

Company, shall render the Bid liable to be rejected without notice and without further reference to the Bidder and its EMD shall be forfeited.

4.11.2 No Bid may be withdrawn in the interval between the bid due date and the expiration of the validity period of the Bid. Withdrawal or unsolicited modification of a Bid during this interval shall result in the Bidder's forfeiture of its Bid Security.

4.12 Evaluation of Bid and selection of Bidder

4.12.1 GSECL will examine the Bid to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bid is generally in order.

4.12.2 Prior to the detailed evaluation, GSECL will determine the substantial responsiveness of each Bid. A substantially responsive Bid is one which conforms to all the terms and conditions of the Tender Documents without material deviations. Deviations from or objections or reservations to critical provisions such as those concerning EMD, Applicable Law and Taxes and Duties will be deemed to be a material deviation. GSECL's determination of a Bid's responsiveness is to be based on the contents of the Bid itself without recourse to extrinsic evidence.

4.12.3 If the Bid is not substantially responsive, it will be rejected by GSECL and may not subsequently be made responsive by the Bidder by correction of the nonconformity.

4.12.4 GSECL will evaluate and compare Bids which have been determined to be substantially responsive.

4.12.5 A Bidder shall have to quote for at least for one location in line with name plate capacity of that location of Solar PV power project.

4.12.6 Following factors shall be required for evaluation of Bid:

a. The Evaluated Bid Value (EBV) shall be calculated using the following parameters:

- i. Engineering Procurement Commissioning (EPC) Contract Price;
- ii. Net Present Value (NPV) of O&M Price of ten (10) years;
- iii. Net Electrical Energy Generation Guarantee; and

b. The Bid with the Lowest Evaluated Bid Value shall be considered as L-1 Bidder.

The Bid with next highest value shall be considered as L-2 and so on for more understanding please refer Appendix 6. An example has also been done for Bidder's comprehension.

4.12.7 In no case, a Bidder shall have the right to claim to be the Successful Bidder for its Bid.

4.12.8 Evaluation of both Techno-Commercial (un-priced) bids and priced bids shall be done separately.

4.12.9 Price Bids of only techno-commercial acceptable bids shall be considered for further evaluation.

4.12.10 **Lowest six (6) eligible bidders or 50% out of total eligible Bidders** (rounded to the next higher whole number), whichever is higher, shall be invited for participation in e-Reverse Auction.

- 4.12.11 Decrement value and duration for the e-Reverse Auction shall be informed to the qualified bidders before start of e-Reverse Auction. The L1 EBV shall be put up for starting e-Reverse Auction. e-Reverse auction shall be for reducing the EBV and the bidders have to reduce their EBV in decrement of value as decided before start of e-Reverse Auction.
- 4.12.12 The reduction offered by the Bidder during e-Reverse Auction Process on the EBV shall be considered for as an equivalent reduction in Total EPC Contract Price only, based on formula of EBV indicated in Appendix-6. Accordingly, final EPC Contract Price will be arrived for all contractual purposes based Quoted O&M cost for 10 years and NEEGG for 10 years shall remain fixed and no change will be allowed in these parameters during e-Reverse Auction.
- 4.12.13 After e-Reverse Auction process, L1 bidder for the location shall be decided on lowest EBV. The L1 bidder after e-Reverse Auction shall have to submit break-up in line with their quoted price bid within three (3) **working** days.
- 4.12.14 O&M period will be 10 years after COD with **GEDA / UGVCL/PGVCL/GUVNL** & completion of all works as per RFP, whichever is later.

4.13 **Contacts during Bid Evaluation**

- 4.13.1 Bids shall be deemed to be under consideration immediately after they are opened and until such time the Company makes official intimation of award/ rejection to the Bidders. While the Bids are under consideration, Bidders and/ or their representatives or other interested parties are advised to refrain from contacting by any means, the Company and/ or their employees/ representatives on matters related to the Bids under consideration.

4.14 **Employment of Officials/ Ex-Official of the Company**

- 4.14.1 Bidders are advised not to employ serving the Company. It is also advised not to employ ex-personnel of the Company within the initial two years period after their retirement/ resignation/severance from the service without specific permission of the Company. The Company may decide not to deal with such firms who fail to comply with the above advice.

4.15 **Declaration on Bidder's Relation to Directors**

- 4.15.1 The Bidders are required to certify in prescribed format Appendix 9: Declaration of Compliance, whether he/they is/are related to any of the Directors/Senior Personnel of the Company in any of the ways mentioned in the Certificate. It is clarified that any such affirmative certificate shall not, by itself, prejudice consideration of the Bid. This certificate must accompany the Bid.

4.16 **Letter of Intent (“LOI”) and Notification to Proceed**

- 4.16.1 After selection of the Successful Bidder, a Letter of Intent (the “LoI”) shall be issued, in duplicate, to the Successful Bidder. The Successful Bidder shall not be entitled to seek any deviation from the Contract, as may have been amended by GSECL prior to the bid submission date.
- 4.16.2 On issue of the LoI by the Company, Authorised representative of the Successful Bidder shall sign the Contract Agreement within 7 (seven) days and submit the Bank Guarantee within the stipulated time.

4.16.3 GSECL will issue Notice to Proceed separately for each project unless it is mentioned in LOA. Time line of the project shall be from Notice to Proceed.

4.17 Performance Guarantee

4.17.1 Security Deposit cum Performance Bank Guarantee (SD/PBG) as per the format given in Appendix 18 (b): Format of Bank Guarantee for Security Deposit/ Performance Bank Guarantee shall be furnished in favour of Chief Engineer (P&P), Gujarat State Electricity Corporation Limited. The Successful Bidder shall submit Security Deposit cum Performance Bank Guarantee of 10% of the EPC Contract Price, within seven (7) days along with the acceptance of LOI, initially valid for a **period as mentioned in table (B) clause (v)**, and shall be valid for further 90 days. However, in case of delay in demonstration of the PG test, the same will have to be extended up to 3 months beyond the due date for successful completion of PG test. The period for Performance Guarantee Test shall begin from the date mentioned in NIT of this Tender and shall continue till next one (1) year. SD/PBG shall be returned only after successful Performance Guarantee Test/ Final Acceptance Test.

4.17.2 The bank guarantee by the Contractor will be given from bank specified in Appendix 17: List of Banks (for Bank Guarantee) only. BG of any other Bank will not be treated as valid BG.

4.18 Fraudulent Practices

4.18.1 The Bidders may please note that the Company shall not entertain any correspondence or queries on the status of the Bids received against this RFP. Bidders are advised not to depute any of their personnel or agents to visit the Company's office for making such inquiries.

4.18.2 Any effort by a Bidder to influence the Company on the Bid evaluation, Bid comparison or Contract award decision may result in the rejection of the Bidder's Bid.

--- End of Section ---

5 Scope of Work

5.1 GENERAL SCOPE OF WORK

The Tender is invited for setting up of grid connected solar PV power plants ranging below 04 MW at unused / waste land within GTPS & STPS premises of GSECL in the state of Gujarat. The cumulative maximum DC installation capacity under Standard Test Conditions (STC) as per IEC61215 and IEC:61730.

The Contractor shall comply that the maximum AC capacity shall not exceed 5% higher than the capacity mentioned for respective substation.

The general scope of work involves Design, Engineering, Procurement & Supply and Construction (EPC) of the grid-connected small scale solar photovoltaic power plant commissioning and evacuation of power into the GSECL's 11 kV substation through construction, erection, testing and commissioning of complete 11 KV bay along with bus bar extension in respective substations, as per UGVCL/PGVCL/GETCO guidelines, with the guaranteed plant performance in the form of guaranteed energy output. Generation from solar PV plant shall be terminated 11 KV side at GETCO S/s., through 11 KV U/g cable or **single circuit** overhead line, which must be GETCO approved Cable or AL conductor of suitable rating as per current carrying capacity, fault level and voltage drop selection criteria.

The project site location are as under:

Sr No	District	Locations	Power evacuation feasibility (MW)	Metering Point
1	Gandhinagar	GTPS	2.5	GSECL feeder at GSECL Colony
2	Jamnagar	STPS	2.0	Sikka Sub station

5.1.1 Evacuation of Power & Metering Point:

For the purpose of this project, the evacuation voltage shall be at 11 KV AC (three phase) wherein evacuating point cum metering point shall be installed at which energy shall be measured and supplied to DISCOM and shall be determined by DISCOM. Scope of work shall also include 11 KV Under Ground cable work from solar plant to GETCO substation as well as construction, erection, testing and commissioning of complete 11 KV bay along with bus bar extension in respective substations as per GETCO guidelines. ABT Meter to measure net power evacuation shall be installed at 11 KV GETCO substations **only**. For each solar PV plant, 4 cables (three-phase plus one spare) are required.

Operation and Maintenance (O&M):

The scope of work includes Operation and Maintenance (O&M) of the plant for ten (10) years, where in the plant shall generate at least equivalent to the guaranteed Performance of the plant. The Bidder shall submit in the Bid a comprehensive project execution schedule as well as Operation and Maintenance (O&M) schedule with resource planning in the form of Gantt chart, Bar chart, PERT chart and shall be liable for abiding by the schedule. It is the responsibility of the Contractor to perform the necessary maintenance/ timely replacement of all Civil /Mechanical or Electrical components of the project during this O&M period such that the guaranteed performance of the plant is not compromised. Any damage to CIVIL/ ELECTRICAL/ MECHANICAL components of the plant is to be reworked/ replaced/ supplied without any extra cost and time by the Contractor during complete O&M period. The Operation and Maintenance shall be comprehensive. The maintenance service provided shall ensure project functioning of the Solar PV system as a whole and Power Evacuation System to the extent covered in the Contract. All preventive/ routine maintenance and breakdown/ corrective maintenance required for ensuring maximum uptime shall have to be provided. Accordingly, the Comprehensive Operation and Maintenance shall have two distinct components as described below:

- a. Preventive / Routine Maintenance: This shall be done by the Contractor regularly and shall include activities such as cleaning and checking the health of the Plant, cleaning of module surface, tightening of all electrical connections, and any other activity that may be required for proper functioning of the Plant as a whole. Necessary maintenance activities, preventive and routine for Transformers and associated switchgears also shall be included.
- b. Breakdown/ Corrective Maintenance: Whenever a fault has occurred, the Contractor has to rectify the fault, the fault must be rectified within 48 hrs time from the time of occurrence of fault, failing which the Contractor will be penalized as per terms and conditions of this Tender.

The date of Comprehensive Operation and Maintenance Contract period of the Plant shall begin on the date as defined in the NIT of this Tender. Detailed scope of comprehensive Operation & Maintenance has been described in Chapter 5 and Annexure 6 of this document. However, operation of the Power Plant means operation of system as per bidding schedule and workmanship in order to keep the project trouble free covering the guarantee period.

- c. Scheduling and forecasting activity/appointment of Qualified coordinating agency for scheduling and forecasting activity shall be in bidder's scope. All required SCADA/System for each site shall be in bidder's scope.

5.1.2 Tracking Structures:

The Company encourages Bidders to employ proven and reliable seasonal tracking system, however the Bidder should note that total land available is approximately as mentioned above in for the Project. The Bidder shall submit in the Bid, the details / specifications / designs / guarantees and warranties / and any other claims on performance / output of the solar tracking solutions in the Bid document. **Bidder may consider fixed or tilt or tracking system.**

5.1.3 Electrical Work:

Consisting of installation of solar PV modules, junction boxes, grid-tied inverters, isolation transformers, meters, relay & control panel, 11 KV switchgear, for evacuation at solar plant periphery, 11 KV UG cable/transmission line, 11 KV bus bar extension in respective DISCOM's substation, interconnection through wires, cables, bus bars, **system fault level study** etc.; plant lighting system, automatic weather station, SCADA and remote web-based communication & monitoring hardware, software etc.; plant and human safety and protection equipment including danger signs etc. Anything not mentioned in the list but still required to finish the EPC contract of Solar Plant capacity to be considered for the BID.

5.1.4 Civil and Other Non-Electrical Work:

Module Mounting Structures (MMS): The Contractor shall design, fabricate, supply and install module mounting structures with all required accessories like clamps, nuts, bolts, cable ties etc., The structures can be of fixed/ seasonal tracker are accepted.

Modules shall be mounted on a non-corrosive support structures (EPDM rubber gasket /Stainless Steel Star Washer). The frames and leg assemblies of the array structures shall be made of hot dip Galvanized steel per ASTM A123. All nuts and bolts (fasteners) shall be made very good quality stainless steel of grade SS 304 required for module fixing and for other components of MMS, superstructure or switchyard, inverter room, control room, etc. in the plant premises nuts and bolts (fasteners) shall be of MS material with minimum Grade HDG: 5.6.

Foundations: The Contractor shall design and construct appropriate civil foundations for MMS, prefabricated structures/RCC, transformers, switchyard equipment, feeder bay etc.

Prefabricated Structures: The following prefabricated /RCC structures are to be planned and constructed by the Contractor for the Solar PV project:

- Prefabricated Inverter rooms **for indoor inverters**
- Prefabricated Watchman's cabin (At Main Gate) - 01 Nos.
- Security : **Security cabin shall be provided at the entry project site.**

Storm Water Drainage System: The Contractor shall provide storm water drainage system for entire plant which shall be connected with STPS/GTPS drainage system.

Solar PV Module Cleaning System: Cleaning frequency shall be decided by the Bidder to meet the guaranteed generation. For this, the Contractor shall construct and operate 10,000 litre /MW capacity RCC/Sintex or underground water storage tank. The Contractor also has to drill a bore and construct pipeline for carrying water to storage tank, provide electric panel and pump for bore and total water cleaning system. For module cleaning, the contractor can provide new tanker with pump; water jet and hose pipe or establish a pipeline network with valves. Bidder may also consider Robotic/dry/ tractor mounted jet cleaning.

RCC Precast Boundary Wall: The Contractor shall provide RCC precast boundary wall for the entire plant boundary of solar plant site. (as per drawing attached herewith).

Approach / Internal Roads and Pathways: The Contractor shall provide internal roads and approach roads / pathways of WBM type. If plant is being installed in more than one pockets, Each pocket shall have internal connectivity by WBM road. Peripheral roads & road connected to inverter transformer shall be of WBM. Carriage way Width of WBM/ Asphalt shall be 4 mtr. and Shoulders width of 0.50 mtr. On both side of road.

Cable Trenches: Construction of RCC cable trenches with cable trays and covers for inverter and control rooms, earthen excavated cable trench with alternate layers of sand and brick as per relevant IS from PV arrays to inverter room to control room to switchyard shall be provided by the Contractor. **However, during detail engineering cable laying philosophy will be decided and bidder shall have to follow respective philosophy as per standard.**

Main Gate: The Contractor shall provide main gate of structural steel material of appropriate design. Also, necessary arrangement has to be made by Contractor to erect the main gate on pylon stone.

5.1.5 Site levelling: The Contractor shall level the site, as required, so as to compact the plant in minimum possible area and also minimize shading losses because of solar PV module structures. Removal of debris and bush-cutting is mandatory. Levelling of the site is to be done if required. **Bidder shall design Array of Solar PV as per the natural contour of site. However, water accumulation (rain +plant) shall not be occurred in Solar PV plant area.**

5.1.6 Communication: The Contractor shall provide complete plant SCADA (Software based) with SCADA server having **string level** monitoring capabilities over remote server. Contractor shall lay the cable in appropriate cable trench, connect with suitable connectors and terminate to the SCADA server inside control room. The Contractor shall also provide necessary internet connection through GPRS enabled modem along with LAN connectivity for data communication over remote server and shall bear the cost of the same during the Contract period including O&M. The Contractor shall provide 3 nos. of Web Client License for remote monitoring per plot. The Contractor shall provide necessary provision of RTU for communication with SLDC. The Contractor shall submit the below mentioned Technical Data Sheet for String RTU, TCP String, Central RTU in the prescribed format. The necessary hardware and software required for SLDC communication from the plant as well as up to evacuation point shall be in the bidder's scope. It is the responsibility of the contractor to obtain ALDC and SLDC connectivity. Necessary charges if any regarding SLDC connectivity shall be in the bidder's scope.

Type Code

Power Entry Characteristics

AC input voltage range ($V_{ac, min}$ $V_{ac, max}$)

Nominal AC input voltage ($V_{ac, n}$)

Rated frequency (f_r)

DC Input Voltage Range ($V_{dc, min}$ $V_{dc, max}$)

Nominal DC input voltage ($V_{dc, n}$)

RS485 Section

Serial interface type

Baud rate

Protocol

Number of devices

Line biasing resistor (wherever necessary)

Termination resistor

RS485 MODBUS section

Serial interface type

Baud rate

Protocol

Number of devices

Line biasing resistor (wherever necessary)

Termination resistor

Physical and Environmental

Environmental protection rating

Ambien temperature range

Relative humidity

Compliance

Isolation

Marking

Safety and EMC standard

Essential list of I/O and equipment is given herewith, but scope is not limited to the Essential List, contractor is fully responsible to provide complete SCADA System which can be extensible / communicable with additional / future solar plant. 10 % or 20 % spare I/o modules and equipments shall be provided.

Sr.	Equipment to be monitored	Data to Be Monitor (Real Time)	Type of IO
1	String Monitoring / Array Monitoring	String/Inverter level monitoring required	Through Communication with SJB PLC/Card
2	String Junction Box / Array Junction Box (SJB = AJB)	SJB internal temperature and SJB Bus Voltage and Current	Through Communication with SJB PLC/Card
3	Inverter	All Electrical Parameters of Inverter along with Scanning, Records & Error communication	Through Communication with SJB PLC/Card
4	Inverter Transformer	Oil and Winding Temp Monitoring	Analog Input
5	11 KV VCB panel	ON/OFF and Trip position of VCB and Energy Meter RS-485 communication	DI and Communication and RS-485/MODDBUS for Energy Measurement
6	Weather Monitoring Station	Two no. of Class I Pyranometer (one for GHI, one at PV plane collector angle), Two numbers of contact type temperature sensors at backside of the module. Ambient temperature sensor, Wind velocity and speed sensor.	Through Communication

7	Aux. Equipment's	Aux. Transformers, UPS, Fire Alarm Panel, Water & Utility Pumps & Panels,	AI / DI / Communication for Information / Records / Logging
8	Main and Check Meter	All electrical parameters recorded by energy meter	Through RS-485/MODDBUS communication

5.1.7 Plant Safety Equipments:

The Contractor shall provide appropriate numbers of foam type fire extinguishers / CO₂ extinguishers, sand buckets and transformer discharge rod at Invertor Rooms, Control Room, Security Cabin and Switchyard/Substation. Further, all high voltage places to be provided with danger sign boards with appropriate size and material to last for 25 years. Transformers shall be provided with appropriate Fire protection/ NIFPS fire prevention system.

5.1.8 Statutory Requirements:

All construction, operation and maintenance procedures shall be carried out as stipulated to appropriate relevant standards, regulations laid by CEA/GETCO / DISCOM / GEDA / GSECL / GoI / MNRE and / or any other agency as and when applicable. Further, this shall comply with the applicable labor laws. The Bidder shall make himself aware of such requirements and shall not solely depend on the Company to make available full information.

Bidders should follow DISCOM/GETCO norms, regulations, T & C, specifications and guidelines prevailing at present & amended time to time in all DISCOM/GETCO connected/related works. The GETCO norms, regulations, T & C, specifications and guidelines etc is available at GETCO site or will be provided at the time of LoI or as per requirement during the execution of the projects which is to be implemented in supply erection & commissioning and testing of GETCO items/related works. Following drawing/documents are attached for ready reference only.

- 1) Standard primary drawings for GETCO substation (i.e. SLD, layout plan and section) – Attached as Annexure A6
- 2) Typical arrangement for GSECL solar feeder in 66KV s/s. (Attached as Annexure A7)
- 3) CEA regulation related to solar developers.(Attached as Annexure A8)

4) SCADA data/system requirement of GETCO with typical system architecture-
Amendment(Attached as Annexure A9)

5.1.9 Planning and Designing:

- i. The Contractor shall plan and design for the electrical / mechanical / civil requirements including but not limited to plant configuration, space optimization, distance between rows of modules, sufficient passage for vehicle and man-power movement in the plant, mounting structures, location of inverter room, cable routing, selection of equipment and items, procurement plan etc. to enhance plant output.
- ii. The Contractor has to carry out the complete soil investigation of the site, through Government approved laboratory before designing various civil structures. The design of all civil foundations, R.C.C structures, buildings etc. shall be carried out considering appropriate seismic zone of the area. All appropriate loads, wind velocity, seismic factors etc. shall be considered as per the relevant IS Specifications while designing any civil structure. Also, the environmental conditions, soil characteristics, atmospheric effect, ground water table level, rain water data, land profile, etc. must be considered as per site actual condition and accordingly appropriate precautions and preventive measures shall be taken while designing the structures. RCC structures shall be adopted considering surrounding weather and soil conditions of site and as per the relevant IS codes. The concrete mix design test of minimum M20 grade with 380 kilograms of cement shall be carried out in Govt. certified laboratory or NABL accredited laboratory.
- iii. The Contractor shall take into consideration all parameters like wind speed, seismic zone, safety factor and safe Soil Bearing Capacity (SBC) etc. for the purpose of design and construction of civil foundations for all civil work as per relevant IS codes.
- iv. The Contractor shall carryout Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal usage of space, material and labor.
- v. All designs & drawings have to be developed based on the governing standards and requirements of the project and also keeping in mind basic design specifications. Company may approve minor deviations or suggest required modifications in the same which are meant for increasing plant performance without sacrificing quality / workmanship norms.
- vi. All designs, specifications, reports, etc. submitted or used by the Contractor at any point in time shall first be approved by the Company /Consultant and revised by Company /Consultant, if required, prior to execution.
- vii. The technology offered shall be commercially established technology and at least one Project based on this technology shall be satisfactorily operational for at least one year in India. Details of the Project with location and the successful operational period of the Project utilizing this technology shall also be mentioned before the submission of first set of drawings for approvals.
- viii The Contractor shall have to arrange the facility for testing bulk material at site such as

elcometer for testing the galvanization, cube-testing machine for testing the strength of cube samples etc.

- ix The Contractor shall have to send samples for testing of the material to Govt. accredited / NABL Accredited laboratory as when required by the Company.

5.1.10 Approval of Design/Drawings

The following procedure has to be followed for assessment and approval of designs, specifications and drawings during the course of the project: The Contractor shall submit to the Company/Consultant the documents in hard copy and soft copy both with proper reference and drawing numbers. The respective documents for selection, supply, installation, erection, commissioning of equipment/ structures have to be submitted at least 15 days in advance to the planned start of the activity as per the Contractor's project schedule. The Contractor shall submit documents as required for this project according to his design and specifications. The Company / Consultant (on behalf of the Company) will assess, review and approve the documents within 10 to 15 days of submission of documents; and only after the approval the Contractor shall release the documents on site for execution. The documents shall be revised by the Contractor as per instructions /comments given by the Company / Consultant (on behalf of the Company) if required, prior to execution. Subsequent revisions and the final version of the documents shall also be submitted in hard and soft copy to the Company and the Consultant. The Contractor has to take into account the above mentioned process of revisions (if required) and adjust the preparation and delivery of the documents such that the overall planned project schedule is not affected.

- ii. The Contractor has to submit all drawings, which are related to plant for approval and the Contractor, shall not claim any drawing as their intellectual property. Drawing which is developed for project will be the intellectual property of the Company.
- iii. The Contractor shall submit a comprehensive project management schedule in the form of a Gantt chart CPM/PERT chart and shall be liable for abiding by the schedule. **The submitted copy shall be compatible to open in either MS project or Primavera**
- iv. The Contractor shall submit a comprehensive maintenance schedule for operation and maintenance of the photovoltaic power plant along with checklists before commencement of work on site and shall be liable for abiding by the schedule. All construction, operation and maintenance procedures shall be carried out through appropriate relevant standards, regulations and labor laws.

5.1.11 Final Commissioning

The commissioning procedure shall be as per GEDA/ GETCO / GSECL / DISCOM / Chief Electrical Inspector to Government (CEIG) requirements. The Contractor shall also ensure the following:

- i. Obtaining written certificate of commissioning of the facility and permission to connect to the grid from the office of the Chief Electrical Inspector of the state and any other authorized representative from Government of India (GoI) / GoG / GETCO / GSECL / DISCOM/GEDA.

- ii. Inspection and successful electrical commissioning certificate from the Company.
- iii. Obtaining all certificates required by DisCom from agency appointed by them.
- iv. Satisfactory completion certificate towards completion of all other contractual obligations by the Contractor as stipulated from the Company.

5.1.12 Comprehensive Operation and Maintenance Contract

The Bidder shall separately quote in Appendix 15.3 for Operation and Maintenance of the power plant for Ten (5 + 5) Years where in the plant should perform at a minimum annual NEEGG derated every year by not more than 1% referring to the installed DC capacity of the plant indicated by the Bidder. Any damage to CIVIL/ELECTRICAL/MECHANICAL components of the plant is to be reworked/replaced/supplied without any extra cost and time by the Contractor during maintenance period. This means after completion of O & M period every component of the plant should be in good and working condition.

Disclaimer: Any civil / electrical / other work, which is not mentioned or included in this Tender document but necessary for the construction and O&M of Solar PV plant inside GSECL Power Stations shall be borne by the Contractor. The Contractor shall, unless specifically excluded in the Contract, perform all such works and /or supply all such items and materials not specifically mentioned in the Contract/ Tender Document but can be reasonably inferred from the Contract as being required for attaining completion, commissioning and performance of the facilities, delivering NEEGG and maintaining the plant & achieving NEEGG during O&M period of Solar PV Power Plant inside GSECL Power Stations as if such work and / or items and materials were expressly mention in the Contract without any extra cost implication and liability to GSECL. All specifications mentioned in this Tender indicates minimum technical requirement. The Contractor may propose alternate specifications or design though the final acceptance of the same is subject to the Company's discretion.

GENERAL SCOPE OF WORK

- The proposed location of solar project may be flat/uneven/hilly/submerged during monsoon. Bidder has to visit the site before pre bid meeting and accordingly discussed with the GSECL official for any query.
- Bidder shall have to execute the work of proposed solar project for proposed location as per the site, accordingly precast boundary wall shall be provided for security point of view.
- Bidder shall have to construct Storm water drain for proposed location. The storm water drain shall be designed by the bidder in such a way that rainy water shall not be accumulated in area and discharge of the same smoothly to existing drain of GTPS & STPS etc.
- ~~If huge quantity of rainy water entered into the proposed solar project site area than bidder has to construct bund/protection wall and necessary storm water drain shall be provided for each pocket of proposed solar project site and divert the same smoothly~~

~~into nearest village nalla /palika drain to avoid the damage the solar project site etc. during monsoon.~~

- Bidder shall have to construct road as per site requirement of proposed solar project capacity with necessary WBM road, culvert with site slope rubble pitching, laying NP-3 pipe of sufficient diameter wherever required etc. shall be executed as per site requirement.
- Bidder shall have to make its own arrangement for construction water as well as water required during O & M period.
- The fresh OPC 53/PPC cement and TMT steel reinforcement bars Fe 500 CRS shall be used confirming to relevant I.S. Specifications of the approved manufacturers of GSECL.
- The all material, installations, fixtures, accessories etc. to be provided shall be as per the relevant I.S. specifications and of best quality and of standard manufacturer as approved by the EIC.
- Bidder shall have to keep the full proof records of purchase and consumption along with original purchase bills of Cement and Steel as per the GSECL procedures and rules.
- Bidder shall have to provide best workmanship with skilled manpower for all the civil items as per the standard specifications/ best practice as approved by the EIC. If there is dispute in the items of civil works/no standard specifications of civil work items, in that case CPWD/ PWD/ booklet of Standard specification shall be applicable. GSECL will not supply any material for this work.
- To obtain necessary approval from Govt. / semi Govt. body etc. as a statutory requirement bidder has to approach the government organization, GSECL will provide required supporting documents for the purpose.
- All such items and materials not specifically mentioned in the Contract/ Tender Document but required as per site condition during execution for completion of proposed solar project / during O & M period of Solar PV Power Plant, bidder has to execute the same without any extra cost.
- For all the civil work of proposed solar project bidder has to submit the drawing for approval of GSECL.
- Civil foundation design for Module Mounting Structures (MMS) as well as control room, inverter room, switch yard transformer / equipment shall be made in accordance with the Indian Standard Codes and soil conditions, with the help of Chartered Structural Designer having substantial experience in similar work. The Successful Bidder shall submit the detailed structural design analysis along with calculations and bases / standards.
- Module Mounting Structures Design is to be certified by Chartered Structure Engineer and certificate to be produced along with the design details for approval by

GSECL. Switchyard structures / transmission line structure designs shall be strictly as per GETCO design.

The scope of work includes Operation and Maintenance (O & M) of the plant for ten (5+5) years, where in the plant shall generate the guaranteed Performance. The Bidder shall submit in the Bid a comprehensive project execution schedule as well as Operation and Maintenance (O & M) schedule with resource planning in the form of Gantt chart, Bar chart, CPM, PERT and shall be liable for abiding by the schedule. It is the responsibility of the Contractor to perform the necessary maintenance/ timely replacement of all Civil /Mechanical or Electrical components of the project during this O&M period such that the guaranteed performance of the plant is not compromised. Any damage to CIVIL/ ELECTRICAL/ MECHANICAL components of the plant is to be reworked/ replaced/ supplied without any extra cost and time by the Contractor during complete O&M period. The Operation and Maintenance shall be comprehensive. The maintenance service provided shall ensure project functioning of the Solar PV system as a whole and Power Evacuation System to the extent covered in the Contract. All preventive/ routine maintenance and breakdown/ corrective maintenance required for ensuring maximum uptime shall have to be provided. Accordingly, the Comprehensive Operation and Maintenance shall have two distinct components as described below:

- a. Preventive / Routine Maintenance: This shall be done by the Contractor regularly and shall include activities such as cleaning and checking the health of the Plant, cleaning of module surface, tightening of all electrical connections, and any other activity that may be required for proper functioning of the Plant as a whole. Necessary maintenance activities, preventive and routine for Transformers and associated switchgears also shall be included.
- b. Breakdown/ Corrective Maintenance: Whenever a fault has occurred, the Contractor has to attend or to rectify the fault, the fault must be rectified within **48 hrs** time from the time of occurrence of fault failing which the Contractor will be penalized as per terms and conditions of this Tender.

5.2: Civil work:

5.2:1 Civil work:

- The proposed location of solar project may be flat/uneven/hilly/submerged during monsoon. Bidder has to visit the site before pre bid meeting and accordingly discussed with the GSECL official for any query.
- Bidder shall have to execute the work of proposed solar project for proposed location as per the site i.e. STPS & GTPS, accordingly precast boundary wall of each pocket shall be provided for security point of view.
- Bidder shall have to make its own arrangement for **construction water as well as water** required during O & M period.

- The fresh OPC/PPC 53 grade cement and TMT steel reinforcement bars Fe 500 CRS shall be used confirming to relevant I.S. Specifications of the approved manufacturers of GSECL.
- The concrete mix design test shall be carried out in Govt. certified laboratory or NABL accredited laboratory for minimum M20 grade with 400 kilograms of cement.
- The all material, installations, fixtures, accessories etc. to be provided shall be as per the relevant I.S. specifications and of best quality and of standard manufacturer as approved by the EIC.
- Bidder shall have to keep the full proof records of purchase and consumption along with original purchase bills of Cement and Steel as per the GSECL procedures and rules.
- Bidder shall have to provide best workmanship with skilled manpower for all the civil items as per the standard specifications/ best practice as approved by the EIC. If there is dispute in the items of civil works/no standard specifications of civil work items, in that case CPWD/ PWD/ booklet of Standard specification shall be applicable. GSECL will not supply any material for this work.
- To obtain necessary approval from Govt. / semi Govt. body etc. as a statutory requirement bidder has to approach the government organization, GSECL will provide required supporting documents for the purpose.
- Bidder has to obtain BOCW certificate & labour license for the proposed solar site from concern government department.
- All such items and materials not specifically mentioned in the Contract/ Tender Document but required as per site condition during execution for completion of proposed solar project / during O & M period of Solar PV Power Plant, bidder has to execute the same without any extra cost.
- For all the civil work of proposed solar project bidder has to submit the drawing for approval of GSECL.

5.2.2 Topographical Survey:

GSECL will show the proposed project site physically to bidder , necessary required survey work for co-ordinate of site will be carried out by bidder and accordingly final plot layout (As per JMS sheet) drawing shall be submitted to GSECL for further approval. Topographical survey shall have to be done by the Bidder for the proposed site at 5 mt. interval with the help of Total Station or any other suitable standard method of survey. All necessary Reduced Levels (RL) as entered in the Field Book/Soft Copy have to be submitted along with pre contour layout of the total site. The formation levels of the proposed solar power plant have to be fixed with reference to High Flood Level of the proposed site. The ground level and plinth level of structures shall be fixed taking into consideration on the highest flood level and surrounding ground profiles.

5.2.3 Soil Test:

The soil testing of proposed project site shall be carried out by the agency. Contractor is solely responsible to carry out detailed Geotechnical investigation to ascertain soil parameters of the proposed site for the use of planning / designing / construction / providing guarantee / warranty of all civil works including but not limited to foundations / piling for module mounting structures, HT lines, 11 kV switchyard equipment etc. The Contractor shall carryout soil investigation through NABL accredited labs. These reports shall be furnished to the Company prior to commencing work. All RCC works shall be provided of required grade of concrete as per relevant IS specifications as well as soil data considering appropriate earthquake seismic zone, wind velocity, whether effect ,soil characteristics etc. The minimum Bore hole for soil investigation report should be done as per IS Code.

5.2.4

The scope of soil investigation covers execution of complete soil exploration including boring, drilling, collection of disturbed & undisturbed soil sample conducting laboratory test of samples to find out the various parameters mainly related to load bearing capacity, ground water level, settlement, and soil condition and submission of detail reports along with recommendation regarding suitable type of foundations for each bore hole along with recommendation for soil improvement where necessary. The design will done based on considering the worst result among the bore holes. Contractor has to carry out also Electrical Resistivity Test.

5.2.5

The bidder shall have to carry out Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal use of space, material and manpower and submit all the details / design to Company for its review / suggestions /approval.

5.2.6

The foundations should be designed considering the weight and distribution of the structure and assembly, and wind speed **as per IS 875 for calculations of Vz. Bidder shall take basic wind speed value for respective sites as per following.**

Bidder shall consider 180 KMPH wind speed for Sikka & GTPS as **per IS 875**

Successful Bidder shall also plan for transport and storage of materials at site and shall arrange for its own construction power and water. However, the Contractor can avail construction power connection from Discom by applying for temporary connection and necessary charges will be borne by the bidder. Client will help for supporting documents.

5.2.8 Land Development and Cleaning:

Site leveling:

The bidder shall have to level the site, as required, so as to compact the plant in minimum possible area and also to minimize shading losses because of solar PV module structures.

Removal of debris and bush-cutting is mandatory. Leveling & area grading of the site is to be done if required for easy drain of surface water naturally to avoid the accumulation of rainy water in plant area. During execution of work if any hidden masonry / concrete foundation / pipe line etc. found then agency has to execute / remove / reroute the same without any financial implication. The bidder shall visit the site to ensure the land development work if any and shall carry out the topographical survey to ensure land development work such that land is perfectly flat. The Contractor has to clean the site from small trees and shrubs, removal of debris, if any; filled the depression area and excavates and level the high level areas wherever required even though contractor follows the natural ground level for entire plant execution. The Contractor can also use the natural contour of the land, if shadow is not affecting the generation. However, the Contractor shall take reasonable care to ensure that the plant is aesthetically designed. Bidder shall have to Level the uneven area of each pocket of the proposed location as per site requirement.

5.2.9 Storm Water Drainage System:

The Contractor shall provide storm water drainage system for entire plant.

The drain is to be designed as per actual site requirement and to avoid accumulation of water in solar Plant area. The peripheral drain and all other internal drains to inverter room, control room, switchyard of solar project shall be of brick lining which is backed up by **PCC (75 mm thick C.C. 1:4:8) on side slope and at bottom of drain with brick lining and all joints of Brick lining are to be filled up with cement mortar in C.M. 1:4.** Also, the bidder shall provide RCC Hume pipe (NP3 grade) at the crossing of road and drains and at required locations. And also necessary arrangement for disposing / lifting of accumulated surface water is to be made by providing pump and RCC sump of required capacity shall be provided by bidder as per site requirement or naturally as per site conditions.

Storm water drain for each pocket of proposed location shall be designed by the bidder in such a way that rainy water will not be accumulated in pocket area and discharge the same smoothly to Plant drain etc.

If huge quantity of rainy water entered into the proposed solar project site area than bidder shall have to construct bund/protection wall with necessary storm water drain shall be provided for each pocket of proposed solar project site and divert the same smoothly into nearest Plant drain to avoid the damage the solar project site etc. during monsoon.

5.2.10 Foundations:

The Contractor shall design and construct appropriate civil foundations for MMS RCC Pile Foundation, prefabricated structures / **RCC frame structure of control room**, transformers, switchyard equipment, feeder bay etc. During execution of work if any hidden masonry / concrete foundation / any structure /pipe line etc. found then agency has to execute / remove / reroute the same without any financial implication. Site is found to be more or less flat.

Civil foundation design for Module Mounting Structures (MMS) as well as control room, inverter room, switch yard transformer / equipment shall be made in accordance with the Indian Standard Codes and soil conditions, with the help of Chartered Structural Designer having substantial experience in similar work. The Successful Bidder shall submit the detailed structural design analysis along with calculations and bases / standards.

Module Mounting Structures Design is to be certified by Chartered Structure Engineer and certificate to be produced along with the design details for approval by GSECL. Switchyard structures / transmission line structure designs shall be strictly as per GETCO design. The Contractor shall design, fabricate, supply and install module mounting structures with all required accessories like clamps, nuts, bolts, cable ties etc., The structures can be of fixed/seasonal tracker are accepted.

Pile integrity test should be carried out for minimum 20% of total pile to be casted for MMS Structure.

5.2.11 Solar PV Module Cleaning System (RCC/ PVC water Tank):

Cleaning frequency shall be decided by the Bidder to meet the guaranteed generation. For this the Contractor has to design as per relevant IS codes, submit and take approval from GSECL, construct and operate 10,000 liter /MW capacity RCC / PVC water storage tank, the PVC water storage shall be of first quality and shall be approved EIC. The Contractor also has to drill a bore and construct pipeline for carrying water to storage tank, provide electric panel and pump for bore and total water. Silting chamber for filtration of the water before the inlet and which shall match with invert level of Storm Water drain. Design of RCC water tank shall be such that it shall resist Earth pressure and Water pressure and satisfy all IS codes. Design of water tank shall be done strictly based on Soil Investigation Report with complying all latest IS codes.

Cleaning system. For module cleaning, the contractor can provide new tanker with pump, water jet and hose pipe or establish a pipeline network with valves.

5.2.12 Approach / Internal Roads and Pathway & Peripheral Road:

Main road connecting to proposed site for each location for construction purpose as per site requirement shall be WBM 4.00 mtr.wide plus side shoulders both side.

The road connecting from the main gate to control room and switch yard shall be accessed by Asphalt road having 4.00 mtr.wide plus side shoulders both side.

Peripheral roads & road connected to inverter transformer shall be of WBM. Width of WBM/ Asphalt road shall be 4.00mtr.wide plus side shoulders both side.

The Contractor shall provide internal roads and approach roads / pathways of WBM type. If plant is being installed in more than one pockets, each pocket shall have internal connectivity by WBM road. Peripheral roads & road connected to inverter transformer shall be of WBM. Width of WBM/ Asphalt road shall be 4mtr.

Bidder shall have to construct road as per site requirement of proposed solar project capacity of each location, with necessary WBM road, culvert with side slope rubble pitching, laying NP-3 pipe of sufficient diameter wherever required etc. shall be executed as per site requirement for road crossing.

5.2.13 Cable Trenches:

Construction of RCC cable trenches with cable trays and covers for inverter and control rooms, earthen excavated cable trench with alternate layers of sand and brick as per relevant IS from PV arrays to inverter room to control room to switchyard shall be provided by the Contractor.

5.2.14 Watchman's Cabin and Main Entrance Gate

The Contractor shall provide main gate of structural steel material of appropriate design. Also, necessary arrangement shall have to be made by Contractor to erect the main gate on pylon stone.

An all-weather main gate with width of at least 6 meter shall be erected at the entrance of the plant site and another gate (4 mt. width) for each pocket shall be provided for internal connectivity with of proposed location.

The Prefabricated Security Cabin of size 3.5 meter x 3.5 meter at the main entrance gate shall be designed & constructed by the Successful Bidder keeping in view the safety and security of the power plant. The Bidder shall provide detailed civil, electrical, plumbing, etc. drawings and equipment specifications for the security cabin in "(B) Technical Offer" of the Bid document.

5.2.15 Security Cabin:

Security Cabin – (at 4 corners of each pocket of proposed Plant.)

The Contractor shall provide 4 (four) numbers of prefabricated Watchman' portable cabin at minimum 4 (four) corners of the boundary of each pocket of proposed Plant such that safety of the plant is ensured along with one Watchman's cabin at the boundary of each pocket of proposed location. The minimum size of watchmen's (Security Cabin) cabin shall be 1.2 meter x 1.8 meter size and height of 2.10 mt. with appropriate roof at the top, considering minimum height of 6 mt above ground level. Location of the watch Cabin (Security Cabin) shall be as directed by GSECL. Bidder shall have to submit the design of supporting structure with ladder & railing for safety point of view. Security cabin of galvanized steel with roof will be submitted for the approval of EIC.

5.2.16 Fencing:

The bidder shall provide RCC precast boundary wall with barbed wire for entire plant area .Internal fencing for PCU, X'mer, HT SWGR -Aux. Chain link fencing of 2.0 mtr. Height With provision of gate shall be considered.

A. Precast compound wall column

Supply and installation of smooth finish and uniform shape & size precast compound wall column of concrete grade M30 with use of OPC 53 Grade of GSECL approved brand cement, including shuttering, reinforced with 3mm wiron (phosphorous carbon steel) of TATA make using pre stressed technology, 1.8m high from finished ground level, vertical post size 150mmX150mmX2700mm, reinforced of 7 nos-3mm dia PC steel of TATA make with a provision of 300 mm long (12")having 12mm dia MS bolt (9" length) grouted at the time of casting with 3" outside for fixing of angle on top of each column for barbed wire fence as per drg. Precast compound wall columns shall be provided with groove for wall

panel slab fixing and grouted below ground level by Augur piling or excavation of 300mm dia, 900mm depth and grouted with PCC of M20 (1:1.5:3 proportion of cement concrete)

B. Precast compound wall panel slab

Supply and installation of smooth finish and uniform shape & size precast compound wall panel slab of concrete grade M30 with use of OPC 53 Grade of GSECL approved brand cement, including shuttering, reinforced with 3mm wiron (phosphorous carbon steel) of TATA make using pre stressed technology, wall panel slab size 1800mmX300mmX50mm thick, reinforced of 3 nos-3mm dia PC steel of TATA make, fixed in groove of vertical posts as per drg. Wall panel slab shall be fixed in groove of vertical column/posts with engraved precast logo in each section with text of GSECL on each one panel of each span and with provision of excess water flow weep holes having reinforced of 4 nos-3mm dia (phosphorous carbon steel of TATA make, fixed in groove of vertical posts as per drg.

C. Angle Post

Angle size of 40x40x5, 90cm. Long with Galvanize coating of minimum 80 micron & 8mm Plate to be provided for angle fixing 100x100mm size.

D. Barbed GI wires

Providing and fixing barbed GI wires four nos 12x14 SWG GI barbed wire (IS 278-2009) heavy coated 230/240 GSM zinc on wire of TATA make shall be provided on top of precast compound wall and fixed over 450 mm high MS HDG 'L' angle (40mmx40mmx5mm). The barbed wire has to be fitted in direction longitudinally between two posts fitted & fixed with GI staples, turn buckles, with all hardware etc, complete as per direction of Engineer-in-charge.

5.2.17 Water supply:

All necessary arrangement for wet cleaning of the solar panels shall be in the scope of the bidders and accordingly bidder shall have to provide all the necessary equipment, accessories, tool & tackles, pumps, tankers, tractors and piping arrangement which is required for the same. Bidder shall have to make its own arrangement for construction water as well as water required during O & M period.

5.2.18 Pre-fabricated Inverter Room (for indoor inverters only) & R.C.C./ PEB Control Room

Bidder has to submit the design drawing for approval of Pre-fabricated Inverter Room & R.C.C./PEB Control Room. Civil work for Pre-fab Inverter Room & R.C.C. Control cum Conference room shall be of adequate size and of be of standard manufacturer with sufficient lighting points and RCC cable trenches with oil painted edge angle of 65mm x 65mm x 6mm and checker plate covers of 8 mm thickness and shall have exhaust chimney and also sufficient ventilation. All prefab inverter room and Control Room shall be laid on RCC plinth with sufficient foundation and reinforced grade slab with finished Kotah of 25mm thickness /Vitrified of 8-10 mm thickness tile flooring and 100 mms skirting of same tiles. The plinth shall be minimum 500 mm high from formation level of the plant. Plinth protection shall be

given throughout perimeter of width 1.2m with rough kotah of 25mm thickness on its top for Inverter rooms and Control Rooms. Sufficient steps at the entry of the room with rough Kotah on its top and RCC ramp of sufficient angle shall be provided for shifting the equipment in the rooms for all Inverter rooms and Control Room. Rain water pipe at various locations with gutter at the top shall be provided to discharge rain water. The bidder shall provide to GSECL the detailed civil, electrical, plumbing, etc. drawings and equipment specifications for the inverter room & control room and shall obtain approval of the same. The drawings of Panels with the make of components should be approved from GSECL.

For inverter transformer Chain link fencing of 2.0 mtr. height With provision of gate shall be provided

i. RCC frame structure below plinth

Inverter Rooms/Control cum Conference Room shall have adequate size of footing, pedestal columns, plinth beam, grade slab with reinforcement as per relevant IS specifications considering seismic zone, wind & soil detail etc. Back filling material shall be of Laboratory tested Murrum or Sand. Grade slab shall be laid on 100 mm thick PCC. Also, Termite proofing is required before preparation of grade slab and plinth protection. The Control cum Conference Room shall have a rolling shutter at the front side.

ii. Control room

It shall be of adequate size (minimum height 3.6 mtr) for fixing the panels, battery banks etc. With; a) SCADA Room with Work station, Desktop and Chairs; b) Store Room with almirah; c) Pantry unit of sufficient size with sandwich type of platform with plumbing fixture and exhaust fan; d) Toilet unit for Gents with urinals and Ladies having wash basins in each; e) RCC cable trenches with covers and cable trays and all openings of cable entry shall have vermin proofing using spray foam or mortar; f) Furniture like conference table, chair and sofa etc.; g) Lighting points and fixtures; and h) Plumbing fixtures.

iii. Facilities required for Control cum Conference Room:

It shall also have adequate size SCADA cabin with necessary 2 numbers of work station with drawers of Godrej/ Durian/ Zuari make, 2 numbers Computer and 1 number of LED TV of 48 inch of Sony/ Phillips / Samsung make, 4 numbers of chairs for workstation, 2 Nos. of almirah and split A.C of 1.5 Ton of Voltas/ Hitachi/ Samsung/LG make for operating staff for work station. Conference Room shall also be equipped with conference table of 10 persons with Power Sockets with 10 chairs of Godrej/ Durian/ Zuari/ Usha/ Lexus and sofas. In Control cum Conference room, except control room (where panels are fixed) all other rooms like SCADA cabin, conference room, store, pantry and passage shall have False ceiling that shall consist of 600 x 600 x 20 mm gypsum board with one coat of primer and two or more coat of Acrylic emulsion paint. The suspension system shall consist of 6 mm diameter galvanised steel rods suspended from ceiling supporting by aluminium grid of 38 x 25 x 1.5 mm and cross tie of 25 x 25 x 1.5 mm and aluminium angle of 25 x 25 x 1.5 mm. Conference room shall be equipped with an all-in-one printer cum scanner, landline phone, refrigerator (150 litre) of Voltas/Godrej/Whirlpool make, projector and screen of 2m x 2m. All material, installations, accessories to be provided shall be of best quality and of standard manufacturer as approved by the EIC/ GSECL. All units of the Control cum Conference Room shall have