

Design, Supply, Installation, Testing and Commissioning of 0.8M W Solar PV Plant at IITM Research Park (Phase - 2 Buildings)

Last Date of submission of the Tender : 03.00 p.m. on 06/05/2016

Validity of Tender : 90 days

Venue of Tender submission & opening : IIT Madras Research Park, Kanagam Road, Taramani, Chennai - 600113

Date of commencement : 10 days from the date of issue of work order

Time of Completion: Within 120 days from the date of commencement

Documents to be provided before start of work :

i) CAR Policy and Workmen Compensation policy during the contract period from approved Insurance Co within 3 days from the date of Work order , and Fire Policy for the period of one year from the completion of the Works

ii) Indemnity regarding Central Excise Payments Plus Agreement One Lakh by demand draft drain in favour of IIT Madras Research park and payable at Chennai

INDEX

Sr.No.	Details	Page Nos
1	Tender Notice & Contract summary	3-12
2	Summary	13-14
3	Format of indemnity for Statutory taxes etc.	15-15
4	Format of undertaking to pay the duties	15-15
5	Articles of Agreement	15-15
6	Special Conditions	15-15
7	Scope of Work	16
8	Preamble to BOQ	17
9	Specification (Electrical)	18
10	List of materials (Approved makes)	21-25
11	Bill of Quantities	26-27
12	Confirmation of Acceptance of terms and conditions	28
13	Declaration	28

IIT Madras Research Park

Tender Notice

Name of work:- Design, Supply, Installation, Testing and Commissioning of 0.8MW Solar PV Plant at IITM Research Park (Phase - 2 Buildings)

COO, IIT Madras Research Park invites sealed tenders for the above work as per the enclosed schedule of quantities, specification, list of materials and as per the terms and conditions

spelt out in this notice:

A. Submission of Tender :

The tender shall be submitted in 3 envelopes

The first envelope will contain the Earnest Money Deposit, second will contain Technical Bid and the third will be the price bid. The rates should be valid upto 90 days from the date of opening of price bid. Also the rates should be inclusive of all taxes, duties excluding service taxes for supply, installation, testing and commissioning of the Solar Power Plant at the place.

a) All entries in Tender document must be made in ENGLISH.

The tender document may be downloaded from the website www.respark.iitm.ac.in The complete tender document form from the website should be downloaded and submitted

No corrections should be made in the tender documents. Observations, if any should be by a separate communication.

b) The Tender should be forwarded in the official letter head of the tenderer.

d) The Earnest Money Deposit in the form of the Demand Draft should be placed in a separate envelope along with the tender duly marked as, " Earnest Money Deposit

e) Technical data and overriding conditions if any and

Tender document duly signed on each page should be enclosed in second envelope which should be clearly marked as "Description of Equipment, Technical Data and Overriding Conditions

f) The third envelope shall contain the tender where in the rates for the various items in the format enclosed shall be quoted.

11. The rate quoted should be inclusive of the cost of materials, labour, transportation, Sales Tax, Excise Duty, Cess, Sales Tax on works contract, VAT but exclusive of

Service tax along shall be paid extra

Criteria for Pre-qualification of contractors

The tenderer shall fulfill the following condition to get pre-qualified in the tender;

Bidder must have total installed capacity of at least one 0.65 MW in off-grid or grid connected solar systems.

Bidder's Turnover should be more than 4 crores in Solar PV business in any one year of last three financial years. This should be certified by the auditors of the bidder.

The Earnest Money will be returned to the unsuccessful tenderer after the intimation of rejection of the tender is sent. The Earnest Money will be retained in the case of the successful tenderer and will get converted as a part of Security Deposit for the due performance of the contract.

Earnest Money Deposit will be forfeited, if the bidder

- a. Revokes the tender or increases the earlier quoted rates within the validity period.
- b. Refuses, delays to sign and execute the contract after tender is accepted.
- c. Does not commence the work within the time specified in the letter of intent/work order

The tenders will be rejected;

- a. If the contractor does not quote any of the item / sub-item in the tender
- b. If the contractor makes any correction in the tender documents without any notification .

Canvassing in connection with the tender is strictly prohibited.

Execution of Work :

1. The work should commence within the period specified from the date of the receipt of work order or the date that may be indicated in the work order.
2. The work should be completed as specified from the date of commencement of the work or within the time limit that may be indicated in the work order.
3. Time allowed for execution of work, as specified in tender, shall be the essence of the contract.
4. If the tenderer commits default in commencing the work, as required by the work order and found that the date stipulated cannot be adhered to, IITMRP shall be entitled without prejudice to any other rights or remedies available to terminate / rescind the contract.
5. If the tenderer fails to carry out the work within the stipulated time mentioned in the work order, IITMRP will have liberty to impose a penalty @ 1% of the total contract value per week of delay subject to a maximum of 10%, without prejudice to other remedies available.
6. However, if IITMRP is convinced that the delay in execution of the work is beyond the circumstances created by the tenderer, they may grant extension of the same to the extent justified based on the request of the tenderer. In such case liquidated damages will be levied for the balance period, if any as provided as per the condition of the tender.

7. If the tenderer fails to commence the work within the days as specified from the date of receipt of intimation for commencement of the work and / or the contractor fails to show progress in execution of work and IITMRP feels the work cannot be completed within the stipulated time, IITMRP will have the right to terminate the contract by giving 10 days notice to the contractor.

In case of termination of the contract, the payment if any, due to the contractor will be released only on completion of the entire project. The amount that may be spent for completion of the balance work will be recovered from the money due to the contractor.

8. All the *materials and workmanship* shall be of the kind described in the schedule of quantities / specifications and in accordance with relevant BIS codes and as per directions of the Engineer-in-charge.

9. The tenderers shall submit original vouchers / challans etc., for verification of actual purchases of any material, if so, desired by the Engineer-in-charge.

10. The tenderer shall submit manufacturers' test certificates for all important materials and in case if so desired by IITMRP will have to carry out testing of materials brought on site at their own cost in any institute / laboratory / site of works as desired by the Engineer-in-charge. No extra claim will be entertained for such testing of materials.

11. The tenderer shall not at any time do, cause or permit any nuisance on the site/ do anything which shall cause unnecessary disturbances or inconvenience to the occupants / visitors at site or near the site of work.

12. The quantities indicated in the bill of quantities are approximate and the quantities may vary as per the site conditions / requirements. The rate quoted should be firm for the deviated quantities of work also.

13. The tenderer's workers will not be allowed to stay at the work site.

14. The contractor has make his own arrangement for drinking water, toilet facilities etc for the workers.

15. Electricity may be supplied by IITMRP at specified charges considering EB charges and DG expenses.

16. In case of any damage to the existing structure, the tenderer should rectify the same free of cost up to the satisfaction of the Engineer-in Charge.

17. IITMRP will have the liberty to modify the design to a reasonable limit. No extra charges will be paid for execution after such modification.

18. The tenderer should protect the work till its completion and handing over against any possible damage, theft, scratches, etc.

19. The tenderer has to make arrangements for cleaning the work site every day and on completion of the work from the work area at his cost.

20. The tenderer should provide samples of the materials for approval of IITMRP and the samples will be kept in the custody of the Engineer-in-charge.

21. Wherever possible the work has to be carried out at the factory of the contractor and the items to be transported to the site.

22. The tenderer should make necessary arrangement for inspection of the items made at his factory / work place by the Engineer-in-charge. The tenderer should complete fabrication and other works at factory and only assembling work and the finishing may be carried out at the site.

23. The tenderer should abide by the rules and regulations for the premises especially on the working hours, entry to the workers to the premises, interpersonal relation with the staff members and other agencies engaged at the site.

24. The tenderer should arrange a qualified technical supervisor at site during the course of the entire work. The tenderer should not change the supervisor till completion of the work.

The supervisor should be available at site when the work is in progress.

25. The workmanship should be of high quality / standard and the decision of the Engineer-in – charge / Consultant shall be final in the regards.

26. The tenderer should not apply primer / putty work / paint or any other finishing material before inspection and certification of the wood work by the Engineer – in – Charge
27. The tenderer should not engage any person prohibited by the law for execution of the job.
- 28 The tenderer should carry out the work strictly as per the specification and as directed by the Engineer-in- Charge.
29. All the materials proposed to be used should have the approval of IITMRP
30. The materials required for the work should be purchased only from the manufactures directly or from the approved dealers. Confirmation for the same may be submitted if so desired.
31. The tenderer should strictly follow the approved colour scheme for wiring.
32. The dismantled material / debris should be removed from the site daily and be transported out to the place as designated by the Municipal Corporation at his own cost.
33. The tenderer should make his own arrangement for storage of materials. IITMRP may provide some space subject to availability (uncovered) within the premises for storage purpose. Materials only as per requirement are to be stored at site. Security for the material such stood/lying at site will be arranged by the contractor.
34. Any damage / loss will be rectified at the cost & risk of the tenderer.
35. The tenderer has to maintain a book for instructions from the Engineer-in-charge.
36. All the electrification work shall be carried out by the licensed electrician under the supervision of licensed electrical contractor. After completion of the work, they shall submit the test certificate for the electrical work carried out by them.

E. Payments :

1. No advance will be paid.
2. Pro rate payment shall be made as per progress of the work
4. 5% of the value of each running bill will be deducted towards security deposit.

5. The final bill will be released on satisfactory completion of the entire work and on completion of all the terms and conditions / obligations spelt out and on proper submission of the bill together with the measurements.
- 6 The Security Deposit shall be refunded after the completion of the defect liability period of 12 months from the actual date of completion of the work.

Defects if any noticed during the defect liability period shall be made good by the contractor at no extra cost.
8. The items of indicated in the BOQ are approximate and may vary as per actual requirement. .
9. It is possible that certain extra items of work may come up during the course of work. The payment for such items will be made based on Market rate analysis. A component of 15% on the cost of material (actual purchase cost / market price without any wastage) and labour will be considered towards profit and other overheads.
10. The bill should be attached with all necessary measurements, sketches, joint measurements (if any).

F. Escalation:

1. No escalation in rate shall be paid for the works carried out.
2. No claim on account of fluctuation of rates of material and labour will be entertained during the course of work – (from the date of acceptance of the Tender till issue of completion certificate).

H Statutory obligations to be followed:

1. The tenderer should ensure adherence of all statutory requirements under the State and Central Rules in force and other local bodies for smooth and timely completion without any additional cost.
2. The tenderer shall comply with the provisions of all the rules and regulation in respect of labours engaged at site (such as Contract Labour {Regulation & Abolition} Act, 1970, Minimum Wages Act, Apprentice Act and all other labour laws as may be enforced from time to time by the Government Authorities) for execution of work, procurement of material for completion of the entire project. IITMRP shall not be held responsible for any penalty on failure of any of the labour regulations or on failure of any compliance of any rule in force.
3. The tenderer shall strictly comply with the provision of Sales Tax (both State & Central), Excise Duty, etc. All the duties / taxes with respect to the work should be borne and paid by the tenderer himself. IITMRP shall not be responsible for any payment/ penalty on this account at any stage.
4. For the goods are manufactured at the tenderers office / site, the tenderer has to pay Central Excise and has to produce Excise Invoice Copy for removal of goods from the manufacturing site. In case the goods are manufactured or produced at the site then Excise Invoice showing that the Central Excise has been paid should be submitted to IITMRP
5. The tenderer should submit a statement confirming that all duties / taxes of every nature covered under the contract have been paid and the tenderer shall indemnify the IITMRP against all claims in that behalf.
- 6 The tenderers should submit an affidavit / Declaration on payment of Central Excise as per the enclosed format.
- 7 The tenderer should also submit, when required, a copy of the declaration filed with the

Central Excise for the last financial year.

8 The tenderers are required to take Contractor's All Risk insurance policies (CAR Policies) with respect to the work within one week from the receipt of the work order and the workmen with an Indian Insurance Company in the joint name of the IITMRP and the Tenderer from the day of commencement of work till the defect liability period.

9 The value of the work to be insured would be 125% of the contract value.

10 The CAR policies should have additional coverage under 3rd party liabilities and maintenance period. The liabilities should be One Lakh Rupees per accident and the number of accidents should be infinity. The maintenance period shall be the defect liability period as per the terms of the contract. The photocopies of the premium receipt and the policies should be submitted to IITMRP

11. The tenderer has also to insure their workers under Workman's compensation Act- 1923.

12 IITMRP will have the right to protect its interest either by taking insurance directly or by any action that may deem fit on account of the tenderer and recover the same from the tenderer incase the tenderer fail to do so.

G. Responsibilities of the tenderer

1. The tenderer should enter into an agreement as per the articles of agreement on stamp paper within 7 days of issue of acceptance of the tender.

2. The tenderer shall not sublet the work without written approval from IITMRP

3. The tenderer should co-ordinate with all the other contractors for execution of the project.

4. The tenderer should set out the layout at site before commencement of work and obtain approval to the same from IITMRP

5. The contractor should arrange for sufficient light & power point required for entire project at

his cost.

6. The tenderer should clear the site within 7 days of virtual completion of work of all material not paid for.

7The tenderer should arrange scaffoldings / ladders for proper execution of work, also to ensure safety of the workers as per the relevant provisions of the law.

8The tenderer should submit rate analysis for the extra/deviated items of work before commencement of the work.

9The tenderer should submit samples of the material proposed to be used for the approval of IITMRP

10. The tenderer should prepare mock-up of the items for the approval of IITMRP

11. In case the tenderer is a partnership firm, any change in the constitution of the firm shall take place only with the prior approval of IITMRP during the contract period.

12. The tenderer should submit shop drawings for all the items for the approval of IITMRP before execution of each item of work.

13. The tenderer should remove the rejected work / materials immediately on receipt of instruction to do so.

14. The tenderer has to ensure safety of the premises and the work till handing over of the same to IITMRP

15 The tenders should submit the As-built drawings of the entire work together with the final bill.

Summary	
Time of Completion	90 days from the date of commencement of work
Date of Commencement of work	10 days from the date of work order
Liquidated damages	1 of the total contract value per week subject to the maximum of 10 % of the contract value
Minimum Value of work for interim certificate	25 % of work order value
Validity of the offer	90 days from the date of opening the tender.
Security Deposit (Retention Money)	5 % of total value of work done
Sales Tax, Excise duty, Royalty, Octroi, Work contract tax or any other statutory levies / Taxes / Cess.	To be entirely borne by the Contractor. The Sales Tax, Excise Duty, Octroi, Works Contract Tax and any other statutory levies / taxes / cess as applicable. Service Tax shall be reimbursed on production of receipt as proof of payment.
Insurance policy	1. CAR policy with value of 125% of the contract value 2. Third Party Insurance – Rs.1 Lac per accident and no. of accidents infinite.
Defects Liability Period	12 (Twelve) months from the date of virtual completion / handing over.
Terms of Payment	1. No advance

	<p>2. monthly pro rate bills</p> <p>3. Settlement of Interim bill within 15 days</p> <p>4. Minimum bill amount 25% of work order value</p> <p>5. Final Bill settlement within 45 days from the date of Proper submission and verification of measurements.</p>
Deductions	<p>Income Tax at source as per Income Tax Rules, Sales Tax /</p> <p>Works Contract Tax/ Commercial Tax as applicable in the statement.</p> <p>Cess applicable as per the local rules</p> <p>Any other Levy/Cess/Tax to be deducted at source by law.</p>
Extra / Additional work	<p>15% of the cost of material and labour towards overheads and profit</p>

I / We hereby agree and accept the above terms and conditions.

For (Name and address of the Contractor)

(Seal) Signature of the Tenderer

For (Name of the Contractor and Designation)

Annexure-I

(On Rs.100/- non-judicial stamp paper by the successful bidder)

From : The Contractor

To IITMRP Chennai

Dear Sirs,

We refer to the tender dated _____ for _____ We hereby confirm that we have complied with all formalities in the performance of our Contract for the supply of goods and services under all statutes governing the same, Central, State or Local. We further confirm that we have paid all taxes and duties including sales tax and excise duty in respect of the goods and services supplied to you and undertake to be responsible for the same.

We agree to indemnify and keep you indemnified against any claim or demand and all loss, costs, charges and expenses incurred or suffered by you as a result of any claim being made by any person in respect of our obligation under the said tender for payment of taxes, duties or otherwise.

Yours truly,

Date : _____

SIGNATURE OF CONTRACTOR

WITH RUBBER STAMP

Scope of Work:

Before quoting and submission of tender, intending vendors should visit the site to examine whether installation of the solar plant is possible to obtain the desired output.

- a. Electrical Safety Certificate from Central Electricity Authority is to be arranged by the contractor. Any liaison work with TNEB any other authority is in the scope of work
- b. Overall Layout plan is to be prepared by the contractor and submit for approval.
- c. Design and Optimization is to be carried out by the successful contractor. Design details to be discussed with concerned Engineer of IITMRP before finalization of the project.
- d. After delivery of Solar modules, joint inspections of the materials are to be made .
- e. Supply & Installation of mounting structures. Since the mounting structures are to be installed on Roof- Top, load of the structures are to be submitted along with Technical Bid of the Tender
- f. Supply, Installation and commissioning of Solar Power Conditioning Unit (Solar Inverters).
- g. Details of support for the structure to be submitted for approval
- h. Installation of DC/AC cabling in the entire plant. The cables shall be of ISI Marked. Make to be used to be mentioned in technical bid.
- i. Earthing for solar panels, Inverters, Control Room, LT Panel. No OF Cu plates and it's size, earth continuity conductors shall be as per IS and NEC and to be mentioned in technical bid.
- j Commissioning of the Entire plant. Before commissioning, steps are to be taken to integrate with Mains are to be mentioned in the technical bid of tender
- k. The tenderer should give full details of Solar Module Cleaning Arrangements along with details of equipment which will be part of the contract.

PREAMBLE TO THE BILL OF QUANTITIES

The work proposed is to be carried out at the Office premises mentioned on the cover page (no.1) of the tender. The quality of work proposed should have the best workmanship. The contractor should ensure that only the first quality materials mentioned in the list of material is purchased for the project.

1. The work should be carried out in such a way that the existing structure is not disturbed.
2. Any difference / discrepancies in the specification should be clarified with the Engineer in charge before submitting the tender. The Engineer in charge will have the liberty to modify the specification to a reasonable limit to suit the basic concept during the course of work; the tenderer should carry out such work with out any extra cost.
3. In case of any major modification such items will be considered as an extra item. Payment for such items will be paid based on the Engineering rate / Market rate analysis. *15% of the total cost of material and labour* will be considered as *tenderer's profit*.
4. The contractor should co-ordinate with the other contractors employed at the site for smooth flow of work.

SPECIFICATIONS

General

Technical Specification for Roof-top solar power plant

1. Solar Modules (Indigenous Make) :Minimum technical Specification

The modules shall be

1. 250 Wp Multi-crystalline Solar Module from reputed supplier to meet the efficiency requirement which is an over riding requirement.
2. It shall have an efficiency of 15.5 % or more.
3. 72 cells module with Low iron anti refractive coated glass gains additional 2% energy.
4. Glass strength of 5400 Pa.
5. Superior resistance to PID(potential induced degradation).
6. The warrant shall be 25 Years after date of final acceptance.
- 7 Modules that have passed four times repeated reliability test (four times than IEC standards:IEC 61215). Manufacturer test certificates to be submitted.25 Years true linear power output warranty. Power degradation should not be more than 0.8% year on year except 1st year where maximum power degradation of 2.0%

10 Years global workmanship warranty.

Peak Power (Pmax) : >250 Wp

Max Power Current (Imp): >8 Amp

No. of Cells: 72

Max Power Voltage (Vmp): Should not be less than 37 V

Tolerance 0, +3%(positive tolerance only)

Module Efficiency (%) : minimum 15%

Weight <25Kgs

Glass High tempered Anti-reflective glass

Frame Anodized aluminum alloy

Junction Box IP65, TUV-UL certified 3 Schottky bypassdiode

.

Minimum Technical specification for Cables:

Cables and accessories are required for the DC cabling, panel wiring, battery wiring, cabling of charge controller, inverter. The bright annealed 99.9% pure bare copper conductors, low conductor resistance, lower heating. These wires should be insulated with a special grade PVC compound formulated and manufactured in-house. The skin coloration should offer high insulation resistance and long life.

PARAMETERS

SPECIFICATIONS

WORKING VOLTAGE UP TO 1100V

TEMPERATURE RANGE -15 TO -80 DEG C

SIZES SUITABLE FOR 2% VOLTAGE DROPE

COLOURS RED,BLACK, YELLOW, BLUE AND

GREEN

Module mounting structure

Structure shall support SPV modules at given orientation absorb and transfer the mechanical loads to the roof uniformly. The structure should be designed to withstand the wind speed of 200 KMPH. The height of the structure shall be as indicated in the general drawing.

The Module Mounting structure shall be made up of Hot dipped galvanized material. The

minimum thickness of galvanization shall be at least 90 microns. All nuts & bolts shall be made of very good quality stainless steel. The minimum clearance of the lowest part of the module structure shall be as indicated in the general drawing.

Leg assembly of module mounting structure made of different diameter galvanized structure are accepted. The work should be completed with supply, fitting fixing of c lamps, saddles, nut & bolts etc. While quoting the rate, the bidder may mention the design & type of structure offered. All nuts & bolts shall be made of very good quality stainless steel.

The structure shall be designed to allow easy replacement of any module and shall be in line with site requirements.

The structure shall be designed for simple mechanical and electrical installation. It shall support SPV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly. There shall be no requirement of welding or complex machinery at site.

The manufacturer shall specify installation details of the PV modules and the support structures with appropriate diagrams and drawings.

The fixing arrangement of the supporting structure to the existing concrete structural elements shall be worked out in consultation with IITMRP and got approved before fabrication of the same.

System should have surge protection device.

System should have proper lightning and earthing protections.

Detailed project execution program shall be submitted along with the offer, the bidder shall be responsible for arranging all the tools/ tackles and manpower for installation and commissioning the entire system.

A: MATERIALS

Materials shall be of the best-approved quality obtainable / available and they shall comply to the respective Bureau of Indian Standard Specifications.

Samples of all materials shall be got approved before placing order and the approved sample shall be deposited with IITMRP

In case of non-availability of materials in metric sizes, the nearest higher size in FPS units shall be provided with the prior approval of IITMRP for which neither extra will be paid nor any rebate shall be recovered.

If directed, materials shall be tested in any approved Testing Laboratory and the Test certificate in original shall be submitted to IITMRP and the entire charges of testing including charges for repeated tests if ordered shall be borne by the Tenderer.

It shall be obligatory for the tenderer to furnish Certificate, if demanded by IITMRP from the manufacturer or the material supplier that, the work has been carried out using their material and as per their recommendation.

All materials supplied by or through other specialized firms if any, shall be properly stored and the tenderer shall be responsible for its safe custody until they are required on the works/until the completion of work.

Unless otherwise shown on the drawings or mentioned in the Schedule of Quantities or Specification the quality of materials, workmanship, dimensions etc., shall be as specified herein-under.

All equipment and facilities for carrying out field tests on materials shall be provided by the tenderer without any extra cost.

2.0 CABLES:

All cables shall be 1100 Volt grade PVC insulated, sheathed with or without steel armoring as

specified and with an outer PVC protective sheath. Cables shall have high conductivity stranded aluminum or copper conductors and cores colour coded to the Indian Standards.

3.0 All cables shall be new without any kind or visible damage. The manufacturers name, insulating material, conductor size and voltage class shall be marked on the surface of the cable at every 600 mm centers.

4.0 INSTALLATION

4.1 Cables shall be laid in the routes marked in the drawings. Where the route is not marked, the contractor shall mark it out on the drawings and also on the site and obtain the approval of the Engineer-in-Charge before laying the cable. Procurement of cables shall be on the basis of actual site measurements and the quantities shown in the schedule of work shall be regarded as a guide only.

4.2 Cables, running indoors shall be laid on walls, ceiling, inside shafts or trenches. Single cables laid shall be fixed directly to walls or ceiling and supported at not more than 500 mm. Where number of cables are run, necessary perforated cable trays shall be provided wherever shown. Perforated trays shall be mild steel or Aluminum as specified in the schedule of work and supported on mild steel frame work as shown on drawings or as approved. Cables laid in built-up trenches shall be on steel supports. Plastic identification tags shall be provided at every 30 m.

4.3 Cables shall be bent to a radius not less than 12 (twelve) times the overall diameter of the cable or in accordance with the manufacturer's recommendations whichever is higher.

4.4 In the case of cables buried directly in ground, the cable route shall be parallel or perpendicular to roadways, walls etc. Cables shall be laid on an excavated, graded trench, over a sand or

soft earth cushion to provide protection against abrasion. Cables shall be protected with brick or cement tiles on all the three sides as shown on drawings. Width of excavated trenches shall be as per drawings. Back fill over buried cables shall be with a minimum earth cover of 750 mm to 1000 mm. The cables shall be provided with cables markers at every 20 meters and at all loop points.

4.5 The general arrangement of cable laying is shown on drawings or may be obtained from Engineer-in-Charge. All cables shall be full runs from panel to panel without any joints or splices. Cables shall be identified at end termination indicating the feeder number and the Panel/Distribution board from where it is being laid. Cable termination for conductors upto 4 sq.mm. may be insertion type and all higher sizes shall have tinned copper compression lugs. Cable termination shall have necessary brass glands. The end termination shall be insulated with a minimum of six half-lapped layers of PVC tape. Cable armoring shall be earthed at both ends.

4.6 In case of cables entering the buildings. It would be done duly only through pipes. The pipes shall be laid in slant position. So, that no rain water may enter the building. After the cables are tested. The pipes shall be sealed with M. seal & then tarpaulin shall be wrapped around the cable for making the entry of water light.

4.7 All cables shall be provided with stainless steel/Aluminum cable identification tags at a maximum distance of 10 m.

5.0 TESTING:

5.1 MV cables shall be tested upon installation with a 500 V Meggar and the following readings established:

1) Continuity on all phases.

2) Insulation Resistance.

(a) between conductors.

(b) all conductors and ground.

All test readings shall be recorded and shall form part of the completion documentation.

6.0 MODE OF MEASUREMENT :

6.1 Cables will be measured on the basis of a common rate per unit length indoor or outdoor and shall include the following :

For cables laid indoors :

i) Cables and clamps.

ii) Installation, commissioning and testing.

iii) Cable marking. For cable buried underground :

i) Cables and protective bricks & tiles.

ii) Installation, commissioning & testing.

iii) Cable markers.

6.2 Cable trays/racks will be measured on the basis of unit length for individual sizes and shall include:

i) Perforated trays on M.S framing ladder wall support or ceiling suspenders.

ii) Installation and painting in 2 coats of black bituminous paint.

6.3 Each cable termination will be measured as one unit for payment. Certain cable sizes are grouped together and rates shall be furnished against each group. The item shall include the following :

i) Cable glands, lugs, bolts, nuts.

ii) All jointing materials.

iii) Installations, testing and commissioning.

iv) Earthing the glands.

6.4 For cables buried under ground excavation shall be paid for, in addition, for the following per unit volume:

i) Excavation and back filling.

ii) 6" Soft Earth Cushioning below and above cable.

iii) Bricks on all the three sides of cable as shown in drawing/instructed by the Engineer-in-Charge.

Name of the work: Design, Supply, Installation, Testing and Commissioning of 0.8MW Solar PV Plant at IITM Research Park (New Buildings)

Bill of Quantity (BOQ)

SI No	Item	Unit	Quantity	For supply items and erection works, quote in INR	
				Rate in INR	Amount in INR
1	Supply of Polycrystalline PV Modules	Nos	3,075		
2	Supply of Fixed Mount Parray structures for mounting PV arrays	Nos	800		
3	Supply of DC String Combiners (16-in, 1-out)	Nos	9		
4	Supply of three phase grid connected Central Inverters	Nos			
	b) 250 kW AC	Nos	3		
	c) 100 kW AC	Nos	1		
5	Supply of Solar Grade DC cables (in m)	Nos			
	a) 6 Sq. mm	Nos	17,000		
	b) 50 Sq. mm	Nos	400		
	c) 70 Sq. mm	Nos	1,050		
7	Supply of sensors including Pyranometer/air temperature sensor/wind direction indicator/wind velocity sensor/PV module temperature sensor and sensor box with Rs485/ethernet interface and Cat-6 cables	Set	1 set		
8	Supply of Data logger with ethernet interface for measurement of above parameters as well as PV plant electrical parameters	Nos	1		
9	Supply of Three Phase multifunction meters with CTs/VTs and ethernet interface, and panel meters	Nos	5		
10	Supply of LT panel (after Isolation Transformer)	Set	1 set		
11	Supply of AC Distribution Box (PCC Panel) with MCCB /ACB	Set	1 Set for all inverters		
12	Supply of Three phase oil filled outdoor type isolation transformers	Set	1 set		
13	Supply of AC cables.(in m)				
	a) 150 Sq. mm	Nos	500		
	b) 240 Sq.mm	Nos	500		
	c) 300 Sq.mm	Nos	1,000		
	d) 630 Sq.mm	Nos	100		
14	Supply of earth pipes/cables ties/lugs etc for doing earthing at each building site	Set	4 sets		
	SUB-TOTAL (Cost of Supply)				
15	Installation and Commissioning of Polycrystalline PV Modules (kW)	Nos	800		

16	Installation and Commissioning of Fixed Mount PV array structures (kW)	Nos	800		
17	Installation and Commissioning of DC String Combiners (kW)	Nos	9		
18	Installation and Commissioning of three phase grid connected Central Inverters	Nos			
	a) 500 kW AC		-		
	b) 250 kW AC	Nos	3		
	c) 100 kW AC	Nos	1		
19	Installation and Commissioning of sensors including Pyranometer/air temperature sensor/wind direction indicator/wind velocity sensor, PV module temperature sensor and sensor box with RS485/ethernet interface and Cat-6 cables		1 set		
20	Installation and Commissioning of Data logger with ethernet interface for measurement of above parameters and PV plant parameters	Nos	1		
21	Installation and Commissioning of Three Phase multifunction meters with CT's/VT's with ethernet interface	Nos	5		
22	Installation and Commissioning of LT panel/AC Combiners	Nos	1		
23	Installation of AC Distribution Box (PCC Panel) with MCCB /ACB	Set	1 Set		
24	Installation of LT panel (after Isolation Transformer)				
25	Installation, Testing and Commissioning of Three phase oil filled outdoor type isolation transformer.	Nos	1		
26	Installation and Commissioning of earth piple/cable ties/lugs etc for doing earthing at each building site	Set	4 sets		
	SUB-TOTAL (Cost of Installation)				
	TOTAL (in INR)				

Rate for AMC

SI No	Item	Unit	Quantity	For supply items and erection works,	
				Rate in INR	Amount in INR
1	Comprehensive AMC of the insullation	Month	60		

Annexure – I

(On Rs.100/- non-judicial stamp paper by the successful bidder)

From : The Contractor

To : IITMRP, Chennai

Dear Sirs,

We / I refer to the tender / contract dated _____ for . We / I advise that, we / I are / am covered under the exemption limit prescribed by the Central Excise Act 1944 and no Excise is payable by us / me on the goods and services supplied to you. We / I further confirm that we / I have complied with all the formalities in the performance of our contract for the supply of goods and services and under all statues governing the same, Central, State or local.

We / I undertake that if any taxes and duties including sale tax and Excise duty in respect of goods and services supplied to you by us / me is payable, the responsibility of paying the same shall be ours / mine.

We / I agree to Indemnify and keep you Indemnified against any claim or demand and all loss, cost, charges and expenses incurred and suffered by you as a result of any claim being made by any person in respect of our / my obligation under the said tender / contract for payment of taxes, duties or otherwise.

Yours truly,

Date : _____

SIGNATURE OF TENDERER

WITH RUBBER STAMP