN TRIPURA ON TURN-KEY BASIS



TRIPURA RENEWABLE ENERGY DEVELOPMENT AGENCY
Vigyan Bhawan, Pandit Nehru Complex, Gorkhabasti, Agartala
Phone - (0381) 232-6139, Tele - fax - (0381) 2325900,
Email-tredaagartala@gmail.com
Web URL- **www.treda.nic.in**

Certified that the NIT Document contains 61 pages



TRIPURA RENEWABLE ENERGY DEVELOPMENT AGENCY
(A Constituent Organization of DSTE, Government of Tripura)
Vigyan Bhawan, Pandit Nehru Complex, Gorkhabasti, Agartala, Tripura
Tele-fax: 0381-2325900, 2326139, email-tredaagartala@gmail.com

No.F.6(218)/TREDA/NCES/2017/616

Date 02/06/2017

NOTICE INVITING TENDER

Sealed tenders are invited only from the bonafied, resourceful and experienced manufacturers and / or channel partners accredited by the Ministry of New & Renewable Energy (MNRE) for Off-Grid and Decentralized Solar Applications under JNNSM having grade SP – 1A/1B/2A/2B (Accreditation to be valid as on 31st March, 2017 or as per subsequent MNRE Notification as on the date of submission of bid whichever is later) for the following works:

PNIT No.	Sl. No.	Name of work	Quantity	Cost of tender document	Earnest Money Deposit	Period of completion
No.F.6(218)/TREDA/NCES/2017/617, dated 02/06/2017	1.	Supply, installation and commissioning of 50 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis as per the specifications mentioned at Annexure – IV (A) of this NIT including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules).	6 (six) nos.	Rs. 3000/- (Rupees three thousand) only	2.5% of the total quoted amount	90 (ninety) days
	2.	Supply, installation and commissioning of 25 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis as per the specifications mentioned at Annexure – IV (B) of this NIT including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules).	6 (six) nos.			

3. The Tender Paper is available & can be downloaded from the State Govt. website named **www.tripura.gov.in** and **www.treda.nic.in** and the same may be submitted after being duly filled in prescribed formats along with all required documents as per NIT.

4. Cost of tender document: Rs. 3000/- (Rupees three thousand) only in the shape of Demand Draft (Non-refundable) drawn in favour of “The Director & Chief Executive Officer, Tripura Renewable Energy Development Agency, Agartala” on

SIGNATURE OF BIDDER WITH SEAL & DATE

Nationalized / Scheduled Bank guaranteed by the Reserve Bank of India. Cost of tender document in cash or in the shape of cheque will not be allowed.

5. Earnest Money Deposit: 2.5% of the total quoted amount for supply, installation & commissioning of Solar Photovoltaic Power Plants throughout the state of Tripura on turn-key basis in the shape of Demand Draft drawn in favour of “The Director & Chief Executive Officer, Tripura Renewable Energy Development Agency, Agartala” on Nationalized / Scheduled Bank guaranteed by the Reserve Bank of India. Earnest money in cash or in the shape of cheque will not be allowed. However, Government of India Undertakings will have the option of submitting EMD in the form of bank guarantee on any Nationalized Bank.
6. 2(two) part tender consisting of the following and shall be opened sequentially.
 - 6.1 Technical Bid: The Technical Bid would comprise of the following sealed envelopes in a single sealed envelope:
 - 6.1.1 Envelop – I: “Technical Bid” as per Annexure – I & Annexure – II superscripting Name of Bidder, name of Work, NIT No, Original due date of opening of Bid alongwith forwarding letter at Annexure - III & all relevant documents mentioned in the NIT.
 - 6.1.2 Envelop – II: “Cost of tender document” superscripting Name of Bidder, name of Work, NIT No, Original due date of opening of Bid.
 - 6.1.3 Envelop – III: “Earnest Money Deposit (EMD)” superscripting Name of Bidder, name of Work, NIT No, Original due date of opening of Bid.
 - 6.1.4 The bidding schedule for submission of Technical Bid is given at Annexure – I & Annexure - II.
 - 6.1.5 The bidder who’s Technical Bids are found to be acceptable, settled and frozen shall be considered for opening of respective Financial Bids.
 - 6.2 Financial Bid: In sealed cover duly marked by Envelop-IV as per Annexure VII superscripting Name of Bidder, name of Work, NIT No., Original due date of opening of Bid.
 - 6.3 Financial Bid will be opened after acceptance of Technical Bid. The date of opening of Financial Bid will be intimated on the same day when Technical Bid is opened, if possible, or later.
 - 6.4 The bidding schedule for submission of Financial Bid has been prescribed at Annexure-VII.

Both the Technical Bid & Financial Bid should be wrapped in a sealed single cover superscripting Name of Bidder, name of Work, NIT No, Original due date of opening of Bid etc. should be addressed to the Tendering Authority.

- 7 The last date of submission of Tender paper and bid document is on **28/06/2017 at 15:30 hrs** and it will be opened, if possible, on the same day at **16:00 hrs** in the presence of the Tenderer or their authorized representative (having valid authorization letter) who may like to be present. In case the day happens to be a holiday, the tenders will be received and opened on the next working day within the specified time.
- 8 Tender without cost of tender document & EMD will automatically be rejected.
- 9 Tenders submitted by post should be posted well in advance to avoid any delay in postal delivery. This office however shall not share any liability for postal delay. Tenders received after the due date of submission shall be liable to be rejected. Tenders received within stipulated date and time shall only be considered.
- 10 A bidder has to offer rates for the works of all the items mentioned in the schedule. The bids will be evaluated item wise i.e. separately for 50 KWp and 25 KWp Power Plants.

- 11 All pages of the tender document shall be signed and stamped by the tenderer before submission.**
- 12** The undersigned reserves the right to accept/reject any or all the Tenders or part thereof without assigning any reason thereon.



(K K GHOSH)
Director & CEO

SIGNATURE OF BIDDER WITH SEAL & DATE



TERMS & CONDITIONS**13 DEFINITIONS:**

- 13.1 **“TENDERING AUTHORITY”** shall mean the undersigned i.e. the Director & Chief Executive Officer, Tripura Renewable Energy Development Agency, A constituent organization of Department of Science, Technology & Environment, Govt. of Tripura with its Head office at Vigyan Bhawan, 2nd Floor, Pandit Nehru Complex, Gorkhabasti, Agartala, West Tripura District.
- 13.2 **“TREDA”** shall mean The Director & Chief Executive Officer or his representative of “Tripura Renewable Energy Development Agency, A constituent organization of Department of Science, Technology & Environment, Govt. of Tripura” with its Head office at Vigyan Bhawan, 2nd Floor, Pandit Nehru Complex, Gorkhabasti, Agartala, West Tripura District and shall also include its successors in interest and assignees.
- 13.3 The **“CONTRACTOR”** shall mean the ***Firm/ Person (whose tender has been accepted by TREDA)*** and shall include his legal representatives, successor in interest and assignees.
- 13.4 The **“CONTRACT”** shall mean “Supply, installation and commissioning of 50 KWp / 25 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules)” from the date of commissioning” and shall be valid till the completion of all related works.
- 13.5 **“OPERATION & MAINTENANCE CONTRACT (OMC)”** means routine and on-call maintenance of the systems including supply of all spare parts as required for reliable operation of the systems for 5 (five) years Warranty / Guarantee period.

14. ELIGIBILITY CRITERIA:

- 14.1 The bidder must attain one of the eligibility as given below:
- 14.1.1 Channel Partners accredited by the Ministry of New & Renewable Energy (MNRE) for Off-Grid and Decentralized Solar Applications under JNNSM having grade SP – 1A/1B/2A/2B valid as on 31st March, 2017 or as per subsequent MNRE Notification as on the date of submission of bid whichever is later.
- 14.1.2 In case of SPV System manufacturer, other than Channel Partners accredited by MNRE (Refer Clause 14.1.1 above), the bidder must be a Company registered under the Indian Companies Act (Not applicable for Govt. of India / State Government undertakings) and should have been manufacturing either SPV Module or Power Conditioning Unit (PCU) or Battery for at least one audited year & also should have valid Test Certificate / Report of that particular component as per relevant Clause of this NIT and the same component should be used in this work.
- 14.2. Tenders from any dealer / supplier / agents of the manufacturer or channel partners will not be accepted.
- 14.3. The tenderer should not have been blacklisted or debarred by any Central/ State Government Departments / Undertaking Bodies / Autonomous Bodies / PSUs from carrying out similar business during last three financial years.

- 14.4. Documents in support of eligibility must be enclosed along with the Technical Bid.
- 14.5. Offers without satisfying eligibility conditions will be out rightly rejected and no correspondence in this regard will be entertained.

15. CREDENTIALS OF THE BIDDER:

- 15.1. The bidders themselves must have executed supply, installation & commissioning of off-grid and / or grid interactive SPV Power Plants (minimum individual capacity should not be less than 10 KWp), total capacity of which in the last three financial years including the current financial year as on the date of publication of this NIT should be at least equal to the total capacity mentioned in this NIT.
- 15.2. A certificate indicating name of the customers, numbers and date of work orders, Costs, Date of completions including the copies of relevant work/supply orders must be enclosed.
- 15.3. Previous credential / records of the bidder as proof of experience / credential/satisfactory completion of works etc., as specified above should be submitted along with technical bid of the tender as performance certificate.
- 15.4. The proof of experience to be submitted along with the Technical Bid as mentioned above should in the name of the tenderer only.
- 15.5. Experience of any collaborator/sister concern of the tenderer submitted as experience proof of the tenderer will not be accepted.

16. TEST CERTIFICATES OF SPV SYSTEMS: The bidders are required to submit test certificates for Solar Photovoltaic Modules, Batteries & Power Conditioning Unit etc. from one of the MNRE approved/IEC/NABL Accredited Test Laboratories in compliance of the specifications of 50 KWp & 25 KWp SPV Power Plant laid down at Annexure – IV(A) and Annexure - IV(B) of this NIT respectively. Test Certificate issued during 2014-15 or later or valid as on the date of publication of the NIT will only be considered as valid.

17. SPECIFICATIONS: General specifications of 50 KWp and 25KWpSPV Power Plant is given at Annexure – IV(A) and Annexure - IV(B) of this NIT respectively. If there is any left out specifications of the Power Plants shall be as per the latest MNRE Guidelines for off-grid and decentralized solar applications.

18. REMOTE MONITORING UNIT:

- 18.1. SIM Cards to be used for data transmission from each site through Remote Monitoring Unit will be procured by TRED A in the name of TRED A from BSNL/other service provider.
- 18.2. The successful bidder has to conduct the survey of sites for identification of suitable Service Provider for SIM Cards to be used in the RMU for un-interrupted data transmission. However, decision of TRED A regarding selection of service provider will be final and binding on the successful bidder.
- 18.3. All run time expenditures, such as expenditure for procurement of SIM Cards, activation / top up charges of SIM Cards and charges for suitable SMS packages etc. for five years Warranty / Guarantee period will be made initially from TRED A and the same will be deducted subsequently from the yearly bills of the successful bidder.
- 18.4. The successful bidder may chose appropriate plan of service provider for procurement of SIM Cards, activation / top up charges of SIM Cards and charges for suitable SMS packages etc. based on the data transmission at nominal 4 (four) to 6 (six) hours interval.
- 18.5. The successful bidder has to return back the SIM Cards to TRED A after completion of five years Warranty / Guarantee period.

- 19. VISIT TO THE SITES OF INSTALLATION BY THE BIDDER(S):** The intending Bidder(s) shall be deemed to have visited the site and familiarized with site condition while submitting the Bid. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the works in strict conformity with the technical specifications or for any delay in performance.
- 20. SUPPLY OF MATERIALS:**
- 20.1. It is a turn-key job for supply, installation & commissioning etc., as such no extra payments against any unforeseen items / works required to complete the job will be paid/allowed. The supplier should be responsible for packing, forwarding and despatching, insurance and safe delivery of materials and installation & commissioning including proper civil works, storage & handling as required at specific sites at their quoted price. Temporary storage of materials during transit or at site shall be the responsibility of the successful bidder at his cost and risk.
- 20.2. Simultaneously with the installation of Power Plants at sites, the successful bidder may have to execute necessary internal wiring for commissioning of the power plants as per site requirement. For this work, additional Orders will be issued & additional payments will be made as per agreed rates for additional items of work.
- 20.3. Delivery of the complete system at site shall commence from 45th day and the work should be completed within 90th day from the date of issue of the work order. The date of issue of work order would be considered as zero date.
- 20.4. Any delay in delivery except forced majeure shall be viewed seriously and may be linked with penalty as deem fit by the tendering authority.
- 20.5. General Assembly Design / Single Line Diagram showing all the required components etc. are to be submitted to TREDA for approval by the successful bidder before commencement of supply of materials.
- 20.6. Manual of PCU (Charge Controller Unit + Inverter), battery, PV Module etc. are to be submitted to TREDA.
- 20.7. Hard copy & soft copy of I-V Curve of each PV Module with technical details such as V_{oc} , I_{sc} , FF, Cell efficiency and P_{max} etc. should be submitted to TREDA alongwith all consignments.
- 21. TENTATIVE LOCATION OF INSTALLATION:** (Final List of locations will be handed over to the successful bidder before commencement of supply of materials).

Sl. No.	Name of site	Capacity of Power Plant
21.1	Agartala Govt. Medical College & GB Pant Hospital, Agartala, West Tripura District	100 KWp (50 KWp X 2 nos.)
21.2	Tripura Medical College & Dr. B R Ambedker Memorial Teaching Hospital, Agartala, West Tripura District	100 KWp (50 KWp X 2 nos.)
21.3	Indira Gandhi Memorial Hospital, Agartala, West Tripura District	100 KWp (50 KWp X 2 nos.)
21.4	Cancer Hospital, Agartala, West Tripura District	25 KWp
21.5	State Homoeopathic Hospital, Agartala, West Tripura District	25 KWp
21.6	Tripura Legislative Assembly, Agartala, West Tripura District	25 KWp
21.7	District Hospital, Kulai, Dhalai District	25 KWp
21.8	District Hospital, North Tripura District, Dharmanagar, North Tripura District	25 KWp

21.9	District Hospital, Sepahijala District, Bishalghar, Sepahijala District	25 KWp
------	---	--------

22. SCOPE OF WARRANTEE/GUARANTEE AND OPERATION & MAINTENANCE CONTRACT (OMC) FOR 50 KWp PLANTS:

22.1. WARRANTEE/GUARANTEE:

22.1.1. The SPV Power Plants shall be warranted /guaranteed for 5 (five) years from the date of commissioning. The mechanical structures, electrical works including power conditioners /inverters/ charge controllers/maximum power point tracker units/distribution boards/digital meters/switchgear, storage batteries and overall workmanship of the SPV power plants/systems must be Warranted / Guaranteed against any manufacturing/ design/ installation defects for a minimum period of 5 (five) years from the date of commissioning of the plant. Materials found damaged during transit or erection shall be replaced by the successful bidder immediately without waiting for settlement of their claim with their Insurance Company.

22.1.2. The Warrantee/Guarantee shall be against breakages, malfunctions, non-fulfillment of guaranteed performance and breakdowns due to manufacturing defects or defects that may arise due to improper operation of electrical or electronics components of the system but do not include physical damages by end users.

22.1.3. The Warrantee/Guarantee will cover all the materials and components involved in the installation & commissioning of the SPV Power Plants by the successful bidder under this contract irrespective of the fact whether these have been manufactured by the successful bidder or not. The decision of TREDA in this regard should be final & binding on successful bidder.

22.1.4. PV modules must be warranted for their output wattage, which should not be less than 90% at the end of 10 years, 80% at the end of 25 years from the date of commissioning of the system.

22.1.5. During the warranty / guarantee period, defective/ non-functioning SPV System including Solar Modules, Power Conditioning Unit, storage batteries etc. and other spare parts of the systems shall be repaired / replaced free of cost by the successful bidder at his own cost for proper, sustained & reliable operation of the systems.

22.1.6. The CFL, LED & Fluorescent lamps should be warranted for 1 (one) year from the date of commissioning.

22.2. OPERATION & MAINTENANCE (O&M): Following O&M guidelines are to be mandatorily followed by the successful bidder:

22.2.1. Successful bidder shall be responsible for all required activities for successful operation & maintenance of the SPV Power Plants for a period of 5 (five) years from the date of commissioning of the plants.

22.2.2. The successful bidder shall depute qualified and experienced engineer/technician well versed in O & M of SPV Power Plants and knowledge of computers till the O&M period at each project site. The details of the technician i.e. Name, address, Mobile number etc. should be submitted to TREDA before execution of work.

22.2.3. The deputed personnel shall have to keep daily log sheet for the Power Plants after commissioning. Photocopy of the log sheet

- shall be submitted to TRED A every month for verification, record and reference.
- 22.2.4. Periodic cleaning & check of SPV Modules, PCUs, Batteries and BoS shall be carried out by the successful bidder as a part of the routine prevention and breakdown maintenance. Operation & Maintenance Guideline, Format for Monthly & Yearly Operation & Maintenance Report is mentioned at Annexure – V.
 - 22.2.5. Successful bidder shall keep at site sufficient inventories to assure ex-stock supply of all spares, consumable and fixtures as required. Stock should be maintained for all associated equipments and materials as per manufacturer / supplier's recommendations.
 - 22.2.6. Immediate replacement of defective modules, batteries, PCUs/Inverters and other equipments/components as and when required should be done by successful bidder irrespective of whether the defect was a manufacturing defect or due to wear and tear.
 - 22.2.7. During O & M Period, if there is any loss or damage of any component due to mis-management or mis-handling or due to any other reasons pertaining to the deputed personnel, what-so-ever, the successful bidder shall be responsible for immediate replacement or rectification. The damaged component may be repaired or replaced by new component.
 - 22.2.8. All the equipments, testing instrument required for testing, installation, commissioning and O & M for the healthy operation of the plants shall be maintained by the successful bidder at site.
 - 22.2.9. A maintenance record register is to be maintained by the successful bidder at site with effect from the date of commissioning of the plant to record the daily generation, regular maintenance work carried out as well as any preventive and breakdown maintenance alongwith date of maintenance, reason for the breakdown, duration of breakdown, steps taken to attend the breakdown etc. The guideline for the same is given at Annexure – V.
 - 22.2.10. In case of any fault, **the fault must be removed /rectified within a maximum period of 3 (three) days** from the date of receipt of complain from User/TREDA/District Scientific Officers of Deptt. of Science, Technology & Environment either through letter or telephonically or e-mail. Failing which, TRED A may make the system functional and the actual expenditure incurred for this will be deducted from the balance payment (Performance Security) due to the successful bidder. The expenditure towards the repairing of the system(s) determined by TRED A should be final & binding on the successful bidder.
 - 22.2.11. In case of any part to be imported from outside the state, the maximum period for repair should not be more than 7 (seven) days. In case the successful bidder fails to repair any fault of the systems within 7 (seven) days, TRED A may make the system functional and debit the actual expenditure to the party which will be deducted from the balance payment (Performance Security) due to the successful bidder and the defaulter bidder may be blacklisted. The expenditure towards the repairing of the system(s) determined by TRED A should be final & binding on the successful bidder.

- 22.2.12. However, under Force Majeure circumstances, penalty can be waived off.
- 22.2.13. During installation & commissioning, the successful bidder shall train, at its own cost, 2(two) persons selected by User / TREDAs for primary O&M of the systems.
- 22.2.14. During the Warranty / Guarantee and O&M period, TREDAs / District Offices of DSTE, / User reserves the right to cross check the performance of the systems with the minimum performance levels specified at Annexure – IV(A) of this NIT / MNRE Guidelines for off-grid and decentralized solar applications.
- 22.2.15. The successful bidder shall provide one copy of Instructing Manual and Routine Maintenance Manual in English per site of installation. The following minimum details must be provided in this manual:
- 22.2.15.1. About the complete Photovoltaic System including PV Module, PCU and electronics etc.,
 - 22.2.15.2. Do's and Don'ts,
 - 22.2.15.3. Clear Instruction on regular operation & maintenance of the systems,
 - 22.2.15.4. Name & address of the contact person in case of non-functioning of the systems.
- 22.2.16. The successful bidder shall submit the monthly & yearly O & M Report to TREDAs as per format enclosed at Annexure – V.
- 22.2.17. TREDAs reserves the right to claim damages and cost for non-fulfillment of warranty / guarantee/O&M obligations, apart from forfeiture of Performance Security in the event of unsatisfactory maintenance.
- 22.2.18. Warranty/guarantee Card is to be supplied with each system. The format of Warranty / Guarantee card should get approved from TREDAs.
- 22.2.19. 3(three) nos. of 62.50 KVA Power Conditioning Unit in good running condition should be kept in the Head Quarter of TREDAs/Office of the District Scientific Officers, Deptt. of Science, Technology & Environment / User's Office to be used as immediate replacement of any defective Power Conditioning Unit at the site of installation. The cost of transportation of the Power Conditioning Unit from TREDAs/ Office of the District Scientific Officers, Deptt. of Science, Technology & Environment to the respective site is to be borne by the successful bidder.
- 22.2.20. The Operation & Maintenance of the Systems may also be taken up by the successful bidder after expiry of 5 (five) years Warranty / Guarantee and O&M Period on mutual agreed terms & conditions.

23. SCOPE OF WARRANTY/GUARANTEE AND OPERATION & MAINTENANCE CONTRACT (O&M) FOR 25 KWp PLANTS:

23.1. WARRANTY/GUARANTEE:

- 23.1.1. The SPV Power Plants shall be warranted /guaranteed for 5 (five) years from the date of commissioning. The mechanical structures, electrical works including power conditioners /inverters/ charge controllers/maximum power point tracker units/distribution boards/digital meters/switchgear, storage batteries and overall workmanship of the SPV power plants/systems must be Warranted / Guaranteed against any manufacturing/ design/ installation defects for a minimum period of 5 (five) years. Materials found damaged during transit

- or erection shall be replaced by the supplier immediately without waiting for settlement of their claim with their Insurance Company.
- 23.1.2. The Warrantee/Guarantee shall be against breakages, malfunctions, non-fulfillment of guaranteed performance and breakdowns due to manufacturing defects or defects that may arise due to improper operation of electrical or electronics components of the system but do not include physical damages by end users.
- 23.1.3. The Warrantee/Guarantee will cover all the materials and components involved in the installation & commissioning of the SPV Power Plants by the successful bidder under this contract irrespective of the fact whether these have been manufactured by the successful bidder or not. The decision of TREDA in this regard should be final & binding on successful bidder.
- 23.1.4. PV modules must be warranted for their output wattage, which should not be less than 90% at the end of 10 years, 80% at the end of 25 years from the date of commissioning of the system.
- 23.1.5. During the warranty / guarantee period, defective/ non-functioning SPV System including Solar Modules, Power Conditioning Unit, storage batteries etc. and other spare parts of the systems shall be repaired / replaced free of cost by the successful bidder at his own cost for proper, sustained & reliable operation of the systems.
- 23.1.6. The CFL, LED & Fluorescent lamps should be warranted for 1 (one) year from the date of commissioning.
- 23.1.7. Successful bidder shall carry sufficient inventories to assure ex-stock supply of consumable spares such as cable plugs, nut & bolts, screws, switches, fuses, indicating lamps & blocking diodes, lights/bulbs, spare modules, critical components of the systems etc. Other mandatory spare parts & components shall be supplied as promptly as possible.
- 23.1.8. 3(three) nos. of 31.25 KVA Power Conditioning Unit in good running condition should be kept in the Head Quarter of TREDA/Office of the District Scientific Officers, Deptt. of Science, Technology & Environment / User's Office to be used as immediate replacement of any defective Power Conditioning Unit at the site of installation. The cost of transportation of the Power Conditioning Unit from TREDA/ Office of the District Scientific Officers, Deptt. of Science, Technology & Environment to the respective site is to be borne by the successful bidder.
- 23.1.9. In case of any fault, **the fault must be removed within a maximum period of 7 (seven) days** from the date of receipt of complain from User/TREDA/District Scientific Officers of Deptt. of Science, Technology & Environment either through letter or telephonically or e-mail. Failing which, TREDA may make the system functional and the actual expenditure incurred for this will be deducted from the balance payment (Performance Security) due to the successful bidder. The expenditure towards the repairing of the system(s) determined by TREDA should be final & binding on the successful bidder.
- 23.1.10. In case of any part to be imported from outside the state, the maximum period for repair should not be more than 15 (fifteen) days. In case the successful bidder fails to repair any fault of the systems within 15 days, TREDA may make the system

functional and debit the actual expenditure to the party which will be deducted from the balance payment (Performance Security) due to the successful bidder and the defaulter bidder will be blacklisted. The expenditure towards the repairing of the system(s) determined by TRED A should be final & binding on the successful bidder.

- 23.1.11. Under Force Majeure circumstances, penalty can be waived off.
- 23.1.12. The successful bidder shall train, at its own cost, 3(three) personals selected by User / TRED A for regular operation of the systems and site wise list of such trainees alongwith contact details should be submitted to TRED A.
- 23.1.13. During the Warranty / Guarantee period, TRED A / District Offices of DSTE, / User reserves the right to cross check the performance of the systems with the minimum performance levels specified at Annexure-IV(B) of this NIT / MNRE Guidelines for off-grid and decentralized solar applications.
- 23.1.14. Warrantee/guarantee Card is to be supplied with each system. The format of Warranty / Guarantee card should get approved from TRED A.
- 23.2. **OPERATION & MAINTENANCE (O&M):**
- 23.2.1. The successful bidder should provide 5 (five) years maintenance of the SPV Power Plants from the date of commissioning which shall include corrective maintenance as well as routine service visit.
- 23.2.2. Periodic cleaning & check of SPV Modules, PCUs, Batteries and BoS shall be carried out by the successful bidder as a part of the routine prevention and breakdown maintenance. Operation & Maintenance Guideline, Format for Monthly & Yearly Operation & Maintenance Report is mentioned at Annexure – V. The reports should be duly signed by representative of the successful bidder, User & TRED A / respective district Scientific Officer of Deptt. of Science, Technology & Environment and are to be submitted to TRED A.
- 23.2.3. The service personal of the successful bidder shall make routine maintenance visits monthly for the first 1 (one) year and quarterly thereon till the completion period of warranty / guarantee and Operation & Maintenance Contract period. The report in this regard should be duly signed by representative of the successful bidder, User & TRED A / respective district Scientific Officer of Deptt. of Science, Technology & Environment and are to be submitted to TRED A. Format for submission of such report would be given during placement of Work Order.
- 23.2.4. The deputed personal shall be in position to check and test all the equipments regularly, so preventive action, if any, could be taken well in advance to save any equipment from damage.
- 23.2.5. During operation and maintenance period of the SPV Power Plants, if there is any loss or damage of any component due to miss management or miss handling or due to any other reasons pertaining to the deputed personal, what-so-ever, the successful bidder shall be responsible for immediate replacement or rectification. The damaged component may be repaired or replaced by new component.
- 23.2.6. The maintenance shall include replacement of any component irrespective of whether the defect was a manufacturing defect or due to wear and tear.

23.2.7. TREDA reserves the right to claim damages and cost for non-fulfillment of warranty / guarantee/O&M obligations, apart from forfeiture of Performance Security in the event of unsatisfactory maintenance.

24. RATE:

- 24.1. The rate quoted in the Financial Bid should be in Indian Rupees and be firm, inclusive of run time expenditure of Remote Monitoring Mechanism / Remote Monitoring Unit and other charges excluding taxes & duties etc. for the complete systems along with all accessories and fittings-fixing including supply, installation & commissioning of the systems at specified location including 5 (five) years Guarantee / Warrantee and Operation & Maintenance Contract from the date of commissioning of the systems(25 years Warranty / Guarantee for SPV Modules).
- 24.2. Break up of quoted price indicating Ex-works cost, cost of transportation / packing, insurance charges, installation & commissioning charges & Civil works, taxes & duties etc. should be indicated separately as part of total price quoted in the price schedule of the bid for justification of the total price quoted.
- 24.3. The rate should be legible written in English both in figure and in words. In case of any contradictions between the prices mentioned in figures and words, the prices mentioned in words shall be considered final.
- 24.4. Rates quoted should be valid for at least 180 (one hundred eighty) days from the date of opening the tender.

25. FORCE MAJEURE:

- 25.1. Notwithstanding the provisions of clauses contained in this NIT; the successful bidder shall not be liable for forfeiture of its performance security, liquidated damages, termination for default, if he is unable to fulfill his obligation under this NIT due to event of force majeure circumstances.
- 25.2. For purpose of this clause, "Force majeure" means an event beyond the control of the contractor and not involving the contractor's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of Govt. either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and fright embargoes.
- 25.3. However, if a force majeure situation arises, the contractor shall immediately notify the "TREDA" in writing. The decision of the Director & CEO, TREDA in above conditions shall be final & binding on successful bidder.

26. PRICE VARIATION CLAUSE: Price should be fixed & firm. No price variation will be allowed in case of any component of quoted price except taxes.

27. VALIDITY OF TENDER & FINALIZED RATE: Once the rates are accepted by TREDA, the rates would be valid up to the period of completion / extended period of completion of the work or for 1(one) year from the date of issue of the Work Order whichever is later.

28. PAYMENT TERMS:

- 28.1.No advance payment will be made.
- 28.2.The supplier shall prefer bills for 100% payment against the supply, installation & commissioning on successful & satisfactory installation and commissioning of the SPV Power Plants.
- 28.2.1 Out of which 80% payment will be released after statutory deductions.
- 28.2.2 Balance 20% amount against the supply, installation & commissioning will be retained as Performance Security which will

be released in phased manner at the rate of 4% per year on prorata basis at the end of each year of the Guarantee/ Warranty period on satisfactory performance after statutory deductions.

28.2.3 However, Performance Security may be released on submission of Bank Guarantee (BG) or Fixed Deposit Receipt (FDR) of equivalent amount in favour of Director & Chief Executive Officer, TREDA on Nationalized Bank having branches at Agartala, Tripura valid till completion of Guarantee / Warranty and Operation & Maintenance Contract period (Draft format for Bank Guarantee for Performance Security is given at Annexure – VI).

28.3. 100% Payment against additional items of work for cabling and accessories at user end will be made as per supplementary work order issued for the same from TREDA on successful execution of the works on site to site basis.

28.4. Run time expenditure of Remote Monitoring Mechanism / Remote Monitoring Unit would be deducted from the yearly bills of the contractor.

28.5. All payments shall be made in Indian Rupees through NEFT/RTGS only for which successful bidder has to submit Bank Details as and when asked for.

29. RELEASE OF BANK GUARANTEE (BG) / FIXED DEPOSIT RECEIPT (FDR) OF PERFORMANCE SECURITY:

29.1. Bank Guarantee (BG) or Fixed Deposit Receipt (FDR) submitted by the successful bidder as Performance Security would be released on satisfactory completion of Guarantee / Warranty and O&MC period as per terms & conditions of the contract.

29.2. Bank Guarantee or Fixed Deposit Receipt would be forfeited partially / absolutely on non-compliance of Guarantee / Warranty and O&MC terms & conditions. The decision of TREDA in this regard would be final & binding on the Contractor.

30. STATUTORY DEDUCTION FROM BILL: Admissible taxes etc. as applicable & necessary will be deducted from the bill of the successful bidder at source as per the prevalent laws and rules of Government of India and Government of Tripura state in this regard.

31. SUBMISSION OF BILLS FOR PAYMENT/ PERFORMANCE SECURITY AFTER SUCCESSFUL EXECUTION:

31.1. The successful bidder may submit the bills to TREDA through Officer-in-charge of the concerned district.

31.2. The bills should be accompanied by completion report in respect of installation & commissioning of the SPV Power Plants & internal wirings etc. duly signed by the concerned authority of user, officer-in-charge of TREDA / Deptt. of Science, Technology & Environment, representative of PRI body, as the case may be, along with at least 20 (twenty) photographs covering SPV Module, Battery Bank, PCU, Load etc. (hard & soft copy) of the site.

31.3. The bills claiming Performance Security should be accompanied by satisfactory performance report for that particular year in respect of Repair Maintenance / Routine Checkup of the SPV Power Plants & internal wirings etc. duly signed by the concerned authority of user, officer-in-charge of TREDA / Deptt. of Science, Technology & Environment.

32. RELEASE OF EARNEST MONEY DEPOSIT (EMD):

32.1. Earnest money deposit of the successful bidder will be released on satisfactory operation of the systems for 90 (ninety) days after commissioning of the systems. No interest will be paid on the earnest money.

- 32.2. EMD of un-successful bidders shall be returned after award of the contract / order to the successful bidder. No interest will be paid on the earnest money.
- 32.3. The EMD of the successful bidder may be forfeited along with other penal actions as deemed fit by the Tendering Authority if the bidder fails to submit the acceptance of the Work Order within the stipulated period or fails to execute the awarded work within the stipulated period, after acceptance of the Work Order.
- 32.4. If any bidder withdraws his offer after opening Technical Bid before opening of Financial bid or makes any modification in the terms and conditions of the quotation which are not acceptable to the Tendering Authority, 25% of the deposited EMD may be forfeited.
- 32.5. If any bidder withdraws his offer after opening of financial bid and within the period of validity or makes any modification in the terms and conditions of the quotation which are not acceptable to the Tendering Authority, 50% of the deposited EMD may be forfeited.
- 32.6. If submitted document(s) / certificate(s) are found fake, EMD will be forfeited.
- 32.7. The earnest money deposited by the tenderer will not carry an interest.
- 33. RESPONSIBILITY OF STORES:** Successful bidder should be solely responsible for stores in transit and during supply, installation & commissioning. Any legal interference of Police / Sales tax / Income tax / Transport / Any other Govt. Agencies will have to be faced by the successful bidder. The transportation delay / non availability of train, truck etc. will never be considered by the tendering authority as reason of delay to supply and naturally no extension of delivery period will be granted on this account.
- 34. LOCAL OFFICE / AGENT FOR INSTALLATION, COMMISSION & AFTER SALES SERVICE DURING WARRANTY / GUARANTEE PERIOD:**
- 34.1. Successful bidder should establish a local office at Agartala, Tripura and also must have authorized technically equipped agents / dealers preferably at least one in each district of the state with full support of infrastructure & sufficient spare parts as required and skilled technical persons for providing after sales services during the warranty/guarantee and Operation & Maintenance Contract period.
- 34.2. The successful bidder should have to provide the details of Authorized Agent, the name of proprietor / owner, complete addresses, contact number etc. along with the list of technicians with address and telephonic numbers to the office of the undersigned before execution of work.
- 34.3. No retired employees of Tripura Renewable Energy Development Agency/ Department of Science, Technology & Environment, Govt. of Tripura or its constituent bodies within a period of 2(Two) years of retirement from Government service and the persons having direct or indirect relationship with the employees of Department of Science, Technology & Environment, Tripura Renewable Energy Development Agency or any other constituent bodies of Department of Science, Technology & Environment shall be engaged in this job by the successful bidder. If such type of irregularities is noticed at any point of time during execution of work, the Work Order may be cancelled and penalty also may be imposed as deemed fit by the undersigned.
- 35. SUPERVISION / EXECUTION OF WORKS:** The works should be done as per the direction of Officer – in – charge, Tripura Renewable Energy Development Agency / respective district Scientific Officers of Deptt. of Science, Technology & Environment.

- 36. QUANTITY TO BE PROCURED:** The quantity shown in the tender is most tentative and may be increased or decreased by 25% of tendered quantity at the discretion of tendering authority as per the accepted rate, terms & conditions stipulated in the Work Order of successful bidder.
- 37. AUTHORITIES TO MAKE CORRESPONDENCE WITH THE BIDDER / CONTRACTOR:**
- 37.1. The Tendering Authority during evaluation of Technical & Financial Bid prior to the placement of Work Order,
 - 37.2. The Tendering Authority after placement of Work Order during execution / post execution of work during warranty / guarantee & OMC period.
 - 37.3. Concerned Officer-in-charge of TREDA & Department of Science, Technology & Environment, post execution of work during warranty / guarantee & OMC period.
- 38. LATE TENDER:** No tender will be accepted after the deadline for submission of tender mentioned in the NIT and such tender will be rejected.
- 39. LEGAL CASE:** All disputes are to be settled within the jurisdiction of Tripura High Court, Agartala.
- 40. INSPECTION AND TESTING OF MATERIALS:**
- 40.1. Prior to placing formal order, pre inspection of the manufacturing unit of the bidder eligible for getting the work may be made by the officials of TREDA to assess the capability.
 - 40.2. The materials will be dispatched / installed by the successful bidder after inspection by the Director, TREDA or his representative at the bidder's premises or manufacturing unit or at site and acceptance of the same.
 - 40.3. The successful bidder shall provide without any extra charge, all materials, tools, testing equipments, labour and assistance of every kind which the inspecting officer may consider necessary for any test or examination which he may require to be made on the successful bidder's premises or manufacturing unit or at site.
 - 40.4. TREDA can also get the systems tested from any MNRE approved / IEC / NABL Accredited Test centre / laboratory and the expenses shall be borne by the successful bidder.
 - 40.5. All the expenses for the inspection of gadgets (At the bidder's premises / manufacturing unit / site) by the TREDA's representatives like TA/DA, boarding and lodging charges will have to be borne by the successful bidder.
- 41. AMENDMENTS IN TENDER DOCUMENT:**
- 41.1. At any time prior to the due date for submission of the tender, TREDA may for any reason, whether at its own initiative or as a result of a request for clarification / suggestion by a prospective tenderer, amend the tender document by issuing a notice.
 - 41.2. The amendments will be notified on the website (www.treda.nic.in and / or www.tripura.gov.in) at least **5 (five) days** before the last date of submission of the tender. TREDA will bear no responsibility or liability arising out of non-receipt of the information in time or otherwise.
 - 41.3. If any amendment is required to be notified within 5 (five) days of the last date of submission of the tender, the last date of submission shall be extended for a suitable period of time.
- 42. PRE-BID MEETING:**
- 42.1. A pre-bid meeting may be held at the office of the Tendering Authority on **21/06/2017 at 12:00 noon**. Interested bidders may confirm their participation within **19/06/2017 by 12:00 noon** in written through e-mail or Fax **alongwith their queries**.

42.2. TREDA is not under any obligation to entertain / response to suggestions made or to incorporate modifications sought for.

43. CLARIFICATIONS ON SUBMITTED TENDER DOCUMENTS:

43.1. During the process of evaluation of the tender, TREDA at its discretion may ask the tenderer for a clarification of his tender either in written or fixing meeting inviting bidders at TREDA Office, Agartala. The request for clarification and the response shall be in writing & in English only.

43.2. Any query regarding any clarification required by TREDA on the information submitted by the tenderer, must be replied by the tenderer within the allowed time schedule.

44. GENERAL:

44.1. The sealed envelopes addressed to the Tendering Authority containing the bid document superscripted with **“Tender for supply, installation and commissioning of 50 and 25 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis including 5(five) years Warranty / Guarantee and Operation & Maintenance Contract with NIT no. & date, due date & time, name of the bidder etc.”** are to be submitted.

44.2. No T & P will be supplied from TREDA for successful execution of the work.

44.3. Deviation of specifications and terms & conditions of NIT may cause for rejection of the offer(s) of bidder(s).

44.4. If submitted document(s) / certificate(s) are found fake, appropriate legal actions will be initiated and the bidder will be blacklisted.

44.5. The facilities may be extended as per norms to SSI Units registered with NSIC under its single point registration scheme having manufacturing unit at Tripura.

44.6. The tender prepared by the tenderer along with all the related documents shall be in English only. Any printed literature furnished by the tenderer may be in another language so long as it is accompanied by an English translation of its pertinent passages. Unit measurements shall be metric in accordance with International system. All correspondence between the tenderer and TREDA shall also be in English.

44.7. The tenderer is expected to examine all instructions, terms and conditions, specifications, forms and formats etc. as mentioned in the tender document. Failure to furnish all information required in the tender document or submission of a tender not substantially responsive to the tender document in every respect will be at the tenderer's risk and is likely to result in out-right rejection of the tender.

44.8. The copy of the tender document must be signed & stamped with the legal name of the corporation / company by the President / Managing Director / Secretary of the firm or a person duly authorized to bid and should be enclosed with the technical bid of the tender. In case of authorized person, the letter of authorization by written power-of-attorney should be enclosed with the technical bid of the tender. The person or persons signing the tender shall initial all pages of the tender document. The tender shall contain no interlink actions, erasers or overwriting except as necessary to correct the errors made by the tenderer in the preparation of tender. The person or persons signing the tender shall also sign & stamp at all such corrections.

44.9. Tender not accompanied with Cost of Tender Document & EMD shall not be accepted. However, Government of India Undertakings will have

- the option of submitting EMD in the form of bank guarantee on any Nationalized Bank.
- 44.10. Copy of Sales Tax / VAT Registration / Clearance Certificate, PAN Card issued by appropriate authority, Income Tax Return of last three Assessment Years are to be submitted along with the Technical Bid.
- 44.11. Work should be completed within **90 (ninety) days** positively from the date of issuing work order. The date of issue of the Work Order may be considered as the zero date.
- 44.12. One copy of the operation and maintenance manual in English and Bengali for the system in the form of booklet as per standard format are to be supplied to concerned users and a copy to TREDA. The contents of O&M manual should get approved from TREDA.
- 44.13. **“Implemented by: TREDA”** should be embossed/laminated on the major components such as Battery sides, components of Power Conditioning Units, ACDB, DCDB, AJB etc.
- 44.14. Any damage of the existing structure, building etc. made by the successful bidder during execution of this work shall be made good as it was at his own cost & risk.
- 44.15. Bidders who have submitted bids against similar type of work of TREDA, became successful bidders but failed to accept the work order issued to them by TREDA within specified time period/ failed to execute the works after issue of work orders, should not submit bid against this tender or otherwise their bids will not be accepted.
- 44.16. The Declaration by the Tenderer given at Annexure – II should be submitted in the letterhead alongwith the offer/bid, otherwise the offer/bid would not be brought under consideration for evaluation.
45. The above terms and condition will be stipulated in the work order.
46. The successful bidder shall be required to convey the acceptance of the Work Order on a valid Non-judicial stamp paper of Rs. 100/- (Rupees one hundred only) for strict compliance of the terms and conditions of the contract vis-à-vis the NIT within 15 (fifteen) days of placement of the work order.
47. **RIGHT TO ACCEPT / REJECT THE BID:** Tendering Authority reserves the right to accept or reject any Bid and to annul the tender process and reject all such bids at any time prior to award of contract, without thereby incurring any liability to the affected applicant(s) or any obligation to inform the affected applicant(s) of the ground for such decision.



(K K GHOSH)
Director & CEO

SIGNATURE OF BIDDER WITH SEAL & DATE



ANNEXURE - I

TECHNICAL BID

PART-I (a) : COMMERCIAL INFORMATION

- 1 Name & complete address of the bidder with telephone, mobile, fax nos. & Email etc.
- 2 Name & designation of the authorized signatory to whom reference shall be made

Name:
Designation
e-mail:
Mobile No.:
Fax No.:
- 3 Present activities/business of the firm
 - i. SPV- Module Manufacturer
 - ii. SPV –BOS Manufacturer
 - iii. SPV – PCU Manufacturer
 - iv. SPV – Battery Manufacturer
 - v. Other activities, pl. specify
- 4 Copy of Sales Tax / VAT Registration / Clearance Certificate, PAN Card issued by appropriate authority, Income Tax Return of last three Assessment Years etc. (attach copy)
- 5 Detail of any existing service network in Tripura (name & address of service centres, year of opening), if available

Date

Signature of bidder & seal

PART I(b): CHECKLIST FOR TENDERER

- 1 EMD @ 2.5% of the total offered value (Attached/ not attached.)

DD No.
Date
Name of the Bank:
Payable at
- 2 Copy of valid test Certificates against the SPV modules, Battery, PCU and BOS attached or not?

Attached / not attached.

- 3 List of off-grid and / or Grid connected SPV Power plants supplied, installed & commissioned by the bidder in last three financial years including the current financial year as on the date of publication of this NIT. The list should include the following **alongwith copies of concerned work orders:**

Attached / not attached

 - (a). Name of Organisation which

SIGNATURE OF BIDDER WITH SEAL & DATE



- have awarded the work
 (b) Location of work
 (c) Total contact amount
 (d) Year of award of work
 (e) Details of involvement in the work
 (f) Was the work completed satisfactorily within stipulated time
- 4 Literature/ leaflets on products Attached / not attached
 5 Declaration by the Tenderer as per Annexure – II of this NIT Attached / Not attached.

Date

Signature of bidder & seal

PART – II(a) : TECHNICAL INFORMATIONS

SL. No.	Name of the components	Name of the manufacturing company	Test Report from MNRE approved /NABL/IEC Accredited test centre
A.	50 KWp Power Plant		
1.	SPV Module – ___ Wp* [Individual capacity of SPV module should be \geq 250 Wp]		Attached / Not attached
2.	Tubular GEL Type Battery [2 Volt, 750 AH]		Attached / Not attached
3.	Power Conditioning Unit (240, Volt, 62.50 KVA)		Attached / Not attached
B.	25 KWp Power Plant		
1	SPV Module – ___ Wp* [Individual capacity of SPV module should be \geq 250 Wp]		Attached / Not attached
2	Tubular GEL Type Battery [2 Volt, 750 AH]		Attached / Not attached
3	Power Conditioning Unit(240 Volt, 31.25 KVA)		Attached / Not attached

* Note: Individual Capacity should be indicated.

Date

Signature of bidder & seal

SIGNATURE OF BIDDER WITH SEAL & DATE



PART-II (b): INFORMATION ON SYSTEMS REQUIRED WITH QUANTITY

Sl. No.	Description of the Items	Quantity
1	Supply, installation and commissioning of 50 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis as per the specifications mentioned at Annexure – IV (A) of this NIT including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules).	6 (six) nos.
2	Supply, installation and commissioning of 25 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis as per the specifications mentioned at Annexure – IV (B) of this NIT including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules).	6 (six) nos.

Date

Signature of bidder & seal

PART-II (c) : INFORMATION ON ADDITIONAL ITEMS AS REQUIRED FOR INTERNAL WIRING

Sl. No.	Items	Quantity
1	<i>Supply, fitting fixing of the following ISI Marked Main Switch</i>	
1.a	16 Amps, 1 phase	As required
1.b	32 Amps, 1 phase	As required
1.c	32 amps, 3 phase	As required
1.d	63 amps, 3 phase	As required
2	<i>Supply, fitting fixing of the following ISI Marked Copper cable (Multistand)</i>	
2.a	25 mm ²	As required
2.b	16 mm ²	As required
2.c	10 mm ²	As required
2.d	6 mm ²	As required
2.e	4 mm ²	As required
2.f	2.5 mm ²	As required
2.g	1.5 mm ²	As required
3	<i>Supply, fitting fixing of ISI Marked Switch</i>	
3.a	5 Amps	As required
3.b	15 Amps	As required
4	<i>Supply, fitting fixing of ISI Market Socket</i>	
4.a	5 Amps	As required
4.b	15 Amps	As required
5	Supply, fitting fixing of ISI marked Plug	
5.a	5 Amps	As required

SIGNATURE OF BIDDER WITH SEAL & DATE

5.b	15 Amps	As required
6	Supply, fitting fixing of ISI Marked Auto Change Over Switch	
6.a	16 Amps (single phase)	As required
6.b	32 amps (single phase)	As required
6.c	32 amps (three phase)	As required
6.d	63 Amps (three phase)	As required
7	Supply, fitting fixing of PVC Casing for internal wiring	
7.a	1 inch.	As required
7.b	1.5 inch.	As required
7.c	2 inch.	As required
8	Supply, fitting fixing of PVC Switch Board	
8.a	4" X 4"	As required
8.b	7" X 4"	As required
8.c	8" X 6"	As required
9	ISI marked CFL including housing cabinet for indoor lighting with transparent cover suitable for wall mounting (With one year replacement warranty for CFL).	
9.a	11 Watt, 230 Volt	As required
9.b	18 watt, 230 Volt	As required
9.c	20 Watt, 230 Volt	As required
10	ISI marked CFL 18/20 Watt, 230 Volt including CFL housing cabinet for outdoor lighting with transparent cover and stand suitable for outer wall mounting (a minimum of 1 year replacement guarantee for CFL lamp should be given)	As required
11	Supply, fitting fixing of ISI marked CFL including holder & PVC Board (With one year replacement warranty for CFL).	
11.a	11 Watt, 230 volt	As required
11.b	18 Watt, 230 volt	As required
11.c	20 Watt, 230 volt	As required
12	Supply, fitting fixing of ISI marked Fluorescent lamp with necessary fittings (With one year replacement warranty for fluorescent lamp)	
12.a	20 watt	As required
12.b	36/40 watt	As required
13	Supply, fitting fixing of ISI marked LED bulbs including holder & PVC Board (With one year replacement warranty for LED).	
13.a	7 Watt, 230 volt	As required
13.b	10 Watt, 230 volt	As required
13.c	14 Watt, 230 volt	As required
13.d	18 Watt, 230 volt	As required
14	ISI marked LED 18 Watt, 230 Volt Light fittings for outdoor/indoor lighting and stand suitable for outer wall mounting (a minimum of 1 year replacement guarantee for LED lamp should be given)	As required
15	ISI marked LED 18 Watt, 230 Volt light fittings for outdoor lighting and stand suitable for Pole mounting (a minimum of 1 year replacement guarantee for LED lamp should be given)	As required
16	ISI marked LED 40 Watt, 230 Volt light fittings for outdoor lighting and stand suitable for Pole mounting (a minimum of 1 year replacement guarantee for LED lamp should be given)	As required

Date

Signature of bidder & seal

SIGNATURE OF BIDDER WITH SEAL & DATE



ANNEXURE – II

(To be submitted in the official letter head of the company)

DECLARATION BY THE TENDERER**(Regarding Tender Notice No.F.6(218)/TREDA/NCES/2017/616, dated 02/06/2017)**

I/We _____ (hereinafter referred to as the Tenderer) being desirous of tendering for the work under the above mentioned tender and having fully understood the nature of the work and having carefully noted all the terms and conditions, specifications etc. as mentioned in the tender document, DO HEREBY DECLARE THAT-

I/We _____ (hereinafter referred to as the Tenderer) being desirous of tendering for the work under the above mentioned tender and having fully understood the nature of the work and having carefully noted all the terms and conditions, specifications etc. as mentioned in the tender document, DO HEREBY DECLARE THAT-

- 1) The Tenderer is fully aware of all the requirements of the tender document and agrees with all provisions of the tender document.
- 2) The Tenderer is capable of executing and completing the work as required in the tender.
- 3) The Tenderer accepts all risks and responsibilities directly or indirectly connected with the performance of the tender.
- 4) The Tenderer has no collusion with other contractor, any employee of TREDA / Department of Science, Technology & Environment, Govt. of Tripura or its autonomous bodies or with any other person or firm in the preparation of the bid.
- 5) The Tenderer has not been influenced by any statement or promises of TREDA / Department of Science, Technology & Environment, Govt. of Tripura or its autonomous bodies or any of its employees but only by the tender document.
- 6) The Tenderer is financially solvent and sound to execute the work.
- 7) The Tenderer is sufficiently experienced and competent to perform the contract to the satisfaction of TREDA.
- 8) The information and the statements submitted with the tender are true.
- 9) The Tenderer is familiar with all general and special laws, acts, ordinances, rules and regulations of the Municipal, District, State and Central Government that may affect the work, its performance or personnel employed therein.
- 10) The Tenderer has not been debarred or Black Listed from similar type of work by TREDA and or Central / State Government Departments /Undertaking during last three years.
- 11) This offer shall remain valid for acceptance for 180 (one hundred eighty) days from the date of opening of the tender.
- 12) The Tenderer gives the assurance to execute the tendered work as per specifications, terms and conditions.
- 13) The quote to supply the goods and materials specified in the underwritten schedule in the manner in which and within the time specified as set forth in the conditions of contract at the rates given in the financial bid.
- 14) The terms and conditions of tender will be binding upon bidder in the event of acceptance of their tender.
- 15) The Tenderer has attached herewith the earnest money as required in the tender document.
- 16) The Tenderer accepts that the earnest money be partially / absolutely forfeited by TREDA as per the terms & conditions laid down in this NIT.

Date: ____/____/2017

(Signature of tenderer)

WITH SEAL

SIGNATURE OF BIDDER WITH SEAL & DATE


ANNEXURE - III

(Format for covering letter)

(To be submitted in the official letter head of the company)

Ref. No. _____ Date ____/____/2017

NIT No.F.6(218)/TREDA/NCES/2017/616, dated 02/06/2017

To
The Director & CEO,
Tripura Renewable Energy Development Agency,
Vigyan Bhawan, P.N. Complex,
Gorkhabasti, Agartala,
West Tripura District.

SUB: Offer in response to the NIT No.F.6(218)/TREDA/NCES/2017/616, dated 02/06/2017 for supply, installation and commissioning of 50 KWp and 25 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules).

Sir,

We are submitting our offer in full compliance of the terms & conditions of the above cited NIT. A blank copy of tender duly signed on each page is also submitted as a proof of our acceptance of all specifications as well as all the terms & conditions. We have submitted the cost of tender document & requisite EMD as per NIT terms & conditions.

We confirm that we have the capability to supply, install & commission the systems within the scheduled period.

We confirm that our offered rate would be valid for at least 180 (one hundred eighty) days from the date of opening of tender.

The tender is submitted in two separate envelopes for Technical Bid & Financial Bid alongwith all the relevant documents as per NIT.

(Signature of the authorized signatory)

Name:
Designation:
Company Seal:

SIGNATURE OF BIDDER WITH SEAL & DATE



ANNEXURE – IV(A)**TECHNICAL SPECIFICATIONS OF 50 KWp SPV POWER PLANT**

Solar Photovoltaic Power Plant consists of SPV Array, Module Mounting Structure, Power Conditioning Unit consisting of Maximum Power Point Tracker (MPPT), Control & Protections, interconnection cables, Junction Boxes, switches etc. The SPV power Plants are Off-grid type to supplement grid power, but it should be designed with necessary grid ready features i.e. having facilities to be connected to grid as and when required. All the components of the Power Plant should confirm to latest BIS or IEC or international specifications wherever such specifications are available and applicable.

1. SOLAR PHOTOVOLTAIC MODULE:

1.1	Type of material	Mono/ Multicrystalline
1.2	Make of Module	Reputed
1.3	Country	India
1.4	IEC/equivalent Standards BIS	a) The PV Modules must conform to the latest edition of the IEC/equivalent BIS Standards for PV Module design qualification and type approval: IEC 61215/IS14286. b) In addition, the modules must conform to IEC 61730 Part 1 - requirements for construction & Part 2 – requirements for testing for safety qualification or Equivalent IS (Under Dev.).
1.5	Cell of efficiency	> 12-13 % and should give good performance at the local insolation level.
1.6	Rating of individual module	≥ 250 Wp
1.7	PV Array Capacity	Minimum 50 KWp
1.8	Solar Module frame material	Corrosion resistant materials, preferably anodized Aluminium.
1.9	Protection devices	a) Against surge should be provided b) Low voltage drop by-pass diode should be provided.
1.10	Junction Box	The module should be provided with Junction Box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be sealed type and should confirm IP 65 enclosure.
1.11	IV Curve under STC	Should be laminated at the back side of the module.
1.12	Identification traceability: &	A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side: a) Name of the Manufacturer or distinctive Logo b) Model or Type No. c) Serial No.

SIGNATURE OF BIDDER WITH SEAL & DATE



		d) Year of make. e) TREDA
1.13	RFID	In addition, each SPV module should have a RF Identification (RFID) tag containing following information inside the module laminate: a) Name of the manufacturer of PV Module b) Name of the Manufacturer of Solar cells c) Month and year of the manufacture (separately for solar cells and module) d) Country of origin (separately for solar cells and module) e) I-V curve for the module f) Peak Wattage, I_m , V_m and FF for the module g) Unique Serial No and Model No of the module h) Date and year of obtaining IEC PV module qualification certificate i) Name of the test lab issuing IEC certificate j) Other relevant information on traceability of solar cells and module as per ISO 9000 series.

2. JUNCTION BOXES (JBs):

- 2.1. The junction boxes are to be provided in the PV array for termination of connecting cables. The JB's shall be made of GRP/FRP/ Powder Coated Aluminium / cast aluminium alloy with full dust, water & vermin proof arrangement. All wires/ cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands. Single / double compression cable glands should be used.
- 2.2. Copper bus bars / terminal blocks housed in the JB with suitable termination threads conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Provision of earthings should be provided. It should be placed at 5 feet height or above for ease of accessibility.
- 2.3. Each Junction Box shall have High Quality suitable capacity Metal Oxide Varistors (MOVs)/ SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.
- 2.4. Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.
- 2.5. All fuses shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers.

3. ARRAY / MODULE MOUNTING STRUCTURE:

3.1	Make	Reputed
3.2	Country of origin	India
3.3	Location	RCC Roof / Ground / GCI Sheet mounting
3.4	Materials & Hardware	a) Hot dip galvanized MS mounting structures shall be used for mounting the modules /panels/arrays. Each structure should have angle of inclination as per the site conditions to take maximum solar insolation. Alternatively,

		<p>aluminium structure specially designed and manufactured by an experienced company for solar module mounting can be used which can withstand the mentioned wind speed.</p> <p>b) The mounting structure & foundation shall be so designed to withstand the wind speed of maximum 200 Km per hour. It may be ensured that the design has been certified by a recognized lab/Institution in this regard. Suitable fastening arrangement such as grouting and clamping should be provided to secure the installation against the specific wind speed.</p> <p>c) The mounting structure steel should be as per latest IS 2062: 1992 and galvanization of the mounting structure should be in compliance with latest IS 4759.</p> <p>d) Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Necessary protection towards rusting need to be provided either by coating or anodization.</p> <p>e) The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module.</p> <p>f) Regarding civil structures, the bidder need to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof. However, grouting of the structure should be made with 1:2:4 (1 cement: 2 river sand: 4 Jhama brick/ stone aggregate of 20 mm. nominal size) cement concrete of size not less than 500 mm X 500 mm X 500 mm.</p> <p>g) The minimum clearance of the structure from the roof level after mounting the Solar modules should be 500 mm from ground / roof. In case the Modules are to be mounted at GCI sheet roof, at least 1 feet clearance should be kept.</p> <p>h) The array structure shall be grounded properly using maintenance free earthing kit suitable for mounting over building terrace/ground.</p>
3.5	Galvanization Report / Certificate	Should be produced before commencement of supply of materials.

4. DC DISTRIBUTION BOARD (DCDB):

- 4.1. DC Distribution panel to receive the DC output from the array field.
- 4.2. Enclosure of DC DPBs should be dust & vermin proof conform to IP65 protection.
- 4.3. The bus bars should be made of cooper of desired size.
- 4.4. Suitable capacity MCBs / MCCB shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.
- 4.5. All components should be of ISI Marked.
- 4.6. Self test report / certificate of DCDB should be submitted before commencement of supply of materials.

SIGNATURE OF BIDDER WITH SEAL & DATE



4.7. **“Implemented by: TREDA”** should be embossed/laminated at the front side of DCDB.

5. AC DISTRIBUTION BOARD (ACDB):

- 5.1. AC Distribution Panel Board (DPB) shall control the AC power from PCU/Inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- 5.2. Suitable capacity MCBs / MCCB shall be provided for controlling the AC power output along with necessary surge arrestors.
- 5.3. All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I,II and III
- 5.4. The changeover switches, cabling work should be undertaken by the bidder as part of the project.
- 5.5. All the Panel's shall be metal clad, totally enclosed, rigid, floor / wall mounted, air- insulated, cubical type suitable for operation on single phase, 230 volts, 50 Hz.
- 5.6. The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.
- 5.7. All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.
- 5.8. Should conform to Indian Electricity Act and rules (till last amendment).
- 5.9. All the 415 Volt or 230 volt devices/ equipment like bus support insulators, circuit breakers, SPDs, VTs etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under $\pm 10\%$ variation in supply voltage & $\pm 3\text{Hz}$ variation in supply frequency.
- 5.10. All components should be of ISI Marked.
- 5.11. Self test report / certificate of ACDB should be submitted before commencement of supply of materials.
- 5.12. **“Implemented by: TREDA”** should be embossed/laminated at the front side of ACDB.

6. POWER CONDITIONING UNIT (INVERTER PLUS MPPT CHARGE CONTROLLER):

6.1	Make of Module	Reputed
6.2	Country of origin	India
6.3	Nominal Capacity	Minimum 62.50 KVA
6.4	IEC/BIS Standards	
	Inverter	1. Efficiency Measurements: IEC 61683 / IS 61683 and must conform to the relevant National / International Electrical Safety Standards. 2. Environmental Testing: IEC 60068-2 (1, 2, 14, 30) /Equivalent BIS Std.
	Charge Controller / MPPT Unit	1. Design Qualification: IEC 62093 and must conform to the relevant National / International Electrical Safety Standards. 2. Environmental Testing: IEC 60068-2 (1, 2, 14, 30) /Equivalent BIS Std. [NOTE: In case if the Charge controller is in-built in the Inverter, no separate IEC 62093 test is required but must additionally conform to the relevant National/ International Electrical Safety Standards

SIGNATURE OF BIDDER WITH SEAL & DATE



		wherever applicable]
6.5	Switching element	IGBT/MOSFET
6.6	Control	Microprocessor / DSP
6.7	Input voltage	a) <u>From PV Array</u> : 240 V nominal DC from Solar PV Array (250 Wp or higher capacity Solar Modules be connected in appropriate series & parallel combinations so that the Array capacity is minimum 50 KWp.) b) <u>From Battery Bank</u> : 240 Volt, 1500 AH c) <u>From AC Source</u> : 410-415 V ($\pm 10\%$), 3 ph, 50 Hz($\pm .5$ Hz).
6.8	Nominal DC output voltage from Charge Controller Unit	Suitable for charging 240 V, 1500 Ah @ C/10 hr. tubular plate GEL type battery bank from SPV array.
6.9	Nominal AC Output Voltage and frequency from Inverter	415 V, 3 ph, 50 Hz
6.10	Grid frequency Synchronization Range	+ 3 Hz or more
6.11	Ambient temperature	-20°C to +50°C
6.12	Humidity	0-95 % non-condensing
6.13	Protection of enclosure	a) Indoor: IP 21 as per IEC 529 b) Outdoor: IP 65 as per IEC 529
6.14	Grid frequency Tolerance range	+ 3 Hz or more
6.15	Grid voltage tolerance	As per IE Code
6.16	No-load losses	<1% of the rated power
6.17	Inverter efficiency (minimum)	a) > 93% with inbuilt galvanic isolation b) > 95% without in-built galvanic isolation
6.18	Total Harmonic Distortion (THD)	<3%
6.19	Power Factor	>0.90
6.20	Protection	a) Short Circuit b) Deep discharge of batteries c) Over charging (Automatic trickle charge mode on full charge) d) Input surge voltage e) Over current(Load) f) Battery reverse polarity g) Solar array reverse polarity
6.21	Indication (LED / LCD indication)	a) String on b) Mains on c) Input on d) Control on e) Charger on f) Battery charge percentage g) Charger overload h) Battery on trickle i) Battery disconnected/ Fault battery j) Low Solar Power k) System fault l) Charger over temperature m) Input over/ under voltage (for AC)

6.22	Standard front LED display (minimum but not exhaustive one)	<ul style="list-style-type: none"> a) Phase wise load, voltage, current, PF, frequency of grid and Inverter b) Solar Charging Current c) Battery Voltage, current, temperature d) Ambient temperature e) Solar Radiation f) Wind speed (Optional) g) Instantaneous and cumulative energy output from Inverter h) Instantaneous and cumulative energy drawn from grid i) Different status of Inverter & Grid j) Kind of fault with audio signal
6.23	Front panel metering (minimum but not exhaustive one)	<ul style="list-style-type: none"> a) Solar ampere meter b) Battery amps meters c) Solar volt meter d) Battery volt meter e) Energy meter (Inverter output)
6.24	Controls	<ul style="list-style-type: none"> a) Selection of option to export power to grid b) Auto / Manual mode selection for Inverter / Grid
6.25	Overload capacity	150 % of the continuous rating for 30 seconds
6.26	Automatic mode of operation	<ul style="list-style-type: none"> a) Under light load conditions and with the battery in a full state of charge, the available solar power will supply the load via Inverter with excess solar power (if any) to be exported to grid, if required by user. b) Under medium and heavy load conditions, solar power is used to charge the battery as fast as required and the excess solar power feeds the load via Inverter. c) Under low /no solar power, batteries will feed the load. d) In case of no grid / unstable grid, grid will be disconnected and battery will feed the load e) In case of low battery and no solar power, grid will feed the load as well as charge the battery.
6.27	Anti- islanding (Protection against Islanding of grid)	Shall have anti-islanding protection in conformity to IEEE 1547/UL 1741/ IEC 62116 or equivalent BIS standard.
6.28	Other features	<ul style="list-style-type: none"> a) PCU / Inverter shall be capable of complete automatic operation including wake-up, synchronization and shutdown. b) The output power factor of PCU/Inverter should be suitable for all voltage ranges or sink of reactive power, Inverter should have internal protection arrangement against any sustainable fault in feed line and against the lightning on feeder. c) Built-in meter and data logger to monitor

SIGNATURE OF BIDDER WITH SEAL & DATE



		<p>plant performance through external computer shall be provided. Additionally, facilities for remote monitoring and data acquisition through Remote Monitoring System software at the Owner/TREDA location with latest software/hardware configuration and service connectivity for online/ real time data monitoring of the power plant using available standard broadband/GSM-GPRS mode of internet connectivity.</p> <p>d) Galvanic isolation of solar roof top power plant with electrical grid or LT panel.</p> <p>e) In PCU/ Inverter, there shall be a direct current isolation provided at the output by means of a suitable isolating transformer. If isolation Transformer is not incorporated with PCU/ Inverter, there shall be a separate Isolation Transformer of suitable rating provided at the output side of PCU.</p> <p>f) The PCU/ Inverter generated harmonics, flicker, DC injection limits, Voltage Range, Frequency Range and Anti-Islanding measures at the point of connection to the utility services should follow the latest CEA (Technical Standards for Connectivity Distribution Generation Resources) Guidelines.</p> <p>g) The junction boxes/ enclosures should be IP 65 (for outdoor application) / IP 54 (for indoor application) and as per IEC 529 specifications.</p>
6.29	Embossing / Lamination	“Implemented by: TREDA” at the front side.

7. BATTERY BANK:

7.1	Type	Tubular GEL Type.
7.2	Country of origin	India
7.3	Standards	As per relevant IS Code
7.4	Nominal Voltage	2.0 V/ cell
7.5	End cell voltage	1.85 V/ cell (27 Deg C)
7.6	Individual Battery / Cell capacity	750 Ah (at c/ 10 discharge rate)
7.7	No. of total Cells & combination / Battery Bank	240 nos. [2 nos. in parallel and such 120 strings in series] / 240 Volt, 1500 AH
7.8	Self discharge	4 % @ 30 Deg C per month
7.9	Charging Efficiency	93% @ 27 Deg DOD (i.e. 80 % SOC)
7.10	Battery Capacities	Measured at 27 Deg C
7.11	Battery Accessories	As required under relevant IS code
7.12	Marking	+ ve & - ve terminal shall be marked boldly on the terminals along with color indication Black- negative Red – positive
7.13	Terminals	1 No. of positive

SIGNATURE OF BIDDER WITH SEAL & DATE



		1 No. of negative
7.14	Embossing / Lamination	"Implemented by: TREDA" at the side(s).

8. BATTERY RACK: Batteries of the battery bank should be housed in racks of suitable dimensions made of Galvanized MS angle or other suitable and durable material. The racks should be strong enough to bear the load of the batteries. The tiers and rows of the racks for placing the batteries should be made as per site conditions and should facilitate easy monitoring & maintenance of the batteries.

9. INTEGRATION OF PV POWER WITH GRID:

- 9.1. The output power from SPV would be fed to the Inverters which converts DC produced by SPV array to AC. This AC power may be fed into the main electricity grid after synchronization as and when required.
- 9.2. If the system operates in grid interactive mode, then in case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid. In this case, for SPV system shall be synchronized with the battery bank and load requirement would be met to the extent of availability of power. **2 pole isolation of Inverter output with respect to the grid / battery power connection need to be provided.**
- 9.3. Under low solar power, grid is used to charge the batteries if required and also feed the load. **An Auto Changeover Switch of suitable ratings between Solar Power / Grid needs to be provided.**

10. DATA ACQUISITION SYSTEM / PLANT MONITORING:

- 10.1. Data Acquisition System shall be provided for each of the solar PV plant.
- 10.2. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable for PC. Metering and Instrumentation for display of systems parameters and status indication to be provided. The data logging features should be adjustable for logging repetition from 1 sec to 60 sec and storage capacity of upto 100 days minimum with 60 sec. Log.
- 10.3. Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) mounted in the plane of the array should be provided and should be integrated with data logging system.
- 10.4. Temperature: Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system.
- 10.5. The following parameters should be accessible via the operating interface display in real time separately for each solar power plant:
- 10.5.1. AC Voltage
- 10.5.2. AC output current
- 10.5.3. Output power
- 10.5.4. Power factor
- 10.5.5. DC input voltage
- 10.5.6. DC input current
- 10.5.7. Battery status data including battery voltage, charging current, load current etc.
- 10.5.8. Time active
- 10.5.9. Time disabled
- 10.5.10. Time idle
- 10.5.11. Power produced

- 10.5.12. Protective function limits (Viz-AC Over voltage, AC under voltage, over frequency, under frequency, ground fault, PV starting voltage, PV stopping voltage, battery low cut off, battery overcharge cut off etc.).
- 10.6. All major parameters available on the digital bus and logging facility for energy auditing through the internal microprocessor and read on the digital front panel at any time and logging facility (the current values, previous values for up to a month and the average values) should be made available for energy auditing through the internal microprocessor and should be read on the digital front panel.
- 10.7. PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class.
- 10.8. Computerized DC String/Array monitoring and AC output monitoring shall be provided as part of the Inverter and/or string/array combiner box or separately.
- 10.9. String and array DC Voltage, Current and Power, Inverter AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC energy (All 3 phases and cumulative) and frequency shall be monitored.
- 10.10. Computerized AC energy monitoring shall be provided in addition to the digital AC energy meter.
- 10.11. The data shall be recorded in a common work sheet chronologically date wise. The data file shall be MS Excel compatible. The data shall be represented in both tabular and graphical form.
- 10.12. All instantaneous data shall be shown on the computer screen.
- 10.13. Software shall be provided for USB download and analysis of DC and AC parametric data for the plant.
- 10.14. Provision for instantaneous Internet monitoring and download of historical data shall be also incorporated.
- 10.15. Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of the plants and the data of the solar radiation and temperature monitoring system.
- 10.16. Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis.
- 10.17. Simultaneous monitoring of DC and AC electrical voltage, current, power, energy and other data of the plant for correlation with solar and environment data shall be provided.
- 10.18. Remote Monitoring and data acquisition through Remote Monitoring System software at the owner /TREDA location with latest software/hardware configuration and service connectivity for online / real time data monitoring/control complete to be supplied and operation and maintenance/control to be ensured by the successful bidder. Provision for interfacing these data on TREDA server and portal in future shall be kept.
- 10.19. The bidders shall be obligated to push real – time plant monitoring data on a intervals to be specified by TREDA (say 15 minute) through open protocol at receiver location (cloud server) in XML/JSON format, preferably. Suitable provision in this regard will be intimated to the successful bidders.
- 11. POWER CONSUMPTION:** Regarding the generated power consumption, priority need to be given for internal consumption first and thereafter any excess power may be exported to grid if felt so by the user with help of

optional grid connectivity features of the system and as per decisions and approval of appropriate authority like Tripura Electricity Regulatory Commission (TERC) & Tripura State Electricity Corporation Limited (TSECL).

12. PROTECTIONS: The system should be provided with all necessary protections like earthing, lightning and grid isolation as follows:

12.1. LIGHTNING PROTECTION:

12.1.1. The SPV power plants shall be provided with lightning & overvoltage protection.

12.1.2. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per IEC 62305 standard. The protection against induced high- voltages shall be provided by the use of Metal Oxide Varistors (MOVs) and suitable earthing such that induced transients find an alternate route to earth.

12.2. **SURGE PROTECTION:** Internal surge protection shall consist of three MOV type surge-arrestors connected from +ve and -ve terminals to earth.

12.3. **EARTHING PROTECTION:** Each array structure of the PV Module, PCU, ACDB, DCDB, Lightning Arrester etc. should be grounded/ earthed properly as per IS:3043-1987. 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.

12.4. GRID ISLANDING:

12.4.1. In the event of a power failure on the electric grid, it is required that any independent power-producing Inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC Inverters from continuing to feed power into small sections of the grid, known as "islands." Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided.

12.4.2. A manual disconnect 2-pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel.

13. CABLES: Cables of appropriate size to be used in the system shall have the following characteristics:

13.1. Standard: 1.1 KV grade confirming IEC 60227/IS 694 and IEC 60502/IS 1554 (Pt. I & II).

13.2. Temp. Range: -10°C to +80°C

13.3. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation

13.4. Flexible

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

- 13.6. For the DC cabling, XLPE or XLPO insulated and sheathed, UV-stabilized single core multi stranded flexible copper cables shall be used. Multi-core cables shall not be used.
- 13.7. For the AC cabling, PVC or XLPE insulated and PVC sheathed single or multi-core multi stranded flexible copper cables shall be used. Outdoor AC cables shall have a UV-stabilized outer sheath.
- 13.8. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use. Outer sheath of cables shall be electron beam cross linked XLPO type and black in colour.
- 13.9. The DC cables from the SPV module array shall run through a UV-stabilized PVC conduit pipe of adequate diameter with a minimum wall thickness of 1.5 mm.
- 13.10. Cables and wires used for the interconnection of Solar PV modules shall be provided with solar PV connectors (MC4) and couplers.
- 13.11. All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermo-plastic clamps at intervals not exceeding 50 cm; the minimum DC cables size shall be 4.0 mm² copper, the minimum AC cable size shall be 4.0 mm² copper. In three phase systems, the size of the neutral wire size shall be equal to the size of the phase wires.
- 13.12. Cable Routing/ Marking: All cable/wires are to be routed in a GI / PVC cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable easily identified. In addition, cable drum no./ Batch no. to be embossed / printed at every one meter.
- 13.13. Cable Jacket should also be electron beam cross - linked XLPO, flame retardant, UV resistant and black in colour.
- 13.14. All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions including high temperatures, UV radiation, rain, humidity, dirt, salt, burial and attack from moss, microbes for 25 years and voltages as per IEC standards. DC cables used from solar modules to array junction box shall be solar grade copper with XLPO insulation and rated for 1.1KV as per relevant standards only.
- 13.15. The total voltage drop on the cable segments from the solar PV modules to the solar grid Inverter and to battery bank shall not exceed 2.0%.
- 13.16. The total voltage drop on the cable segments from the solar grid Inverter to the building distribution board shall not exceed 2.0%.
- 14. CONNECTIVITY:** The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the Distribution Code/Supply Code of the State and amended from time to time. TREDA may be consulted before finalization of the voltage level and specification be made accordingly.
- 15. TOOLS & TACKLES AND SPARES:**
 - 15.1. After completion of installation & commissioning of the power plant, necessary tools & tackles are to be provided free of cost by the bidder for maintenance purpose. List of tools and tackles to be supplied by the bidder is to be submitted for approval of specifications and make from TREDA.
 - 15.2. A list of requisite spares in case of PCU/Inverter comprising of a set of control logic cards, IGBT driver cards etc. Junction Boxes. Fuses, MOVs / arrestors, MCCBs etc. along with spare set of PV modules be indicated, which shall be supplied along with the equipment. A minimum set of spares shall be maintained in the plant itself for the entire period of warranty and Operation & Maintenance which upon its use shall be replenished.

- 16. DANGER BOARDS AND SIGNAGES:** Required quantity of Danger boards should be provided as and where necessary as per IE Act. /IE rules as amended up to date. Text of the signage to be finalized in consultation with TREDA.
- 17. FIRE EXTINGUISHERS:** The fire fighting system for the proposed power plant for fire protection shall be consisting of:
- 17.1. Portable fire extinguishers in the control room for fire caused by electrical short circuits
 - 17.2. Sand buckets in the control room
 - 17.3. The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided in the control room housing PCUs as well as on the Roof or site where the PV arrays have been installed.
- 18. SAFETY MEASURES:** The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA guidelines etc.
- 19. DISPLAY BOARD:** Sign Board made of Aluminium sheet and MS Angle not less than of size 8 ft. X 4 ft. should be supplied and installed at a suitable location at the site of installation of system as per direction of the Officer-in-charge, TREDA. The sign board should contain the information as follows:
- 19.1. Name of the site:-
 - 19.2. Capacity of SPV Power Plant:
 - 19.3. Implemented by: Tripura Renewable Energy Development Agency (TREDA), (A constituent organization of Department of Science, Technology & Environment, Govt. of Tripura).
 - 19.4. Funded by:
 - 19.5. Date of commissioning: ___/___/20___,
 - 19.6. Contact Person details:
 - 19.7. System details:
 - 19.7.1. Capacity & type of SPV Module:
 - 19.7.2. Quantity of SPV Modules:
 - 19.7.3. Capacity of Power Conditioning Unit:
 - 19.7.4. AC Distribution Box: 01 (one) no.
- 20. DISPLAY OF SINGLE LINE DIAGRAM:** SLD of Power Plant of suitable size should be displayed in the Control Room as per direction of the Officer-in-charge, TREDA.

SIGNATURE OF BIDDER WITH SEAL & DATE

[Handwritten Signature]
2/16/17

ANNEXURE – IV(B)**TECHNICAL SPECIFICATIONS OF 25 KWp SPV POWER PLANT**

Solar Photovoltaic Power Plant consists of SPV Array, Module Mounting Structure, Power Conditioning Unit consisting of Maximum Power Point Tracker (MPPT), Control & Protections, interconnection cables, Junction Boxes, switches etc. The SPV power Plants are Off-grid type to supplement grid power, but it should be designed with necessary grid ready features i.e. having facilities to be connected to grid as and when required. All the components of the Power Plant should confirm to latest BIS or IEC or international specifications wherever such specifications are available and applicable.

1. SOLAR PHOTOVOLTAIC MODULE:

1.1	Type of material	Mono/ Multicrystalline
1.2	Make of Module	Reputed
1.3	Country	India
1.4	IEC/equivalent Standards BIS	a) The PV Modules must conform to the latest edition of the IEC/equivalent BIS Standards for PV Module design qualification and type approval: IEC 61215/IS14286. b) In addition, the modules must conform to IEC 61730 Part 1 - requirements for construction & Part 2 – requirements for testing for safety qualification or Equivalent IS (Under Dev.).
1.5	Cell of efficiency	> 12-13 % and should give good performance at the local insolation level.
1.6	Rating of individual module	≥ 250 Wp
1.7	PV Array Capacity	Minimum 25 KWp
1.8	Solar Module frame material	Corrosion resistant materials, preferably anodized Aluminium.
1.9	Protection devices	a) Against surge should be provided b) Low voltage drop by-pass diode should be provided.
1.10	Junction Box	The module should be provided with Junction Box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be sealed type and should confirm IP 65 enclosure.
1.11	IV Curve under STC	Should be laminated at the back side of the module.
1.12	Identification traceability: &	A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side: a) Name of the Manufacturer or distinctive Logo b) Model or Type No. c) Serial No.

SIGNATURE OF BIDDER WITH SEAL & DATE

		d) Year of make. e) TREDA
1.13	RFID	In addition, each SPV module should have a RF Identification (RFID) tag containing following information inside the module laminate: a) Name of the manufacturer of PV Module b) Name of the Manufacturer of Solar cells c) Month and year of the manufacture (separately for solar cells and module) d) Country of origin (separately for solar cells and module) e) I-V curve for the module f) Peak Wattage, I_m , V_m and FF for the module g) Unique Serial No and Model No of the module h) Date and year of obtaining IEC PV module qualification certificate i) Name of the test lab issuing IEC certificate j) Other relevant information on traceability of solar cells and module as per ISO 9000 series.

2. JUNCTION BOXES (JBs):

- 2.1. The junction boxes are to be provided in the PV array for termination of connecting cables. The JB's shall be made of GRP/FRP/ Powder Coated Aluminium / cast aluminium alloy with full dust, water & vermin proof arrangement. All wires/ cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands. Single / double compression cable glands should be used.
- 2.2. Copper bus bars / terminal blocks housed in the JB with suitable termination threads conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Provision of earthings should be provided. It should be placed at 5 feet height or above for ease of accessibility.
- 2.3. Each Junction Box shall have High Quality suitable capacity Metal Oxide Varistors (MOVs)/ SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.
- 2.4. Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.
- 2.5. All fuses shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers.

3. ARRAY / MODULE MOUNTING STRUCTURE:

3.1	Make	Reputed
3.2	Country of origin	India
3.3	Location	RCC Roof / Ground / GCI Sheet mounting
3.4	Materials & Hardware	a) Hot dip galvanized MS mounting structures shall be used for mounting the modules /panels/arrays. Each structure should have angle of inclination as per the site conditions to take maximum solar insolation. Alternatively,

SIGNATURE OF BIDDER WITH SEAL & DATE

		<p>aluminium structure specially designed and manufactured by an experienced company for solar module mounting can be used which can withstand the mentioned wind speed.</p> <p>b) The mounting structure & foundation shall be so designed to withstand the wind speed of maximum 200 Km per hour. It may be ensured that the design has been certified by a recognized lab/Institution in this regard. Suitable fastening arrangement such as grouting and clamping should be provided to secure the installation against the specific wind speed.</p> <p>c) The mounting structure steel should be as per latest IS 2062: 1992 and galvanization of the mounting structure should be in compliance with latest IS 4759.</p> <p>d) Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Necessary protection towards rusting need to be provided either by coating or anodization.</p> <p>e) The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module.</p> <p>f) Regarding civil structures, the bidder need to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof. However, grouting of the structure should be made with 1:2:4 (1 cement: 2 river sand: 4 Jhama brick/ stone aggregate of 20 mm. nominal size) cement concrete of size not less than 500 mm X 500 mm X 500 mm.</p> <p>g) The minimum clearance of the structure from the roof level after mounting the Solar modules should be 500 mm from ground / roof. In case the Modules are to be mounted at GCI sheet roof, at least 1 feet clearance should be kept.</p> <p>h) The array structure shall be grounded properly using maintenance free earthing kit suitable for mounting over building terrace/ground.</p>
3.5	Galvanization Report / Certificate	Should be produced before commencement of supply of materials.

4. DC DISTRIBUTION BOARD (DCDB):

- 4.1. DC Distribution panel to receive the DC output from the array field.
- 4.2. Enclosure of DC DPBs should be dust & vermin proof conform to IP65 protection.
- 4.3. The bus bars should be made of cooper of desired size.
- 4.4. Suitable capacity MCBs / MCCB shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.
- 4.5. All components should be of ISI Marked.
- 4.6. Self test report / certificate of DCDB should be submitted before commencement of supply of materials.

SIGNATURE OF BIDDER WITH SEAL & DATE



4.7. **“Implemented by: TREDA”** should be embossed/laminated at the front side of DCDB.

5. AC DISTRIBUTION BOARD (ACDB):

- 5.1. AC Distribution Panel Board (DPB) shall control the AC power from PCU/Inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- 5.2. Suitable capacity MCBs / MCCB shall be provided for controlling the AC power output along with necessary surge arrestors.
- 5.3. All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I,II and III
- 5.4. The changeover switches, cabling work should be undertaken by the bidder as part of the project.
- 5.5. All the Panel's shall be metal clad, totally enclosed, rigid, floor / wall mounted, air- insulated, cubical type suitable for operation on single phase, 230 volts, 50 Hz.
- 5.6. The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.
- 5.7. All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.
- 5.8. Should conform to Indian Electricity Act and rules (till last amendment).
- 5.9. All the 415 Volt or 230 volt devices/ equipment like bus support insulators, circuit breakers, SPDs, VTs etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under $\pm 10\%$ variation in supply voltage & $\pm 3\text{Hz}$ variation in supply frequency.
- 5.10. All components should be of ISI Marked.
- 5.11. Self test report / certificate of ACDB should be submitted before commencement of supply of materials.
- 5.12. **“Implemented by: TREDA”** should be embossed/laminated at the front side of ACDB.

6. POWER CONDITIONING UNIT (INVERTER PLUS MPPT CHARGE CONTROLLER):

6.1	Make of Module	Reputed
6.2	Country of origin	India
6.3	Nominal Capacity	Minimum 31.25 KVA
6.4	IEC/BIS Standards	
	Inverter	1. Efficiency Measurements: IEC 61683 / IS 61683 and must conform to the relevant National / International Electrical Safety Standards. 2. Environmental Testing: IEC 60068-2 (1, 2, 14, 30) /Equivalent BIS Std.
	Charge Controller / MPPT Unit	1. Design Qualification: IEC 62093 and must conform to the relevant National / International Electrical Safety Standards. 2. Environmental Testing: IEC 60068-2 (1, 2, 14, 30) /Equivalent BIS Std. [NOTE: In case if the Charge controller is in-built in the Inverter, no separate IEC 62093 test is required but must additionally conform to the relevant National/ International Electrical Safety Standards

SIGNATURE OF BIDDER WITH SEAL & DATE



		wherever applicable]
6.5	Switching element	IGBT/MOSFET
6.6	Control	Microprocessor / DSP
6.7	Input voltage	a) <u>From PV Array</u> : 240 V nominal DC from Solar PV Array (250 Wp or higher capacity Solar Modules be connected in appropriate series & parallel combinations so that the Array capacity is minimum 25 KWp.) b) <u>From Battery Bank</u> : 240 Volt, 750 AH c) <u>From AC Source</u> : 410-415 V ($\pm 10\%$), 3 ph, 50 Hz($\pm .5$ Hz).
6.8	Nominal DC output voltage from Charge Controller Unit	Suitable for charging 240 V, 750 Ah @ C/ 10 hr. tubular plate GEL type battery bank from SPV array.
6.9	Nominal AC Output Voltage and frequency from Inverter	415 V, 3 ph, 50 Hz
6.10	Grid frequency Synchronization Range	+ 3 Hz or more
6.11	Ambient temperature	-20°C to +50°C
6.12	Humidity	0-95 % non-condensing
6.13	Protection of enclosure	a) Indoor: IP 21 as per IEC 529 b) Outdoor: IP 65 as per IEC 529
6.14	Grid frequency Tolerance range	+ 3 Hz or more
6.15	Grid voltage tolerance	As per IE Code
6.16	No-load losses	<1% of the rated power
6.17	Inverter efficiency (minimum)	a) > 93% with inbuilt galvanic isolation b) > 95% without in-built galvanic isolation
6.18	Total Harmonic Distortion (THD)	<3%
6.19	Power Factor	>0.90
6.20	Protection	a) Short Circuit b) Deep discharge of batteries c) Over charging (Automatic trickle charge mode on full charge) d) Input surge voltage e) Over current(Load) f) Battery reverse polarity g) Solar array reverse polarity
6.21	Indication (LED / LCD indication)	a) String on b) Mains on c) Input on d) Control on e) Charger on f) Battery charge percentage g) Charger overload h) Battery on trickle i) Battery disconnected/ Fault battery j) Low Solar Power k) System fault l) Charger over temperature m) Input over/ under voltage (for AC)

6.22	Standard front LED display (minimum but not exhaustive one)	<ul style="list-style-type: none"> a) Phase wise load, voltage, current, PF, frequency of grid and Inverter b) Solar Charging Current c) Battery Voltage, current, temperature d) Ambient temperature e) Solar Radiation f) Wind speed (Optional) g) Instantaneous and cumulative energy output from Inverter h) Instantaneous and cumulative energy drawn from grid i) Different status of Inverter & Grid j) Kind of fault with audio signal
6.23	Front panel metering (minimum but not exhaustive one)	<ul style="list-style-type: none"> a) Solar ampere meter b) Battery amps meters c) Solar volt meter d) Battery volt meter e) Energy meter (Inverter output)
6.24	Controls	<ul style="list-style-type: none"> c) Selection of option to export power to grid d) Auto / Manual mode selection for Inverter / Grid
6.25	Overload capacity	150 % of the continuous rating for 30 seconds
6.26	Automatic mode of operation	<ul style="list-style-type: none"> a) Under light load conditions and with the battery in a full state of charge, the available solar power will supply the load via Inverter with excess solar power (if any) to be exported to grid, if required by user. b) Under medium and heavy load conditions, solar power is used to charge the battery as fast as required and the excess solar power feeds the load via Inverter. c) Under low /no solar power, batteries will feed the load. d) In case of no grid / unstable grid, grid will be disconnected and battery will feed the load. e) In case of low battery and no solar power, grid will feed the load as well as charge the battery.
6.27	Anti- islanding (Protection against Islanding of grid)	Shall have anti-islanding protection in conformity to IEEE 1547/UL 1741/ IEC 62116 or equivalent BIS standard.
6.28	Other features	<ul style="list-style-type: none"> a) PCU / Inverter shall be capable of complete automatic operation including wake-up, synchronization and shutdown. b) The output power factor of PCU/Inverter should be suitable for all voltage ranges or sink of reactive power, Inverter should have internal protection arrangement against any sustainable fault in feed line and against the lightning on feeder. c) Built-in meter and data logger to monitor

SIGNATURE OF BIDDER WITH SEAL & DATE



		<p>plant performance through external computer shall be provided. Additionally, facilities for remote monitoring and data acquisition through Remote Monitoring System software at the Owner/TREDA location with latest software/hardware configuration and service connectivity for online/ real time data monitoring of the power plant using available standard broadband/GSM-GPRS mode of internet connectivity.</p> <p>d) Galvanic isolation of solar roof top power plant with electrical grid or LT panel.</p> <p>e) In PCU/ Inverter, there shall be a direct current isolation provided at the output by means of a suitable isolating transformer. If isolation Transformer is not incorporated with PCU/ Inverter, there shall be a separate Isolation Transformer of suitable rating provided at the output side of PCU.</p> <p>f) The PCU/ Inverter generated harmonics, flicker, DC injection limits, Voltage Range, Frequency Range and Anti-Islanding measures at the point of connection to the utility services should follow the latest CEA (Technical Standards for Connectivity Distribution Generation Resources) Guidelines.</p> <p>g) The junction boxes/ enclosures should be IP 65 (for outdoor application) / IP 54 (for indoor application) and as per IEC 529 specifications.</p>
6.29	Embossing / Lamination	"Implemented by: TREDA" at the front side.

7. BATTERY BANK:

7.1	Type	Tubular GEL Type.
7.2	Country of origin	India
7.3	Standards	As per relevant IS Code
7.4	Nominal Voltage	2.0 V/ cell
7.5	End cell voltage	1.85 V/ cell (27 Deg C)
7.6	Individual Battery / Cell capacity	750 Ah (at c/ 10 discharge rate)
7.7	No. of total Cells /Battery Bank	120 nos. / 240 Volt, 750 AH
7.8	Self discharge	4 % @ 30 Deg C per month
7.9	Charging Efficiency	93% @ 27 Deg DOD (i.e. 80 % SOC)
7.10	Battery Capacities	Measured at 27 Deg C
7.11	Battery Accessories	As required under relevant IS code
7.12	Marking	+ ve & - ve terminal shall be marked boldly on the terminals along with color indication Black- negative Red – positive
7.13	Terminals	1 No. of positive 1 No. of negative

SIGNATURE OF BIDDER WITH SEAL & DATE



7.14	Embossing / Lamination	“Implemented by: TREDA” at the side(s).
------	------------------------	--

8. BATTERY RACK: Batteries of the battery bank should be housed in racks of suitable dimensions made of Galvanized MS angle or other suitable and durable material. The racks should be strong enough to bear the load of the batteries. The tiers and rows of the racks for placing the batteries should be made as per site conditions and should facilitate easy monitoring & maintenance of the batteries.

9. INTEGRATION OF PV POWER WITH GRID:

- 9.1. The output power from SPV would be fed to the Inverters which converts DC produced by SPV array to AC. This AC power may be fed into the main electricity grid after synchronization as and when required.
- 9.2. If the system operates in grid interactive mode, then in case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid. In this case, for SPV system shall be synchronized with the battery bank and load requirement would be met to the extent of availability of power. **2 pole isolation of Inverter output with respect to the grid / battery power connection need to be provided.**
- 9.3. Under low solar power, grid is used to charge the batteries if required and also feed the load. **An Auto Changeover Switch of suitable ratings between Solar Power / Grid needs to be provided.**

10. DATA ACQUISITION SYSTEM / PLANT MONITORING:

- 10.1. Data Acquisition System shall be provided for each of the solar PV plant.
- 10.2. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable for PC. Metering and Instrumentation for display of systems parameters and status indication to be provided. The data logging features should be adjustable for logging repetition from 1 sec to 60 sec and storage capacity of upto 100 days minimum with 60 sec. Log.
- 10.3. Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) mounted in the plane of the array should be provided and should be integrated with data logging system.
- 10.4. Temperature: Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system.
- 10.5. The following parameters should be accessible via the operating interface display in real time separately for each solar power plant:
 - 10.5.1. AC Voltage
 - 10.5.2. AC output current
 - 10.5.3. Output power
 - 10.5.4. Power factor
 - 10.5.5. DC input voltage
 - 10.5.6. DC input current
 - 10.5.7. Battery status data including battery voltage, charging current, load current etc.
 - 10.5.8. Time active
 - 10.5.9. Time disabled
 - 10.5.10. Time idle
 - 10.5.11. Power produced
 - 10.5.12. Protective function limits (Viz-AC Over voltage, AC under voltage, over frequency, under frequency, ground fault, PV

- starting voltage, PV stopping voltage, battery low cut off, battery overcharge cut off etc.).
- 10.6. All major parameters available on the digital bus and logging facility for energy auditing through the internal microprocessor and read on the digital front panel at any time and logging facility (the current values, previous values for up to a month and the average values) should be made available for energy auditing through the internal microprocessor and should be read on the digital front panel.
 - 10.7. PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class.
 - 10.8. Computerized DC String/Array monitoring and AC output monitoring shall be provided as part of the Inverter and/or string/array combiner box or separately.
 - 10.9. String and array DC Voltage, Current and Power, Inverter AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC energy (All 3 phases and cumulative) and frequency shall be monitored.
 - 10.10. Computerized AC energy monitoring shall be provided in addition to the digital AC energy meter.
 - 10.11. The data shall be recorded in a common work sheet chronologically date wise. The data file shall be MS Excel compatible. The data shall be represented in both tabular and graphical form.
 - 10.12. All instantaneous data shall be shown on the computer screen.
 - 10.13. Software shall be provided for USB download and analysis of DC and AC parametric data for the plant.
 - 10.14. Provision for instantaneous Internet monitoring and download of historical data shall be also incorporated.
 - 10.15. Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of the plants and the data of the solar radiation and temperature monitoring system.
 - 10.16. Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis.
 - 10.17. Simultaneous monitoring of DC and AC electrical voltage, current, power, energy and other data of the plant for correlation with solar and environment data shall be provided.
 - 10.18. Remote Monitoring and data acquisition through Remote Monitoring System software at the owner /TREDA location with latest software/hardware configuration and service connectivity for online / real time data monitoring/control complete to be supplied and operation and maintenance/control to be ensured by the successful bidder. Provision for interfacing these data on TREDA server and portal in future shall be kept.
 - 10.19. The bidders shall be obligated to push real – time plant monitoring data on a intervals to be specified by TREDA (say 15 minute) through open protocol at receiver location (cloud server) in XML/JSON format, preferably. Suitable provision in this regard will be intimated to the successful bidders.

11. **POWER CONSUMPTION:** Regarding the generated power consumption, priority need to be given for internal consumption first and thereafter any excess power may be exported to grid if felt so by the user with help of optional grid connectivity features of the system and as per decisions and approval of appropriate authority like Tripura Electricity Regulatory

Commission (TERC) & Tripura State Electricity Corporation Limited (TSECL).

12. PROTECTIONS: The system should be provided with all necessary protections like earthing, lightning and grid isolation as follows:

12.1. LIGHTNING PROTECTION:

12.1.1. The SPV power plants shall be provided with lightning & overvoltage protection.

12.1.2. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per IEC 62305 standard. The protection against induced high- voltages shall be provided by the use of Metal Oxide Varistors (MOVs) and suitable earthing such that induced transients find an alternate route to earth.

12.2. SURGE PROTECTION: Internal surge protection shall consist of three MOV type surge-arrestors connected from +ve and -ve terminals to earth.

12.3. EARTHING PROTECTION: Each array structure of the PV Module, PCU, ACDB, DCDB, Lightning Arrester etc. should be grounded/ earthed properly as per IS:3043-1987. 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.

12.4. GRID ISLANDING:

12.4.1. In the event of a power failure on the electric grid, it is required that any independent power-producing Inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC Inverters from continuing to feed power into small sections of the grid, known as "islands." Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided.

12.4.2. A manual disconnect 2-pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel.

13. CABLES: Cables of appropriate size to be used in the system shall have the following characteristics:

13.1. Standard: 1.1 KV grade confirming IEC 60227/IS 694 and IEC 60502/IS 1554 (Pt. I & II).

13.2. Temp. Range: -10°C to +80°C

13.3. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation

13.4. Flexible

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

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

- 13.7. For the AC cabling, PVC or XLPE insulated and PVC sheathed single or multi-core multi stranded flexible copper cables shall be used. Outdoor AC cables shall have a UV-stabilized outer sheath.
- 13.8. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use. Outer sheath of cables shall be electron beam cross linked XLPO type and black in colour.
- 13.9. The DC cables from the SPV module array shall run through a UV-stabilized PVC conduit pipe of adequate diameter with a minimum wall thickness of 1.5 mm.
- 13.10. Cables and wires used for the interconnection of Solar PV modules shall be provided with solar PV connectors (MC4) and couplers.
- 13.11. All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermo-plastic clamps at intervals not exceeding 50 cm; the minimum DC cables size shall be 4.0 mm² copper, the minimum AC cable size shall be 4.0 mm² copper. In three phase systems, the size of the neutral wire size shall be equal to the size of the phase wires.
- 13.12. Cable Routing/ Marking: All cable/wires are to be routed in a GI / PVC cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable easily identified. In addition, cable drum no./ Batch no. to be embossed / printed at every one meter.
- 13.13. Cable Jacket should also be electron beam cross – linked XLPO, flame retardant, UV resistant and black in colour.
- 13.14. All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions including high temperatures, UV radiation, rain, humidity, dirt, salt, burial and attack from moss, microbes for 25 years and voltages as per IEC standards. DC cables used from solar modules to array junction box shall be solar grade copper with XLPO insulation and rated for 1.1KV as per relevant standards only.
- 13.15. The total voltage drop on the cable segments from the solar PV modules to the solar grid Inverter and to battery bank shall not exceed 2.0%.
- 13.16. The total voltage drop on the cable segments from the solar grid Inverter to the building distribution board shall not exceed 2.0%.
- 14. CONNECTIVITY:** The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the Distribution Code/Supply Code of the State and amended from time to time. TRED A may be consulted before finalization of the voltage level and specification be made accordingly.
- 15. TOOLS & TACKLES AND SPARES:**
 - 15.1. After completion of installation & commissioning of the power plant, necessary tools & tackles are to be provided free of cost by the bidder for maintenance purpose. List of tools and tackles to be supplied by the bidder is to be submitted for approval of specifications and make from TRED A.
 - 15.2. A list of requisite spares in case of PCU/Inverter comprising of a set of control logic cards, IGBT driver cards etc. Junction Boxes. Fuses, MOVs / arrestors, MCCBs etc. along with spare set of PV modules be indicated, which shall be supplied along with the equipment. A minimum set of spares shall be maintained in the plant itself for the entire period of warranty and Operation & Maintenance which upon its use shall be replenished.
- 16. DANGER BOARDS AND SIGNAGES:** Required quantity of Danger boards should be provided as and where necessary as per IE Act. /IE rules as

amended up to date. Text of the signage to be finalized in consultation with TREDA.

- 17. FIRE EXTINGUISHERS:** The fire fighting system for the proposed power plant for fire protection shall be consisting of:
- 17.1. Portable fire extinguishers in the control room for fire caused by electrical short circuits
 - 17.2. Sand buckets in the control room
 - 17.3. The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided in the control room housing PCUs as well as on the Roof or site where the PV arrays have been installed.
- 18. SAFETY MEASURES:** The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA guidelines etc.
- 19. DISPLAY BOARD:** Sign Board made of Aluminium sheet and MS Angle not less than of size 8 ft. X 4 ft. should be supplied and installed at a suitable location at the site of installation of system as per direction of the Officer-in-charge, TREDA. The sign board should contain the information as follows:
- 19.1. Name of the site:-
 - 19.2. Capacity of SPV Power Plant:
 - 19.3. Implemented by: Tripura Renewable Energy Development Agency (TREDA), (A constituent organization of Department of Science, Technology & Environment, Govt. of Tripura).
 - 19.4. Funded by:
 - 19.5. Date of commissioning: ___/___/20___,
 - 19.6. Contact Person details:
- 20. DISPLAY OF SINGLE LINE DIAGRAM:** SLD of Power Plant of suitable size should be displayed in the Control Room as per direction of the Officer-in-charge, TREDA.

SIGNATURE OF BIDDER WITH SEAL & DATE

[Handwritten Signature]
2/16/17

ANNEXURE – V**OPERATION AND MAINTENANCE GUIDELINES FOR THE SPV POWER PLANTS**

For the optima operation of a PV Plant, maintenance must be carried out on a regular basis. All the components should be kept clean. It should be ensured that all the components are fastened well at their due place. Maintenance guidelines for various components viz., Solar PV Modules, Power Conditioning Unit, Battery, cabling etc. are given below:

1. SOLAR PV MODULES:

- 1.1. Although the cleaning frequency for the modules will vary from site to site depending on soiling, it is recommended that -- The SPV modules are cleaned at least once every fifteen days.
- 1.2. Any bird droppings or spots should be cleaned immediately.
- 1.3. Use water and a soft sponge or cloth for cleaning.
- 1.4. Do not use detergent or any abrasive material for module cleaning.
- 1.5. Iso-propyl alcohol may be used to remove oil or grease stains.
- 1.6. Do not spray water on the module if the module glass is cracked or the back side is perforated.
- 1.7. Wipe water from the module as soon as possible.
- 1.8. Early morning is particularly good time for module cleaning.
- 1.9. Check if there is any shade problem due to vegetation or new building.
- 1.10. If there are, arrange for removing vegetation or shift panel to shadow free place.
- 1.11. Ensure that the module terminal connections are not exposed while cleaning.

2. CABLES AND CONNECTION BOXES:

- 2.1. Check the connections for corrosion and tightness.
- 2.2. There should be no vermin inside the box.
- 2.3. Check the cable insulating sheath for crack, break or burn. If found damaged, replace the wire.
- 2.4. Ensure proper clamping of the wire.

3. POWER CONDITIONING UNIT (CHARGE CONTROLLER AND INVERTER):

- 3.1. The PCU / Inverter area should be clean, dry and ventilated.
- 3.2. Remove any excess dust in heat sink and ventilation with only dry cloth or brush.
- 3.3. Check for vermin infestation and clean if found any.
- 3.4. Check functionality e.g., automatic disconnect upon loss of grid power supply, at least once a month.
- 3.5. Verify the state of DC/AC surge arrestors, cable connections and circuit breakers.

4. BATTERY

- 4.1. Batteries should remain in dry and ventilated area.
- 4.2. Check the battery terminals for any loose connection, corrosion or dust.
- 4.3. Check for electrolyte leaks and integrity.
- 4.4. Check for corrosion of racks / cabinets.
- 4.5. Check for ambient temperature.

5. SHUTTING DOWN THE SYSTEM:

- 5.1. Disconnect system from all power sources in accordance with instructions for all other components used in the system.

- 5.2. Completely cover system modules with an opaque material to prevent electricity from being generated while disconnecting conductors.
- 5.3. To the extent possible, system shutdown shall not be done during day time or peak generation period.

6. INSPECTION AND MAINTENANCE SCHEDULE:

Component	Activity	Description	Interval	
			50 KWp	25 KWp
PV Module	Cleaning	Clean any bird droppings / dark spot in the module	Immediately	Monthly
	Cleaning	Clean PV Module with plain water	Fortnightly or as per site conditions	Monthly
PV Array	Inspection	Check the PV modules and rack for any damage. Note down location, serial number of damaged modules	Quarterly	Quarterly
	Inspection	Determine any new object causing shading of the array and remove them if possible	Quarterly	Quarterly
	Vermin removal	Remove bird nests or vermin from array and rack area	Quarterly	Quarterly
Junction Boxes	Inspection	Inspection for corrosion / intrusion of water or insects. Seal boxes, if required, check position of switches and breakers. Check operation of all protective devices.	Quarterly	Quarterly
	Inspection	Inspect cabling for signs of cracks, defects, loose connections, overheating, arching, short or open circuits and ground faults.	Quarterly	Quarterly
Power Conditioning Unit (PCU)	Inspection	Observe instantaneous operational indicators to ensure real time status.	Monthly	Monthly

SIGNATURE OF BIDDER WITH SEAL & DATE



		Inspect PCU housing for physical maintenance, if needed.		
	Service	Clean or replace any air filter	As needed	As needed
Battery	Inspection	Inspection General Cleanliness of battery, mounting rack	Daily	Monthly
	Inspection	Check for corrosion at terminal connectors, racks and cabinet	Daily	Monthly
	Monitoring	a) Check and record voltage of pilot cell b) Check & record the float voltage across the whole battery with accurate digital voltmeter. Compare this reading with the panel voltmeter and adjust the panel voltmeter accordingly.	Daily	Monthly
	Monitoring	Check the temperature of each individual cell and compare readings with initial and all prior temperatures for taking any corrective measures	Quarterly	Quarterly
	Monitoring	Check voltage of each individual cell with accurate digital voltmeter	Half yearly	Half yearly
	Monitoring	Measure resistance of all connections and compare them with previous readings. Take corrective measures for 20% increase in resistance.	Annually	Annually
Instruments	Validation	Spot check monitoring instruments with	Annual	Annual

		standard ones to ensure proper operation		
Plant	Monitoring	Operation & performance Monitoring	Daily	Monthly
Spare parts	Management	Manage inventory of spare parts	As needed	As needed
Log book	Documentation	Document all O&M activities in a workbook	Continuous	Continuous

7. MONTHLY OPERATION & MAINTENANCE REPORT:

Month & Year:

Name of Contractor:

Work Order reference No.:

Project Capacity:

Name & address of the site:

PART - A

(APPLICABLE FOR 50 KWp & 25 KWp PLANTS)

Component	Activity	Description	Date	Name & Signature of user	Remarks
PV Module	Cleaning	Bird droppings / dark spot			
	Cleaning	With plain water			
Power Conditioning Unit(PCU)	Inspection	a) Inspection of operational indicators b) Physical Maintenance of PCU/ Inverter Housing c) Checking of connections			
	Service	Clean / Replacing of air filter			
Battery	Monitoring	Check for corrosion at terminals connectors, racks and cabinets			
	Monitoring	a) Record voltage of pilot cell b) Record the float voltage across the whole battery with accurate digital voltmeter. Compare this			

SIGNATURE OF BIDDER WITH SEAL & DATE

		reading with the panel voltmeter and adjust the panel voltmeter if required.			
Plant	Monitoring	Operation & performance			Spare Parts required
Spare Parts	Management	Inventory management			
Log book	Documentation	Log records			

PART - B

(APPLICABLE FOR 50 KWp PLANT)

Date	Generation (KWh)	Grid outage (hh:mm)	Inverter down period (hh:mm)	Battery down period (hh:mm)	Remarks
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

Total Generation for the month in KWh:

Cumulative generation since commissioning in KWh:

CUF for the month (in %):

Cumulative CUF since commissioning (in %):

SIGNATURE OF BIDDER WITH SEAL & DATE



8. ANNUAL OPERATION & MAINTENANCE REPORT:

<i>Component</i>	<i>Activity</i>	<i>Description</i>	<i>Date</i>	<i>Name & signature of user</i>	<i>Remarks</i>
PV Array	Inspection	Check for any damage			
	Inspection	Check for any object making shadow and remove the object			
	Inspection	Vermin removal			
Battery	Monitoring	Measure resistance of all connections and compare them with previous readings. Take corrective measures for 20% increase in resistance			
Junction boxes	Inspection	a) Inspection for corrosion / intrusion of water or vermin, b) Check position of switches & breakers, status of all protective devices			
Cabling	Inspection	Check for crack, defect, loose connections, corrosion, overheating, short/open circuit, ground faults.			
Instruments	Validation	Verification with standard instruments			

SIGNATURE OF BIDDER WITH SEAL & DATE


 A handwritten signature in blue ink, followed by the date '2/16/17' written below it.

ANNEXURE - VI

DRAFT FORMAT FOR BANK GUARANTEE FOR PERFORMANCE SECURITY

This deed of Guarantee made on day of Month & Year by Name & Address of the bank (hereinafter called the 'GUARANTOR') on the one part, on behalf of M/s Name & address of the Firm (hereinafter called the 'FIRM')) in favour of Director & CEO, Tripura Renewable Energy Development Agency,(TREDA), Vigyan Bhavan, Pandit Nehru Complex, Gurkhabasti, P.O. Kunjaban, Agartala, Tripura -799006 (hereinafter called 'TREDA') on the other part, on the following terms and conditions.

Whereas the FIRM has executed the 'Name of Work'..... under Agreement No..... between FIRM & TREDA and whereas in pursuance of the terms of the agreement, TREDA having agreed to pay the amount for performance security against bank guarantee, this guarantee is being made for the purpose of release of the performance security amount.

Know all people by these presents that the GUARANTOR, hereby undertake to indemnify and keep TREDA indemnified up to the extent of Rs.....during the validity of this bank guarantee and authorize TREDA to recover the same directly from the GUARANTOR. This bank guarantee herein contained shall remain in full force and effect till the expiry of its validity or till any extended period (if extended by the bank on receiving instructions from FIRM.). The liability under the guarantee shall be binding on the GUARANTOR or its successors.

Whereas the GUARANTOR further agrees that their liability under this guarantee shall not be affected by any reason of any change in the offer or its terms and conditions between the FIRM and TREDA with or without the consent or knowledge of the GUARANTOR.

Whereas the GUARANTOR further agrees to pay guaranteed amount hereby under or part thereof, on receipt of first written demand whenever placed by TREDA during the currency period of this guarantee. The GUARANTOR shall pay TREDA immediately without any question, demure, reservation or correspondence.

Whereas the GUARANTOR hereby agrees not to revoke this guarantee bond during its currency period except with the previous consent of TREDA in writing.

Notwithstanding anything contained herein -

- 1 Our liability under this bank guarantee shall not exceed Rs.
 - 2 This Bank guarantee shall be valid up to
 - 3 We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only against the written claim or demand on or before
- Sealed with the common seal of the bank on thisday of Month and Year

Witness

1..... (Signature and seal of the bank)
 2.....

SIGNATURE OF BIDDER WITH SEAL & DATE

ANNEXURE - VII**BIDDING SCHEDULE - I**

TENDER INVITING AUTHORITY: Director & Chief Executive Officer, TREDA.

NAME OF ITEM: "Supply, installation and commissioning of Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules)".

NIT: No.F.6(218)/TREDA/NCES/2017/616, dated 02/06/2017.

BIDDER NAME:

1. SPV Power Plant:

Sl. No.	Description of the Items	Qty	Rate (with detailed breakup)	Amount
1.1	Supply, installation and commissioning of 50 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis as per the specifications mentioned at Annexure – IV (A) of this NIT including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules).	6 (six) nos.		
1.2	Supply, installation and commissioning of 25 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism throughout the state of Tripura on turn-key basis as per the specifications mentioned at Annexure – IV (B) of this NIT including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules).	6 (six) nos.		

Date

Signature of bidder & seal

SIGNATURE OF BIDDER WITH SEAL & DATE

BIDDING SCHEDULE – II**2. Charges for the additional items as required:**

Sl. No.	Items	Unit Rate including all taxes, duties etc.
1	<i>Supply, fitting fixing of the following ISI Marked Main Switch</i>	<i>Rate per unit</i>
1.a	16 Amps, 1 phase	
1.b	32 Amps, 1 phase	
1.c	32 amps, 3 phase	
1.d	63 amps, 3 phase	
2	<i>Supply, fitting fixing of the following ISI Marked Copper cable (Multistand)</i>	<i>Rate per unit</i>
2.a	25 mm ²	
2.b	16 mm ²	
2.c	10 mm ²	
2.d	6 mm ²	
2.e	4 mm ²	
2.f	2.5 mm ²	
2.g	1.5 mm ²	
3	<i>Supply, fitting fixing of ISI Marked Switch</i>	<i>Rate per unit</i>
3.a	5 Amps	
3.b	15 Amps	

Date**Signature of bidder & seal****SIGNATURE OF BIDDER WITH SEAL & DATE**


Sl. No.	Items	Unit Rate including all taxes, duties etc.
4	<i>Supply, fitting fixing of ISI Market Socket</i>	<i>Rate per unit</i>
4.a	5 Amps	
4.b	15 Amps	
5	<i>Supply, fitting fixing of ISI marked Plug</i>	<i>Rate per unit</i>
5.a	5 Amps	
5.b	15 Amps	
6	<i>Supply, fitting fixing of ISI Marked Auto Change Over Switch</i>	<i>Rate per unit</i>
6.a	16 Amps (single phase)	
6.b	32 amps (single phase)	
6.c	32 amps (three phase)	
6.d	63 Amps (three phase)	
7	<i>Supply, fitting fixing of PVC Casing for internal wiring</i>	<i>Rate per unit</i>
7.a	1 inch.	
7.b	1.5 inch.	
7.c	2 inch.	
8	<i>Supply, fitting fixing of PVC Switch Board</i>	<i>Rate per unit</i>
8.a	4" X 4"	
8.b	7" X 4"	
8.c	8" X 6"	

Date**Signature of bidder & seal****SIGNATURE OF BIDDER WITH SEAL & DATE**

Sl. No.	Items	Unit Rate including all taxes, duties etc.
9	<i>ISI marked CFL including housing cabinet for indoor lighting with transparent cover suitable for wall mounting (With one year replacement warranty for CFL).</i>	<i>Rate per unit</i>
9.a	11 Watt, 230 Volt	
9.b	18 watt, 230 Volt	
9.c	20 Watt, 230 Volt	
10	ISI marked CFL 18/20 Watt, 230 Volt including CFL housing cabinet for outdoor lighting with transparent cover and stand suitable for outer wall mounting (a minimum of 1 year replacement guarantee for CFL lamp should be given)	<i>Rate per unit</i>
11	<i>Supply, fitting fixing of ISI marked CFL including holder & PVC Board (With one year replacement warranty for CFL).</i>	<i>Rate per unit</i>
11.a	11 Watt, 230 volt	
11.b	18 Watt, 230 volt	
11.c	20 Watt, 230 volt	
12	<i>Supply, fitting fixing of ISI marked Fluorescent lamp with necessary fittings (With one year replacement warranty for fluorescent lamp)</i>	<i>Rate per unit</i>
12.a	20 watt	
12.b	36/40 watt	
13	<i>Supply, fitting fixing of ISI marked LED bulbs including holder & PVC Board (With one year replacement warranty for LED).</i>	<i>Rate per unit</i>
13.a	7 Watt, 230 volt	
13.b	10 Watt, 230 volt	

Date**Signature of bidder & seal****SIGNATURE OF BIDDER WITH SEAL & DATE**


Sl. No.	Items	Unit Rate including all taxes, duties etc.
13.c	14 Watt, 230 volt	
13.d	18 Watt, 230 volt	
14	ISI marked LED 18 Watt, 230 Volt Light fittings for outdoor/indoor lighting and stand suitable for outer wall mounting (a minimum of 1 year replacement guarantee for LED lamp should be given)	<i>Rate per unit</i>
15	ISI marked LED 18 Watt, 230 Volt light fittings for outdoor lighting and stand suitable for Pole mounting (a minimum of 1 year replacement guarantee for LED lamp should be given)	<i>Rate per unit</i>
16	ISI marked LED 40 Watt, 230 Volt light fittings for outdoor lighting and stand suitable for Pole mounting (a minimum of 1 year replacement guarantee for LED lamp should be given)	<i>Rate per unit</i>

Date

Signature of bidder & seal

SIGNATURE OF BIDDER WITH SEAL & DATE

Handwritten signature and date 2/16/17

ANNEXURE – VIII**BID INFORMATION SHEET**

Name of work	1. Supply, installation and commissioning of 50 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism and throughout the state of Tripura on turn-key basis as per the specifications mentioned at Annexure – IV (A) of this NIT including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules). 2. Supply, installation and commissioning of 25 KWp Solar Photovoltaic Power Plant with grid ready features i.e. having optional facility for grid connection through Net metering as & when required and having Remote Monitoring Mechanism and throughout the state of Tripura on turn-key basis as per the specifications mentioned at Annexure – IV (B) of this NIT including 5 (five) years Warranty /Guarantee and Operation & Maintenance Contract from the date of commissioning of the plant (25 years Warranty/Guarantee for SPV Modules).
NIT	No.F.6(218)/TREDA/NCES/2017/616, dated 02/06/2017
Last date of submission of bid	28th June, 2017 at 3:30 PM
Pre-bid meeting	21st June, 2017 at 12:00 noon
Schedule date of opening of tender	28th June,2017 at 4:00 PM
Cost of tender document	Rs. 3,000/- (Rupees three thousand)
Amount of EMD required	2.5% of the total quoted amount in Bidding Schedule - I.
Address for submission of bid document	Director & Chief Executive Officer, Tripura Renewable Energy Development Agency, Vigyan Bhawan, Pandit Nehru Complex, Gorkhabasti, Agartala, Pin: 799006. Ph-(0381)-232-6139, Tele - fax – (0381) 232-5900, <u>Email- tredaagartala@gmail.com</u> Web URL- www.treda.nic.in

IMPORTANT NOTE: Prospective bidders are requested to remain updated for any Notices/Amendments/Clarifications etc. to the NIT document through the website **www.tripura.gov.in** and **www.treda.nic.in**. No separate Notices would be issued for such Notices/Amendments/Clarifications etc. in the print media or individually. All the information related to this NIT shall be uploaded in the website **www.tripura.gov.in** & **www.treda.nic.in**.

SIGNATURE OF BIDDER WITH SEAL & DATE

