NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI – 15

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ESTATE MAINTENANCE DEPARTMENT/ELECTRICAL

EXPRESSION OF INTEREST (EOI)

Name of work	:	Expression of interest (EOI) for installation of 2MW solar rooftop at various building of NIT Tiruchirappalli. under RESCO model approved by SECI (Solar Energy Corporation of India.,) roof top scheme for government building for tamilnadu region.
Capacity	:	2.0 MW
Tender EOI Enquiry No	:	**EMD/EO/ELE/tender notice/Enq.No:50/17/18**

NATIONAL INSTITUTE OF TECHNOLOGY

TIRUCHIRAPALLI -620 015.

ESTATE MAINTENANCE DEPARTMENT/ELECTRICAL

NOTICE INVITING EOI

Name of Work : Expression of interest (EOI) for installation of 2MW solar rooftop at various building of NIT Tiruchirappalli. under RESCO model approved by SECI (Solar Energy Corporation of India.,) roof top scheme for government building for tamilnadu region.

1. Capacity : **2.0 MW**

2. Last Date & Time for submission of EOI : 27.11.2017 @ 3.00 P.M

3. Address for Submission of EOI : The Director,
National Institute of technology,
Tiruchirappalli-620015.

Name of the Agency Submitting EOI .....

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NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-15
EXPRESSION OF INTEREST

1. INTRODUCTION

1.1 NIT OVERVIEW

The National Institute of Technology (formerly known as Regional Engineering College) Tiruchirappalli, situated in the heart of Tamil Nadu on the banks of river Cauvery, was started as a joint and co-operative venture of the Government of India and the Government of Tamil Nadu in 1964 with a view to catering to the needs of man-power in technology for the country. The college has been conferred with autonomy in financial and administrative matters to achieve rapid development. Because of this rich experience, this institution was granted Deemed University Status with the approval of the UGC/AICTE and Govt. of India in the year 2003 and renamed as National Institute of Technology. NIT-T was registered under Societies Registration Act XXVII of 1975.

NIT Trichy as part of its sustainability initiatives, proposes to source 2 MW of solar energy through a grid linked rooftop solar system under the RESCO Model from a successful bidder under the SECI 1000MW tender Phase 1 (RESCO Model) as released on 9th December 2016 (Reference No.: SECI/C&P/MNRE/1000MW RT/IND/122016) and through the subsequent letter of award released by SECI dated 12th September 2017.

1.2 SECI TENDER – 1000MW PHASE 1

Government of India has launched Jawaharlal Nehru National Solar Mission (JNNSM) which now has a target of 100,000 MW of grid solar power by 2022, out of which grid connected rooftop Solar PV systems is considered as very potent area and has a target of 40,000 MW. To achieve energy security and for having good optics, it is envisaged to develop solar rooftop projects on large scale by utilising vacant roofs of buildings and adjoining lands of the campus etc.

MNRE (Ministry of New and Renewable Energy, Government of India) desires to implement grid connected rooftop solar PV projects on the roofs of Government buildings/offices as well as ground mounted Solar PV systems as a part of its Renewable Energy Initiatives.

SECI – Solar Energy Corporation of India is a central PSU under Ministry of New and Renewable Energy, Government of India has released a tender for 1000MW Solar rooftop projects to be installed only in government buildings across India. Phase I of 500MW has been initiated first and allocations for the same have been released.

1.3 SCOPE OF WORK

The Brief scope of work shall include, but not limited to, the following as per SECI guidelines:

"Site Survey, Planning , Design, Engineering, Supply, Erection, Testing & Commissioning of the Grid Connected Rofftop Solar PV Project including Operation & Maintenance (O&M) of the project for a period of 25 (Twenty-Five) years under the RESCO model.

Maximum allowable tariff for is "SECI 1000MW tender phase 1 – discovered tariff for Tamil Nadu" which is ₹4.169 per kWh flat for 25 years.

1.3.1 LIST OF SELECTED BUILDINGS

NIT Trichy has done a Preliminary Solar DC capacity estimates and the tentative solar capacity that can be installed is mentioned below. The interested parties have to carry out a detailed survey of the site on their own before submitting their response. NIT Trichy holds no responsibility on the correctness of the data mentioned below.

Sl. No.	Building Name	Estimated DC Capacity (kWp)
1	Ojas	115.20
2	Multi Purpose hall South slope	187.50
3	Multi Purpose hall North slope	128.00
4	main office	108.80
5	Civil	128.00
6	Lyceum	38.40
7	Management studies	64.00
8	SJB	64.00
9	Garnet-A	76.80
10	Garnet-B	64.00
11	Garnet-C	64.00
12	Zircon-A	76.80
13	Zircon-B	64.00
14	Zircon-C	64.00
15	Aquamarine-A	64.00
16	Aquamarine-B	57.60
17	Amber-A	64.00
18	Amber-B	57.60
19	Diamond	57.60
20	Sapphire	32.00
21	Topaz	32.00
22	Lapis	32.00
23	Twel	32.00
24	Ruby	32.00
25	Jaspar	64.00
	Total:	1768.30

More buildings are available for solar installation. The above table gives only an indicative capacity. Hence interested parties should evaluate all the buildings before submitting your response

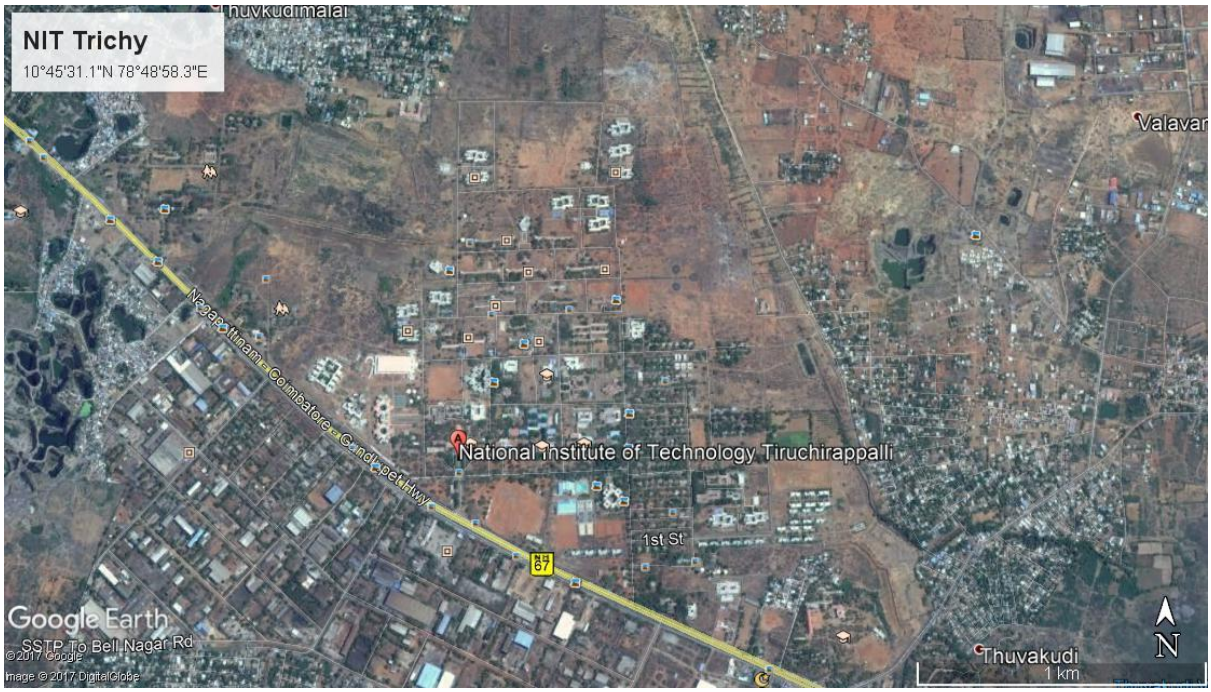

Figure 1: Satellite view of NIT Trichy, TN

2. ELIGIBILITY CRITERIA

2.1 GENERAL ELIGIBILITY CRITERIA

2.1.1 The interested applicant should be a Successful bidder in the recently concluded SECI 1000 MW roof top tender for Govt Buildings (Reference No.: SECI/C&P/MNRE/1000MW RT/IND/122016) under the RESCO model for the Tamil Nadu Region.

2.1.2 The interested applicant should submit a copy of Letter Of Award (LOA) received from SECI in this regard.

2.2 TECHNICAL ELIGIBILITY CRITERIA

2.2.1 Interested Party should have installed and commissioned a minimum cummulative capacity of not less than 10 MW grid connected onsite roof top project till date under the RESCO/OPEX model. The prior mentioned capacity should have been commissioned at least 6 months prior to the last of date of submission for this EOI.

2.2.2 Interested Party should have the experience of Installing, commissioning and also carrying out the Operation and maintenance activities for atleast one 2.0 MW grid connected onsite roof top project under the RESCO/OPEX model inside the state of Tamil Nadu. This 2.0 MW project can be in one single roof or in multiple roofs within a campus/factory.

2.2.3 Interested Party should have the experience of Installing, commissioning and also carrying out the Operation and maintenance activities for atleast 2.5 MW grid connected onsite roof top project under the RESCO/OPEX model within the state of Tamil Nadu.

2.3 FINANCIAL ELIGIBILITY CRITERIA

2.3.1 Average annual turnover of the interested party during the last three financial years (preceeding the date of submission for this EOI) should be atleast 50% of the total project cost

The interested party should fulfil all the general, technical and financial eligibility criteria and need to submit the necessary documents to support the claim.

3. TECHNICAL SPECIFICATIONS

The Proposed project shall be commissioned as per the technical specifications under SECI 1000MW tender phase 1, Any shortcomings will not be tolerated.

3.1 GRID TIED SOLAR PV SYSTEM

A Grid Tied Solar Rooftop Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables, Junction boxes, Distribution boxes and switches. PV Array is mounted on a suitable structure. Grid tied SPV system is without battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable. Solar PV system shall consist of following equipments/components.

- Solar PV modules consisting of required number of Crystalline PV cells.
- Grid interactive Power Conditioning Unit with Remote Monitoring System
- Mounting structures
- Junction Boxes.
- Earthing and lightening protections.
- IR/UV protected PVC Cables, pipes and accessories

Brief description of Technical Specifications can be found below, However for a detailed description of the same, refer SECI 1000 MW tender document (Reference No.: SECI/C&P/MNRE/1000MW RT/IND/122016).

3.1.1 SOLAR PHOTOVOLTAIC MODULES:

The PV modules used should be made in India.

The PV modules used must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC 61215/IS14286. 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.

- For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701.
- The total solar PV array capacity should not be less than allocated capacity (kWp) and should comprise of solar crystalline modules of minimum 300 Wp and above wattage. Module capacity less than minimum 300 watts shall not be accepted

3.1.2 ARRAY STRUCTURE

1. Hot dip galvanized MS mounting structures may be used for mounting the modules/ panels/arrays. Each structure should have angle of inclination as per the site conditions to take maximum insolation. However to accommodate more capacity the angle inclination may be reduced until the plant meets the specified performance ratio requirements.
2. The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed (Trichy wind speed of 50 m/s). The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759.
3. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Aluminium structures also can be used which can withstand the wind speed of respective wind zone. Protection towards rusting need to be provided either by coating or anodization.
4. 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.
5. The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m2.

3.1.3 JUNCTION BOXES

1. The junction boxes are to be provided in the PV array for termination of connecting cables. The J. Boxes (JBs) 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 JBs shall be such that input & output termination can be made through suitable cable glands.
2. 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.

3.1.4 DC DISTRIBUTION BOARD:

1. DC Distribution panel to receive the DC output from the array field.
2. DC DPBs shall have sheet from enclosure of dust & vermin proof conform to IP 65 protection. The bus bars are made of copper of desired size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.

3.2.0 AC DISTRIBUTION PANEL BOARD:

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.
2. All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.
3. Should conform to Indian Electricity Act and rules (till last amendment).
4. All the 415 AC 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	+/- 5 Hz

3.1.6 PCU/ARRAY SIZE RATIO:

1. The combined wattage of all inverters should not be less than rated capacity of power plant under STC.
2. Maximum power point tracker shall be integrated in the PCU/inverter to maximize energy drawn from the array.

3.1.7 PCU/ Inverter:

As SPV array produce direct current electricity, it is necessary to convert this direct current into alternating current and adjust the voltage levels to match the grid voltage. Conversion shall be achieved using an electronic Inverter and the associated control and protection devices. All these components of the system are termed the "Power Conditioning Unit (PCU)". In addition, the PCU shall also house MPPT (Maximum Power Point Tracker), an interface between Solar PV array & the Inverter, to the power conditioning unit/inverter should also be DG set interactive. If necessary. Inverter output should 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 frequeny	415V, 3 Phase, 50 Hz (In case single phase inverters are offered, suitable arrangement for balancing the phases must be made)
Output frequency	50 Hz
Grid Frequency Synchronization range	+/- 5 Hz
Ambient temperature considered	-20^{o} C to 50^{o} C

Humidity	95 % Non-condensing
Protection of Enclosure	IP-20(Minimum) for indoor.
	IP-65(Minimum) for outdoor.
Grid Frequency Tolerance range	+/- 5 Hz
Grid Voltage tolerance	-0.20.15
No-load losses	Less than 1% of rated power
Inverter efficiency(minimum)	>93% (In case of 10 kW or above with in-built galvanic isolation) >97% (In case of 10 KW or above without in- built galvanic isolation)
Inverter efficiency (minimum)	> 90% (In case of less than 10 kW)
THD	< 3%
PF	> 0.9

3.2 INTEGRATION OF PV POWER WITH GRID:

The output power from SPV would be fed to the inverters which converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization. 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. Once the DG set comes into service, PV system shall again be synchronized with DG supply and load requirement would be met to the extent of availability of power. 4 pole isolation of inverter output with respect to the grid/ DG power connection need to be provided.

3.3 DATA ACQUISITION SYSTEM / PLANT MONITORING

1. Data Acquisition System shall be provided for each of the solar PV plant above 10 kWp capacity.
2. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable PC. Metering and Instrumentation for display of systems parameters and status indication to be provided.

3.4 PROTECTIONS

The system should be provided with all necessary protections like earthing, Lightning, and grid islanding as follows:

3.4.1 LIGHTNING PROTECTION

The SPV power plants shall be provided with lightning &overvoltage protection. 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 NFC 17-102:2011 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.

3.4.2 SURGE PROTECTION

Internal surge protection shall consist of three MOV type surge-arrestors connected from +ve and –ve terminals to earth (via Y arrangement).

3.4.3 EARTHING PROTECTION

1 Each array structure of the PV yard should be grounded/ earthed properly as per IS:3043-1987. In addition the lighting arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Department/SECI as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly.

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

3.4.4 GRID ISLANDING:

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 Rooftop 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.

2 A manual disconnect 4-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.

3.5 CABLES

Cables of appropriate size to be used in the system shall meet IEC 60227/IS 694, IEC 60502/IS1554 standards

3.6 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.

Rest all the terms and conditions as per the SECI 1000 MW tender document (Reference No.: SECI/C&P/MNRE/1000MW RT/IND/122016).

Scope of Work: Scope of work will be as per the SECI 1000 MW tender document (Reference No.: SECI/C&P/MNRE/1000MW RT/IND/122016)

4. TIMELINES FOR SUBMITTING THE RESPONSE DOCUMENTS

Interested parties should submit their proposal along with supporting proof documents fulfilling the eligibility as mentioned in clause 2 of this document on or before 27.11.2017 @ 3.00 p.m. Proposal from the interested parties without the necessary proof documents (to support the general, technical and financial eligibility criteria mentioned above) will not be considered for further evaluation. Also the proposals received beyond the submission date will also be not considered by NITT for further evaluation.

Annexure - I

1	Name of the agency with contact details Letter of allocation form SECI (proof to be submitted)	
2	Experience of commissioning at least 2.5 MW in solar roof top under RESCO model in Tamilnadu (Already completed as on the date of advertisement) (Proof to be submitted).	YES/NO
	a) If yes give the name of the client , location, capacity etc.,(Details to be submitted)	
3	Any similar experience in any other MHRD recognized institutes like NIT/IIT/IIM etc., (If 'YES' please provide proof documents)	
4	Annual turnover in the last 3 years (Proof to be submitted)	
5	TIN/GST registration (Details to be provided).	
6	Willing to visit NITT campus for site study before the last date of submission (27.11.2017 @ 3.00 p.m.)	YES/NO
	a) If yes give the period of date to visit (only working days)	
7	Willing to participated in negotiation	YES/NO
8	General terms and condition of NITT (Annexure – II) will be followed	YES/NO
9	Roof wise solar capacity estimation details to be submitted	

Signature of the Head of the Agency
With Seal and Date

ANNEXURE - II

General Terms and Condition of NIT Tiruchirappalli:

a) All the materials related to the project should be with the contractor's scope

b) The labour engaged in this contract is fully under the contractor's scope and ensuring payment as per the Government minimum wages act from time to time.

c) No worker is allowed to work in the site after 6.00 p.m (If necessary prior permission from the engineer in charge of the site should be obtained).

d) Proper measuring instruments and hand-tools with ISI marks should be used.

e) The contractor shall provide all safety devices and personal protective equipments to their workers at their own cost.

f) All PV panels connecting cables MCCBs and all other Electrical switch gears related to the project is fully on the contractor's scope and as per SECI specification.

g) Damage to any of the property of NITT during execution of work is not allowed. If damaged, it should be rectified at the earliest under the supervision of NITT installation committee.

Signature of the Head of the Agency
With Seal and Date