



**GOVERNMENT OF TAMIL NADU  
DEPARTMENT OF TOURISM**

**Infrastructure Development Investment Program for Tourism  
PIU - Tamil Nadu Tourism Development Corporation Limited**

**BIDDING DOCUMENT  
for**

**Procurement of Goods**

**Providing Solar Lights and PV Panels in TTDC  
Tourist Complexes.**

**Single-Stage: Two-Envelope  
Bidding Procedure**

**Volume 2-Price Bid Documents**

**Issued on** : 15 May 2018

**Invitation for Bids No** : PIU/TTDC/ROC NO: 3459/Engg/2018 Dated: 09.05.2018

**NCB No** : IDIPT/TN/T4/NCB/12/2017

**Purchaser** : Chairman and Managing Director,  
Tamil Nadu Tourism Development Corporation Limited,  
Tamil Nadu Tourism Complex,  
2, Wallajah Road,  
Chennai – 600 002, Tamil Nadu  
Telephone: +91 044-25333850-54.  
Email: ttdc@vsnl.com

**Country** : India

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# Bidding Forms

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## Price Bid Submission Sheet

**-- Note --**

*The Bidder must accomplish the Price Bid Submission Sheet on its letterhead clearly showing the bidder's complete name and address.*

Date:

NCB No.: IDIPT/TN/T4/NCB/12/2017

Invitation for Bid No.: PIU/TTDC/ROC NO:3459/Engg/2018

Dated: 09.05.2018

To:

Chairman and Managing Director,  
Tamil Nadu Tourism Development Corporation Limited,  
Tamil Nadu Tourism Complex,  
2, Wallajah Road,  
Chennai – 600 002, Tamil Nadu  
India.

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Document, including the Addenda issued in accordance with Instructions to Bidders (ITB) 8.
- (b) We offer to supply in conformity with the Bidding Document and in accordance with the delivery schedule specified in Section 6 (Schedule of Supply), the following Goods and Related Services: . . .  
*[insert a brief description of the goods and related services] . . .*
- (c) The total price of our Bid, excluding any discounts offered in item (d) below, is

*[amount of foreign currency in words], [amount in figures], and [amount of local currency in words], [amount in figures]*

- (d) The discounts offered and the methodology for their application are as follows:

Discounts: If our Bid is accepted, the following discounts shall apply: . . . . . *[specify in detail each discount offered and the specific item of the Schedule of Supply to which it applies] . . . . .*

Methodology of Application of the Discounts: The discounts shall be applied using the following method: . . . . . *[specify in detail the method that shall be used to apply the discounts] . . . . .*

- (e) Our bid shall be valid for a period of . . . . . *[insert validity period as specified in ITB 20.1 of the BDS] . . . . .* days from the date fixed for the submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

(f) If our Bid is accepted, we commit to obtain a Performance Security in the amount of . . . . . [specify a figure between 5% and 10%, which should be consistent with that of SCC 18.1] . . . . . percent of the Contract Price for the due performance of the Contract.

(g) The following commissions, gratuities, or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract:<sup>1</sup>

Name of Recipient	Address	Reason	Amount
_____	_____	_____	_____
_____	_____	_____	_____

(h) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed.

(i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

(j) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.

Name \_\_\_\_\_

In the capacity of \_\_\_\_\_

Signed \_\_\_\_\_

Duly authorized to sign the Bid for and on behalf of \_\_\_\_\_

Date \_\_\_\_\_

<sup>1</sup> If none has been paid or is to be paid, indicate "None."

## General

### 1. Scope and Objective of the work:

1. The Scope of work involves provision simplicity and uniformity in design, position and applications, solar energy as an alternate to conventional energy from the grid and contribution to carbon emission reductions.
2. The Main Objective of the work is Installation of Solar Rooftops for captive Consumption, Low O&M, Carbon Emission reduction, Long life, Reduction of Transmission and distribution losses in the system and Overall energy savings through decentralized power generation and sustainability.
3. On Grid Solar Rooftop Photovoltaic systems feed electricity directly into the hotel electrical loads without battery storage. Surplus energy, if any, is exported to the TANGEDCO grid and shortfall, if any, is imported from the grid which is popularly known net metering mechanisms.
4. Net metering concept has been introduced in Tamil Nadu effecting from 17.02.2014 following Solar Energy Policy 2012. In net metering, the exported solar energy to the grid will be deducted from the energy imported from the grid. The consumer is required to pay for the net energy imported from the grid. To enable this mechanism, TANGEDCO will replace the existing unidirectional meter with a bidirectional energy meter that displays both the import and export energy separately on consumer request.
5. The Conditions of Contract, Specification and Drawings are to be read in conjunction with the Bill of Quantities Schedule of Prices and reference shall be made to these documents for detailed descriptions, which are not repeated in the Bill of Quantities.
6. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the contractor and verified by the Engineer and valued at the rates and prices tendered in the priced bill of quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the contract.
7. Except where a provision is made under a separate item in the Bill of Quantities the amounts inserted in the Bill of Quantities shall be the full inclusive value of the work described under the respective items and includes constructional plant, labour supervision, materials, erection, defect liability, profit, taxes and duties together with all general risks, liabilities and obligations set forth or implied in the Contract.
8. The whole cost of complying with the provisions of the contract shall be included in the items provided in the priced bill of quantities, and where no items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related items of work.

9. Where an item is provided for the design of an element of the Plant, the amount entered shall include all costs and expenses which may be required to complete the design of that element including obtaining the approval of the Engineer to drawings and calculations where required.
10. All costs associated with testing and inspection at manufacturers' works, individual tests (pre-commissioning tests) and Tests on Completion shall be deemed to be included in the items for supply and installation.
11. Contractor will have to provide all assistance to Engineer or Engineers representative for taking all measurements of the works. The accepted measurement by contractor and Engineer shall be the basis of submission of bill by contractor. These joint measurements have to be attached with each bill by the contractor.

## **I. Payments**

### **A. Concrete**

Formwork and necessary reinforcement shall be priced with concrete if separate items are not provided for such in the Bills of Quantities. Rates for concrete shall include for the following unless measured separately:-

- a) Obtaining ready mix concrete, where necessary, as per specifications, and obtaining test report from the manufacturer.
- b) Transporting, admixtures, handling, pumping / hoisting and placing at any height or depth.
- c) Packing and tamping around reinforcement, including vibrating.
- d) Mixing, hoisting / lowering, placing in position and packing around reinforcements, site mixed concrete.
- e) Vibrating and curing as specified.
- f) All necessary stop boards, construction joints etc.
- g) Finishing to slopes and falls and cross falls prepare surface ready for screed or paving where necessary including cutting to sizes and temporary supports to form necessary grooves.
- h) Water bars / water stops where necessary.
- i) Making good after removal of form work.



- j) Making provisions, in concrete to fix any fixtures required under the work.
- k) Making provisions, leaving openings, sleeves for all pipe work and making good around openings.
- l) Rates for plain concrete blinding beds shall include for any necessary formwork at edges for the extra width of concrete which may be required in lieu.

**B. Electrical Installation:**

- 1. Work shall be carried out by an experienced electrical contractor who has had previous experience in similar projects and shall have necessary tools, equipment and experienced staff for Electrical installation and Testing.
- 2. When procuring main cables the Bidder shall take into account actual physical measurements to avoid joints. Special orders shall be placed with manufacturers for cable lengths more than 100 meters.
- 3. All imported products and fittings shall have the country of manufacture and the specification number marked distinctly.

**Rates for Electrical works shall include for:-**

- a) Assembling and jointing together and for any jointing material; for fixings and supports to each and any background inclusive of all fixing materials, components and special mountings; for cutting and pinning or building in all fixings and supports, including subsequently making good; and for disconnecting and re fixing equipment and fittings to enable other trades to proceed.
- b) All wall, ceiling or floor sleeves and plates as required including any necessary packing and water tight cable entries at locations with risks of water leaks.
- c) All identification plates, discs, labels, type of service indicators, warning notices, circuit schedules, instruction charts and the like.
- d) Marking the position of all holes, mortises, chases, sinking and the like in both the structure and its coverings and for forming or cutting away same as required and for building in and all making good in connection therewith.
- e) Switchboards, switchgear, distribution boards, control gear, fittings, equipment and the like shall include for all fuses, MCBs, RCCBs, isolators, relays, contactors, instrumentation, indicators, interlocks, metering, cable entry boxes, gland plates earthing connection and the like and levelling.
- f) Bus way systems where applicable shall include fire barriers, bends, joints, end boxes, end covers, fuses, hangers, expansion joints and all other installation material.
- g) Cables shall include for all fixings as necessary, cable terminations and glands, joint boxes, earthing lugs, bus bar clamps and the like; for drawing cable into conduit or ducts, laying into trunking or trenches, or fixing to cable tray or the fabric of the building; for bonding to earthing points and the like; and for all identification labels, markers and

tags as required. Installation of underground cables shall include cutting trenches, laying cables as required by regulations, filling with sand, supplying and laying protecting tiles, warning tapes and compacting.

- h) All PVC conduits shall be embedded, unless otherwise specified. Raceways and accessories shall be of galvanized steel and shall include bends, tees, covers, joints, brackets, hangers and all other required installation material.
- i) Conduiting, (rigid and flexible) cable trays, trunking, ladders and any other means of support and/or mechanical protection to cables, forming openings in trunking; for bushing materials, pin racks and fire barriers; for suspension sets; and for all fittings, accessories, boxes and the like.
- j) Lamp fittings shall include for all associated lamps, control gear ballasts, starters, capacitors, diffuses, suspension sets and fixings including boxes, conduit boxes, wooden blocks, , break-joint rings, ceiling roses, connector blocks, compression glands, flexible cords, all wiring and the like as required.
- k) Lighting and small power (or socket outlet) wiring circuits shall include PVC insulated copper cables including earth cable of required cross section drawn in PVC or other conduits as per Specifications including junction boxes, ceiling boxes, wall boxes and electrical and other accessories.
- l) Accessories shall include all necessary back plates, boxes, screws, nuts and bolts, iron / G.I. brackets, rods, clips as per specification and all other necessary materials to complete the installation.
- m) Transporting of all electrical equipment shall include the use of cranes, folk lifts and all other methods of transport.
- n) Protective painting to plant, equipment, conduit and the like shall include for all preparatory work and painting with rust inhibitive or other protective paint or coating.
- o) Decorative painting to all exposed plant, equipment, conduit and the like shall include for all preparatory work, primers, undercoats and finishing coats of paint to approved colours.
- p) Preparing, making applications to statutory authorities and all follow up work and co-ordination to obtain permanent electrical connection to the building. Statutory payments made to authorities in this respect will be reimbursed to the contractor by the Client on submission of documentary proof of such payments.
- q) Coordination of work with other services / subcontractors.

## **II. Inspection**

Bidder is requested to visit the site to acquaint themselves with all existing conditions, and with the nature and extent of work to be done under this contract as no extras will be allowed on the plea of want of information due to neglect of their part in this regard.

## **III. Materials**

All materials, equipment supplied shall be new, unused without any defects.

All materials, equipment and accessories stated herein shall be the best of their respective kind and shall comply with the requirements of the relevant Standards, Specifications or equivalent where such exists. In all cases of permanent work specifications, model nos., makes etc., and other technical data shall be approved by the Engineer before an order is placed, and all materials, equipment, accessories and spares etc., supplied shall correspond in quality with the approved samples. The Engineer will exercise the right to reject all such items not complying in quality with the standard of the approved items and all costs incurred by this rejection shall be borne by the Contractor/ Supplier. All such rejected items shall be removed from the site. The Contractor/ Supplier shall provide the necessary details to the Engineer regarding the dates and sources of obtaining such items.

## **IV. Trade Name**

Where reference is made to certain manufactures' products and items identified by registered trademarks, this has been done for the sole purpose of defining and establishing standards of quality and performance and not with the intention of restricting the procurement of material or fitting to a particular manufacturer. Any other materials equipment and accessories or equivalent may be used provided that the characteristics of type, quality, and appearance finish, method of construction and/or performance is not less than specified and provided also that the approval is first obtained, by the Engineer.

## **V. AS BUILT DRAWINGS**

- 1) Unless otherwise specified the Contractor/ Supplier shall deliver to the Engineer two sets of hard copies to appropriate scale and on appropriate size paper, and one set of AutoCAD compatible soft copy in a compact disk.
- 2) All drawings, documents and manuals shall be to a standard format. All drawings shall be to the size required by Engineer.
- 3) The Bid shall be deemed to include the cost of the preparation, supply and delivery of all drawings, instruction manuals, transparent copies on polyester and information and copies thereof which the Contractor/ Supplier is required to provide under the terms of the Contract.

**VI. Provisional Sum, Contingencies and Taxes**

- 1 Provision has made in the Bill of Quantities for contingencies and amount payable to line department for shifting of utility services such as shifting of water supply pipeline, telephone / power supply cable for permanent restoration of National Highways, State Highways and PWD roads. Permanent restoration shall be done by concerned department and paid from provisional sum. The identification and permanent shifting of existing utilities namely water supply, sewerage, electricity, and telephone cable is the responsibility of the contractor and the cost towards shifting of utilities shall be borne by the Employer (for permanent shifting only) under the head of provisional sum. Temporary shifting of utilities is the responsibility of the contractor and no extra cost shall be paid against such works. The amount under provisional sum is fixed and the bidder shall not quote tender premium for this provision
- 2 In respect of every Provisional Sum and/or “contingencies” the Engineer shall have authority to issue instructions for the execution of work or the supply of, materials, Plant Sums or services by the Contractor, in which case the Contractor shall be entitled to an amount equal to the value thereof determined in accordance with Clause 15.
- 3 The Contractor shall produce to the Engineer all quotations, invoice, vouchers and accounts or receipts in connection with expenditure in respect of Provisional Sums, except where work is valued in accordance with rates or prices set out in the Tender.
- 4 Provisional sums provided in the bill of quantities includes petty supervision charges, unforeseen items works during execution and Labour Welfare fund.
- 5 The rate for each item of works mentioned in the bill of quantities does not include 12% GST (CGST = 6% SGST=6%) and hence it is shown separately in the bill of quantities as GST and the contractor requested to quote GST Separately for each item of works based on the basic rate.

<b>GOVERNMENT OF TAMILNADU, DEPARTMENT OF TOURISM</b>		
<b>INFRASTRUCTURE DEVELOPMENT INVESTMENT PROGRAMME FOR TOURISM</b>		
<b>PIU – Tamil Nadu Tourism Development Corporation Limited</b>		
<b>Procurement of the Goods for Providing Solar Lights and PV Panels in TTDC Tourist Complexes</b>		
CONTRACT PACKAGE NO : IDIPT/TN/T4/NCB/12/2017		
Invitation for Bid No: PIU/HR&CE/ROC/NO: 3459/Engg/2018 Dated: 09.05.2018		
Price Schedule For Goods To Be Offered From Within The Purchaser's Country		
Name of Bidder: .....		
<b>Abstract to Bill Of Quantities</b>		
S.No	Description of Work	Amount in INR
1	Providing Solar Lights and PV Panels in TTDC Tourist Complexes	
	Provisional sum towards Petty Supervision charges & contingencies, Labour Welfare fund, and unforeseen item of works	<b>16,33,266.00</b>
<b>Grand total</b>		
<b>Amount (Rupees in Words)</b>		
<b>Signature of bidder with seal</b>		

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**GOVERNMENT OF TAMILNADU, DEPARTMENT OF TOURISM**

**INFRASTRUCTURE DEVELOPMENT INVESTMENT PROGRAMME FOR TOURISM**

**Procurement of the Goods for Providing Solar Lights and PV Panels in TTDC Tourist Complexes**

**CONTRACT PACKAGE NO : IDIPT/TN/T4/NCB/12/2017**

**Price Schedule For Goods To Be Offered From Within The Purchaser's Country**

**Name of Bidder: ..... IFB No: PIU/TTDC/ROC NO: 3459/Engg/2018 dated: 09.05.2018 Page..... Of.....**

1	2	3	4	5		6	7	8	9
Item No	Description of item	Country of origin	Domestic value Added in Percent	Quantity and Unit of Measurement		Unit Price EXW	Total EXW Price per item	GST On Total Price	Total Price per item including Taxes
							5x6		7+8
1	<b>567 kWp PV SOLAR MODULES</b> POLYCRYSTALLINE TYPE – 320 Wp :- Design, Supply, Installation, Testing, Integration, EB grid connected / Synchronization and commissioning the total 567 kWp) Rooftop solar photovoltaic (SPV) power plant as per the technical specifications & conditions of the tender document Modules with efficiency more than 16.2 % for Polycrystalline, with positive tolerance only. Fill factor of the module shall not be less than 70%. Minimum module rating shall be 300 Wp at STC. Module capacity less than 300 watts shall not be accepted. The cells used for module making shall be free			562	No				

<p>from all defects like micro-cracks edge chipping, breakages, printing defects, discoloration of top surface etc. The superstrate should be High transmittance ARC glass and should withstand 70km/h for 20mm ice ball (hail), Low Iron glass with minimum thickness of 3.2 mm per international standards (IEC61215). The glass used shall have transmittance of above 90%. Back sheet used in the crystalline silicon based modules shall be of 3 layered structure. Outer layer of fluoropolymer, middle layer of Polyester (PET) based and Inner layer of fluoropolymer or UV resistant polymer. Back sheet with additional layer of Aluminium also will be considered. The thickness of back sheet should be of minimum. 300 microns with water vapor transmission rate less than 3g/m2/day. The Back sheet shall have voltage tolerance of more than 1000 V. PV modules supplied should be of Potential Induced Degradation (PID) resistant modules and tested for PID as per IEC 62804. The test certificate complying with the same shall be provided. PV modules must be warranted for their output peak watt capacity, which should not be less than 90% of the initial value at the end of 10 years and 80% of the initial value at the end of 25 years.</p> <p>All modules shall be certified</p> <ul style="list-style-type: none"> <li>- IEC 61215 2nd Edition (Design qualification and type approval for Crystalline Si modules)</li> <li>- IEC 61730: PV module safety qualification testing @ 1000 V DC or higher</li> <li>- IEC 61701/IS 61701: Salt Spray test for highly corrosive environment</li> <li>- Test certificate from NABL approved or / ILAC member body approved labs shall be provided</li> </ul> <p>Note: Optimum wattage of each module, no of modules considered and technical details should be given in technical bid</p>								
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<p>2</p>	<p><b>GRID TIE STRING INVERTERS</b>                  Design, Supply, Installation, Testing, Integration, EB grid connected / Synchronization and commissioning the total 567 kWp rooftop solar photo voltaic (SPV) power plant as per the technical specifications &amp; conditions of the tender document                  The Inverter shall also house MPPT (Maximum Power Point Tracker), an interface between Solar PV array &amp; the Inverter. The power conditioning unit/inverter shall also be DG set interactive, if necessary. Inverter output shall be compatible with the grid frequency. Typical technical features of the inverter shall be as follows;                  • Switching devices : IGBT/MOSFET                  • Control : Microprocessor /DSP                  • Nominal AC output voltage and frequency : 415V, 3 Phase, 50 Hz (In case single phase inverters, suitable arrangement for balancing the phases must be made)                  • Output frequency : 50 Hz                  • Grid Frequency Synchronization range : +/-3 Hz                  • Ambient temperature considered : -20o C to 50o C                  • Humidity : 95 % Non-condensing                  • Protection of Enclosure : IP-20(Minimum) for indoor : IP-65(Minimum) for outdoor                  • Grid Frequency Tolerance range : +/-3 Hz                  • Grid Voltage tolerance : - 20% &amp; + 15 %                  • No-load losses : Less than 1% of rated power                  • Inverter efficiency(minimum) : &gt;93% (In case of 10kW or above) : &gt; 90% (In case of less than 10 kW)                  • Total Harmonic Distortion (THD) : &lt; 3%                  • Power Factor (PF) : &gt; 0.9                  a. PCU/inverter shall be capable of fully automatic operation including wake-up, synchronization &amp; shutdown                  b. The power factor of PCU inverter is suitable for all voltage ranges or sink of reactive power. The Inverter shall also have internal protection arrangement against any sustainable fault in feeder line and against lightning on the feeder.                  c. Built-in meter and data logger to monitor plant performance through external computer shall be provided                  d. The power conditioning units / inverters should comply with applicable IEC/equivalent BIS standard for efficiency</p>			<p>530</p>	<p>No</p>				
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	<p>measurements and environmental tests as per standard codes IEC 61683/IS 61683 and IEC 60068-2(1, 2, 14, 30) /Equivalent BIS Std.</p> <p>e. The charge controller (if any) / MPPT units environmental testing shall qualify IEC 60068-2(1, 2, 14, 30)/Equivalent BIS std. The junction boxes/enclosures should be IP 65(for outdoor)/ IP 54 (indoor) and as per IEC 529specifications.</p> <p>f. The PCU/ inverters shall be tested from the MNRE approved test centres /NABL /BIS /IEC accredited testing-calibration laboratories. In case of imported power conditioning units, these shall be approved by international test houses</p> <p>Note: Optimum wattage of each inverter, no of inverter considered and technical details should be given in technical bid</p>								
<p>3</p>	<p><b>DC COMBINER BOX (ARRAY JUNCTION BOX)</b>                  Design, Supply, Installation, Testing, Integration, EB grid connected / Synchronization at double bus bar panel located DG room and commissioning the total 567 kWp (Rooftop solar photo voltaic (SPV) power plant as per the technical specifications &amp; conditions of the tender document</p> <p>a. The Junction Boxes are to be provided in the PV array for termination of connecting cables. The Junction Boxes shall be made of GRP/FRP/Powder-Coated Aluminium /cast aluminium alloy with full dust, water &amp; vermin proof arrangement. All wires/cables must be terminated through cable lugs. The Junction boxes shall be such that input &amp; output termination can be made through suitable cable glands.</p> <p>b. Copper bus bars/terminal blocks housed in the junction box with suitable termination threads Conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single / double compression cable glands. Provision of earthings. It should be placed at 5 feet height or above for ease of accessibility.</p> <p>c. Each Junction Box shall have High Quality Suitable Capacity Metal Oxide Varistors (MOVs) / SPDs, suitable</p>			<p>34</p>	<p>No</p>				

	<p>Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement of monitoring and disconnection for each of the groups.</p> <p>d. 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</p> <p>Note: Designed optimum wattage of each box, no of boxes considered and technical details should be given in technical bid</p>								
4	<p><b>DC DISTRIBUTION BOXES</b></p> <p>Design, Supply, Installation, Testing, Integration, EB grid connected / Synchronization and commissioning the total 567 kWp rooftop solar photo voltaic (SPV) power plant as per the technical specifications &amp; conditions of the tender document</p> <p>a. DC Distribution panel to receive the DC output from the array field.</p> <p>b. DC Distribution Panel Boards shall have a sheet from enclosure for dust &amp; vermin proof conform to IP 65 protection. The bus bars are made of copper of desired size. Suitable capacity of MCBs/MCCB shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.</p> <p>Note: Designed optimum wattage of each box, no of boxes considered and technical details should be given in technical bid</p>			24	No				
5	<p><b>AC DISTRIBUTION BOXES</b></p> <p>Design, Supply, Installation, Testing, Integration, EB grid connected / Synchronization and commissioning the total 567 kWp rooftop solar photo voltaic (SPV) power plant as per the technical specifications &amp; conditions of the tender document</p> <p>a. AC Distribution Board (ACDB) shall control the AC power from PCU/inverter, and shall have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid connected mode.</p> <p>b. All switches and the circuit breakers, connectors should conform to IEC60947, part I, II and III/ IS 60947 parts I, II and</p>			24	No				

	<p>III.</p> <p>c. The changeover switches, cabling work shall be undertaken by the supplier (integrator) as part of the project.</p> <p>d. All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air -insulated, cubical type suitable for operation on three phases (415 Volts) / single phase (230 volts), 50 Hz</p> <p>e. The panels shall be designed for minimum expected ambient temperature of 45 °C, 80 % humidity and dusty weather</p> <p>f. All indoor panels will have a protection of IP54 or better.</p> <p>g. The Panels shall conform to Indian Electricity Act and rules (till last amendment).</p> <p>h. All the AC 415 volts or 230 volts 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 the following supply conditions;  Variation in supply voltage : +/- 10 %  Variation in supply frequency : +/- 1.5 Hz  Note: Designed optimum wattage of each box, no of boxes considered and technical details should be given in technical bid</p>								
6	<p><b>MOUNTING STRUCTURE FOR SOLAR PANELS WITH MS HOT DIP GALVANIZED</b></p> <p>Providing, fabricating and fixing in position of structural (support structure for solar panels) with SS 304 for fixing of Solar Panels including cutting, welding, hoisting &amp; including cost and conveyance of all materials, all taxes, labour charges for fabrication erection at site work for all heights etc., complete as directed by the Engineer-in-Charge for finished item of work</p> <p>Components  Leg, Rafter  Types of Purlin  Bracing  Pivot Channel  Base Plate</p>			22993	Kg				

	Support Plate-Rafter Support Plate-Leg L-Connector-primary purlin Stiffener L-Connector-rafter Pin M8xL25 SS304 (Module Mounting) M8 Flat Washer M8 Spring Washer M8 Nut M12xL30 M12 Flat Washer M12 Spring Washer M12 Nut M8xL40 M8 Flat Washer M8 Spring Washer M8 Nut								
7	<b>SUPPLY AND INSTALLATION GI CABLE TRAY</b> Tray Type: Perforated Cable Tray, Cable Tray Coating: Galvanized Coating, Thickness: 3 mm, Side Rail Height: 50 mm - 200 mm Supply and Installation of different sizes of GI cable tray with cover with 1 coat primer and 2 coat of weather proof silver paint and junction boxes along with required angle supports, with coupler plates, Anchor bolts and nuts including cost and conveyance of all materials etc., complete and the tray should be fitted on the wall / Ceiling/Fencing poles etc. complete.			750	Mtr				
8	<b>EARTHING PIT FOR SOLAR GRID PANEL &amp; LIGHTNING PROTECTION</b> Supply, Fixing of Earthing as per the ISI specification with an earth electrode of 2.1 mt class 'B' GI pipe of dia not less than 40mm, with copper earth plate of size 125mm x 50mm x 6mm, with necessary funneling arrangements with necessary masonry work and with 38mm RCC cover slab for the brick masonry and etc to complete to work. (SD-233)			48	No				

<p>9</p>	<p><b>DATA ACQUISITION, PERFORMANCE MONITORING &amp; REPORTING</b>                  Design, Supply, Installation, Testing, Integration, EB grid connected / Synchronization and commissioning the total 567kWp rooftop solar photo voltaic (SPV) power plant as per the technical specifications &amp; conditions of the tender document                  a. Data Acquisition System shall be provided for each of the solar PV plant                  b. Data Logging Provision for plant control and monitoring with time and date stamped system data logs for analysis connected with a suitable PC. Metering and Instrumentation for display of system parameters and status indication to be provided                  c. Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) to be provided, with the sensor mounted in the panel of the array. Readout integrated with data logging system                  d. 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                  e. The following parameters are accessible via the operating interface display in real time separately for solar power plant  <ul style="list-style-type: none"> <li>• AC Voltage</li> <li>• AC Output current</li> <li>• Output Power</li> <li>• Power factor</li> <li>• DC Input Voltage</li> <li>• DC Input Current</li> <li>• Time Active</li> <li>• Time disabled</li> <li>• Time Idle</li> <li>• Power produced</li> <li>• Protective function limits (Viz-AC Over voltage, AC Under voltage, over frequency, under frequency ground fault, PV starting voltage, PV stopping voltage)</li> </ul>                 f. All major parameters available on the digital panel and logging facility for energy auditing through the internal</p>			<p>24</p>	<p>No</p>				
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<p>microprocessor (the current values, previous values for up to a month and the average values) shall be made available</p> <p>g. PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current &amp; Energy generated by the PV system to be provided. Energy meter along with CT/PT shall be of 0.5 accuracy class</p> <p>h. 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.</p> <p>i. 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.</p> <p>j. Computerized AC energy monitoring shall be in addition to the digital AC energy meter.</p> <p>k. 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</p> <p>l. All instantaneous data shall be shown on the computer screen.</p> <p>m. Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant</p> <p>n. Provision for Internet monitoring and download of data shall be also incorporated.</p> <p>o. Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of all the plants and the data of the solar radiation and temperature monitoring system</p> <p>p. Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis</p> <p>q. 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</p> <p>r. Remote Monitoring and data acquisition through Remote Monitoring System software at the owner location with latest software/hardware configuration and service connectivity for online / real time data monitoring/control complete to be</p>								
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	supplied and operation and maintenance/control to be ensured by the supplier. Provision for interfacing these data on the owner server and portal in future shall be kept Note: Make, model nos for measured, monitored & accuracy levels parameters considered, at what level the parameters inputs are taken, software & hardware details along with quantities considered and all technical details in a tabular form should be given in technical bid								
	<b><u>CABLES</u></b>								
10	Supply and laying of 3.5 x 25 sq.mm Al XLPE armoured LTUG cable in a roof /wall with necessary accessories to make good earth connection and etc to complete to work.			2722	Mtr				
11	Supply and laying of 4C x 10 sq.mm Al XLPE armoured LTUG cable in a roof /wall with necessary accessories to make good earth connection and etc to complete to work.			1814	Mtr				
12	Supply and laying of 4C x 10 sq.mm Al XLPE armoured LTUG cable in a roof /wall with necessary accessories to make good earth connection and etc to complete to work.			8505	Mtr				
13	<b><u>GLANDING &amp; END TERMINATION</u></b> Supply , Fixing of brass cable gland & end termination for 3.5 x 25 sq.mm Al XLPE armoured LTUG cable with earth connection and etc to complete to work			200	No				



14	Supply , Fixing of brass cable gland & end termination for 4 C x 10 Sqmm PVC armoured power cable with earth connection and etc to complete to work			100	No				
15	Supply , Fixing of end termination for 1 C x 4 Sqmm Tinned Cu cable with earth connection and etc to complete to work			100	No				
16	<p><b><u>SUPPLY AND FIXING OF MC4 CONNECTOR</u></b>  Specifications  Mating Contacts: Copper, Tin plated, &lt;0.5mΩ Resistance  Rated Current: 30 A  Rated Voltage: 1000V (TUV) 600V (UL)  Ingress Protection: IP67  Temperature Range:-40°C to +85°C  Safety: Class II, UL94-V0  Suitable Cable: 10, 12, 14 AWG [2.5, 4.0, 6.0mm<sup>2</sup>]</p> <p><b><u>Components</u></b>  1. Female Insulated Connector Housing  2. Male Insulated Connector Housing  3. Housing Nut with internal rubber bushing/cable gland (seals wire entry)  4. Female Mating Contact  5. Male Mating Contact  6. Wire Crimp Area  7. Locking Tab  8. Locking Slot - Unlock Area (press to release)</p>			1772	No				
17	<p><b><u>PVC CONDUITS</u></b>  Supply and fixing of PVC Conduits of 2 Inch with necessary accessories for the total 567 kWp (Rooftop solar photo voltaic (SPV) power plant as per the technical specifications &amp; conditions of the tender document</p>			3969	Mtr				

18	<p><b><u>CONCRETE BALLAST</u></b>  Cement Concrete 1:1-1/2:3 (One Cement, One and a half sand and Three hard broken stone jelly) using 20 mm gauge hard broken granite stone jelly for all RCC items of works excluding cost of reinforcement grill and fabricating charges centering and shuttering but including laying, vibrating with mechanical vibrators, finishing, curing, etc. and providing fixtures like fan clamps in the RCC floor / roof slabs wherever necessary and bearing surfaces of walls, beams etc. shall be finished smooth with Cement Mortar 1:3 (One Cement and Three Sand) and kraft paper laid over it without claiming extra, etc., complete complying with standard specification and as directed by the departmental officers</p>			12	Cum				
19	Comprehensive operation and maintenance cost for five years for all 16 hotels in 13 districts of Tamil Nadu			01	No				
<b>Grand Total</b>									

**Notes**

Column No 4:	In accordance with margin of preference ITB Clause 35, if applicable. Domestic Value Added comprises domestic labor, the domestic content of materials, domestic overheads and profits from the stage of mining the raw material until final assembly.
Column No 6:	Incoterm in accordance with ITB Clause 14  Currency in accordance with ITB Clause 15  Price shall include all customs duties, sales and other taxes already paid or payable on the components and raw materials used in the manufacture or assembly of the item or the custom duties and sales and other taxes already paid on previously imported items.
Column No 8:	Payable in the Purchaser’s country if Contract is awarded.

Name: .....

In the capacity of: .....

Signed: .....

Duly authorized to sign the Bid for and on behalf of: .....

Date: .....