

- 27.4.5 The O&M contract period may further be extended for a suitable period as per mutually agreed terms and conditions. The contractor is allowed to submit his intent at the time of Final acceptance.

28. Inter-changeability

All the parts shall be made accurately to applicable Standards and specification so as to facilitate replacement and repairs. All corresponding parts of similar apparatus shall be inter-changeable.

29. Power to Vary or Omit Work

- 29.1 No alterations, amendments, omissions, additions, subtractions, or variations of the work (hereinafter referred to as "variation") under the contract shall be made by the Contractor except as directed by the Employer
- 29.2 If any suggested variations would, in the opinion of the Contractor, if carried out would prevent it from fulfilling any of its obligations or guarantees under the Contract, it shall notify the Employer thereof in writing and the Employer shall decide forthwith whether or not the same shall be carried out and if Employer confirms its instruction, the Contractor shall carryout the work as per the instructions.
- 29.3 The differences in cost, if any, occasioned by such variations, shall be added to or deducted from the specific Contract Price i.e., Supply, Erection and Civil Works, as the case may be.
- 29.4 In the event of the Employer requiring any variations; reasonable and proper notice shall be given to the Contractor as well, to enable it to make arrangements accordingly, and in cases where goods or materials are already prepared/ procured, or any designs, drawings or patterns made or work done that require to be altered, a reasonable sum in respect thereof shall be allowed by the Employer.
- 29.5 In every case in which the contractor shall receive instructions from the Employer for carrying out any work, which either then or later, will in the opinion of the Contractor involve a claim for additional payment, the Contractor shall as soon as reasonably possible, not later than 15 days after the receipt of such instructions, inform in writing to the Employer of such claim for additional payment.
- 29.6 In any case, if the Bidder deviates from the design or specification as defined in the NIT document, the Bidder has to submit the deviation sheet along with the Bid.

30. Negligence

If the Contractor neglects to manufacture or supply or construct the Plant and equipment with due diligence and with expeditiousness or refuses or neglects to comply with any reasonable order given to it in writing by the Employer or contravenes any provisions of the Contract, the Employer may give (7) seven days' notice in writing to the Contractor, to make good the failure, neglect or contravention complained of. If the Contractor fails to comply with the notice within reasonable time depending on the nature of affected work, which is evaluated by the Project Manager from the date of serving thereof, in the event of failure, neglect or contravention capable of being made good

within that time, then in such case, if the Employer thinks fit it may get the work done at the risk and cost of the contractor

If the cost of executing the work as aforesaid shall exceed the balance due to the Contractor and the Contractor fails to make good such deficiency, the Employer shall take action in the manner it may consider deem fit in terms of the Contract.

31. Statutory Responsibility

The Contractor shall comply with all applicable laws or ordinances, codes, approved standards, rules, and regulations and shall procure and maintain their validity along with all necessary Municipal, Panchayat and Government permits & licenses etc. at its own cost.

32. Insolvency

The Employer may at any time, by notice in writing, summarily terminate the Contract without compensation to the Contractor in the following events:

If the Contractor being an individual or a firm or any partner thereof shall at any time, be adjudged insolvent or shall have a receiver appointed from administration against it or shall take any proceeding for compensation under any Insolvency Act for the time being in force or make any conveyance or assignment with its creditors or suspend payment or if the firm be dissolved under Partnership Act, or court or a Receiver, Liquidator or manager on behalf of the Debenture holder is appointed or circumstances have arisen which entitle the Court or debenture holder to appoint a Receiver, Liquidator or Manager.

33. Delay in Execution or Failure to Supply

Any delay in completion of the work, shall attract liquidated damage, for late completion as per Liquidated Damage GCC Clause 34.

If the Contractor fails to deliver the Plant or fails to start the work within specified time frame after signing of Contract Agreement or leave the work Site after partial execution of the work, Employer shall have the right to get the work done through any other agency at the risk and cost of the Contractor. Further to this, Employer may, without prejudice to the right of the Employer to recover damages for breach of trust of the Contract, may impose liquidated damages on the contractor as per GCC Clause 34.

34. Liquidated Damages

- 34.1 The project is scheduled to be commissioned within the period specified in SCC from the date of issue of LOI/ NTP.

- 34.2 In case the Contractor fails to achieve successful commissioning of Plant by the due date indicated in schedule, the Employer shall levy Liquidated Damages on the Contractor at the rate of 0.10% per week of the value of the remaining work for first sixty days (The value of remaining work shall be considered based on difference between the total contract price and Bills Submitted for Payment by the Bidder). For next fifty days of delay in successful commissioning of Plant, Liquidated Damages @ 0.15% per week of the Total Contract value shall be applicable. However, total amount on account of LD shall be maximum of 5% (five percent) of the total contract value.
- 34.3 The project should be commissioned within the stipulated time period mentioned at SCC. In case of delay for more than the maximum time period allowed (including LD) as mentioned at para 34.2 above, the Employer may get the project completed by other suitable agency at risk and cost of Contractor. For calculation of liquidated damages, the month shall be considered consisting of 30 days and date of LOI/ NTP as reference date.

35. Defect Liability

- 35.1 The Contractor must warrant that the Facilities shall be free from defects in the engineering, materials and workmanship of the Plant and Equipment supplied and of the work executed.
- 35.2 If it shall appear to the Project Manager that any supplies have been executed with unsound, imperfect or unskilled workmanship, or with materials of any inferior description, or that any materials or articles provided by the Contractor for the execution of Contractor are unsound or otherwise not in accordance with the Contract, the Contractor shall on demand in writing inform the Project Manager or its authorized representative specifying the item, materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for. The Contractor shall forthwith rectify or remove and replace that item so specified and provide other proper and suitable materials or articles at its own charge and cost, and in the event of failure to do so within a period to be specified by the Project Manager in its demand aforesaid, the Project Manager may on expiry of notice period rectify or remove and re-execute the time or remove and replace with others, the materials or articles complained of as the case may be at the risk and expense in all respects of the Contractor. The decisions of the Project Manager in this regard shall be final and binding.
- 35.3 The Contractor shall also be undertaking the operation and maintenance of the Facility and consequently shall be required to rectify any defects that emerge during the operation of the Facilities for the entire term of this Contract.
- 35.4 The Defect Liability Period shall be of Sixty(60) months from the date of completion of the Facilities, during which the Contractor must repair any defect identified by the Project Manager / EIC after commissioning of the Plant. All the expenses to repair the defects shall be borne by the contractor and no additional cost charged to the Employer ("Defects Liability Period").

- 35.5 If during the Defect Liability Period any defect should be found in the engineering, materials and workmanship of the Plant and Equipment supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good (as the Contractor shall, at its discretion, determine) such defect as well as any damage to the Facilities caused by such defect.
- 35.6 Furthermore, without prejudice to the generality of the foregoing, it is clarified that the Contractor shall also be responsible for the repair, replacement or making good of any defect, or of any damage to the Facilities arising out of or resulting from any of the following causes:
- Improper operation or maintenance of the Facilities by the Contractor during operation and maintenance of the Facility; and
 - Operation of the Facilities outside specifications of the Facilities.
- 35.7 The Employer shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. The Employer shall afford all reasonable opportunity for the Contractor to inspect any such defect.
- 35.8 The Employer shall provide the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its obligations under this Clause 35 (Defect Liability). The Contractor may, with the consent of the Employer, remove any Plant and Equipment or any part of the Facilities that are defective from the Site, if the nature of the defect and/or any damage to the Facilities caused by the defect is such that repairs cannot be expeditiously carried out at the Site.
- 35.9 If the repair, replacement or making good is of such a nature that it may affect the efficiency of the Facilities or any part thereof, the Employer may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests.
- 35.10 If such part fails the tests, the Contractor shall carry out further repair, replacement or making good (as the case may be) until that part of the Facilities passes such tests. The tests, in character, shall in any case be not inferior to what has already been agreed upon by the Employer and the Contractor for the original equipment/part of the Facilities.
- 35.11 If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than seven (7) days), the Employer may, following a notice to the Contractor, proceed to do such work, and the costs incurred by the Employer in connection therewith shall be paid to the Employer by the Contractor or may be deducted by the Employer from any monies due to the Contractor or claimed under the Performance Guarantee, without prejudice to other rights, which the Employer may have against the Contractor in respect of such defects.

- 35.12 If the Facilities or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be extended by a period equal to the period during which the Facilities or such part cannot be used by the Employer because of any of the aforesaid reasons. Upon correction of the defects in the Facilities or any part thereof by repair/replacement, such repair/replacement shall have the defect liability period of twelve (12) months from such replacement.
- 35.13 In addition, the Contractor shall also provide an extended warranty for any such component of the Facilities and for the period of time. Such obligation shall be in addition to the defect liability specified under Clause 35.2.
- 35.14 The Bidder's liability under this contract for any reason, what so ever, shall be limited to the total Contract Price (Including T & D)

36. Termination by default and Breach of Contract

Employer may, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Contractor, terminate the Contract in whole or in part:

- 36.1 If the Contractor fails to deliver or execute any or all of the goods within the time period(s) under the Contract or any extension thereof granted by the Employer pursuant to the clause for Delay in Execution or Failure to Supply or, if the Contractor fails to perform any other obligations(s) under the Contract.
- 36.2 In the event the Employer terminates the contract in whole or in part, pursuant to above, the Employer may procure, upon such terms and in such manner as it deems appropriate, goods similar to those undelivered, the Contractor shall be liable to the Employer for any excess costs for such similar goods. However, the Contractor shall continue the Performance of the Contract to the extent not terminated.
- 36.3 In case of termination of the Contract due to breach of contract, the Contractor may be debarred from participation in future tenders by Employer, through a communication in writing for a period to be specified therein.
- 36.4 In case the termination of contract in accordance with GCC Clause 32 thereto.

37. Breach & Cancellation of the Contract

- 37.1 In case of non-Performance, in any form or change of the covenant and conditions of the Contract by the Contractor, Employer shall have the power to annul, rescind, cancel or terminate the order and upon its notifying in writing to the Contractor that it has so done, this Contract shall absolutely determine. The decision of the Employer in this regard shall be final and binding.

37.2 The following conditions shall contribute to the breach of contract:

- If the Contractor fails to deliver any or all of the Goods within the period(s) specified in the Contract;
- or
- If the Contractor fails to perform any of their obligations(s) under the Contract, and
- If the Contractor, in either of the above circumstances does not rectify his failure within a period of 30 (Thirty) days (or such longer period as the Employer may authorize in writing) after receipt of the default notice from the Employer

38. Force Majeure

38.1 A 'Force Majeure' means any event or circumstance or combination of events those stated below that wholly or partly prevents or unavoidably delays an Affected Party in the performance of its obligations under this Agreement, but only if and to the extent that such events or circumstances are not within the reasonable control, directly or indirectly, of the Affected Party and could not have been avoided if the Affected Party had taken reasonable care or complied with Prudent Utility Practices:

- Act of God, including, but not limited to lightning, fire not caused by contractors' negligence and explosion (to the extent originating from a source external to the site), earthquake (above 7.0 magnitude on Richter Scale), volcanic eruption, landslide, unprecedented flood, cyclone, typhoon or tornado;
- Any act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, terrorist or military action, quarantine;
- Radioactive contamination or ionizing radiation originating from a source in India or resulting from another Force Majeure Event mentioned above.

38.2 Force Majeure Exclusions

Force Majeure shall not include (i) any event or circumstance which is within the reasonable control of the Parties and (ii) the following conditions, except to the extent that they are consequences of an event of Force Majeure:

- Unavailability, late delivery,
- Delay in the performance of any contractor, sub-contractor or their agents;
- Non-performance resulting from normal wear and tear typically experienced in power generation materials and equipment;
- Strikes at the facilities of the Contractor / Affected Party;
- Insufficiency of finances or funds or the agreement becoming onerous to perform; and
- Non-performance caused by, or connected with, the Affected Party's:
- Negligent or intentional acts, errors or omissions;
- Failure to comply with an Indian Law; or
- Breach of, or default under this Contract Agreement.
- Normal rainy seasons and monsoon

- 38.3 In the event of either party being rendered unable by Force Majeure to perform any obligation required to be performed by them under this Contract, relative obligation of the party affected by such Force Majeure shall be treated as suspended during the period which the Force Majeure clause last.
- 38.4 Upon occurrence of such causes, the party alleging that it has been rendered unable as aforesaid, thereby, shall notify the other party in writing by registered notice within 48 (forty eight) hours of the alleged beginning thereof giving full particulars and satisfactory evidence in support of its claim. Further, within 7 (seven) days, the Contractor will furnish a detailed Contingency Plan to overcome the effects of the incident and bring the project on its schedule after cessation of the effect of Force Majeure.
- 38.5 The Affected Party shall give notice to the other Party of (i) the cessation of the relevant event of Force Majeure; and (ii) the cessation of the effects of such event of Force Majeure on the performance of its rights or obligations under this Agreement, as soon as practicable after becoming aware of each of these cessations.
- 38.6 Time for Performance of the relative obligation suspended by the force majeure shall stand extended by the period for which such Force Majeure clause lasts.
- 38.7 If works are suspended by Force Majeure conditions lasting for more than two months, the Employer shall have the option of cancelling this Contract in whole or part thereof, at its discretion.
- 38.8 The Contractor will not be entitled to claim any compensation for Force Majeure conditions and shall take appropriate steps to insure its men and materials utilized by it under the Contract.

39. Insurance

- 39.1 During the Contract period, i.e., during Construction, all insurance related expenses shall be borne by the Contractor. The goods supplied under the Contract shall be fully insured against the loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in such a manner that Employer shall not incur any financial loss, as long as the plant continues to remain under the custody of the Contractor. During O&M period (after Contract period is over), the insurances shall be arranged by the Owner (at Owner cost).
- 39.2 In case of any loss or damage or pilferage or theft or fire accident or combination of the said incidents etc. under the coverage of insurance, the Contractor shall lodge the claim as per rules of insurance. Any FIR required to be lodged to local Police Station shall be the responsibility of the Contractor.
- 39.3 The Contractor shall arrange to supply/ rectify/ recover the materials even if the claim is unsettled for timely completion of the project. The final financial settlement with the insurance company shall rest upon the Contractor
- 39.4 In case of any delay of the project attributable to the Contractor, the Contractor himself in consultation with Employer should take the extension of insurance. Any financial implications shall, however, be borne by the Contractor.

- 39.5 The Contractor should arrange for providing insurance coverage to its workmen under Workmen's Compensation Act or similar Rules and Acts as applicable during execution of work for covering risk against any mishap to its workmen. The Contractor shall also undertake a Third Party Insurance. The Employer will not be responsible for any such loss or mishap.
- 39.6 All other insurance like In – transit insurance (Marine/ Cargo/ others as applicable), Contractor All Risk, Erection All Risk, workmen compensation , third party liability, insurance against theft and acts of GOD and others as required for the Construction and O&M of the Plant and to indemnify the Employer/ equipment/ material and resources shall be borne by the Contractor. Fire insurance is to be arranged by the Contractor up to the years of O&M of the Contract.
- 39.7 Employer shall be named as co – insured under all insurance policies taken out by the contractor pursuant to GCC Clause 39, except for the workmen compensation, third party liability and Employer's liability insurances. Also, Contractors' sub – contractor shall be named as co – insured under all insurances taken out by the contractor pursuant to GCC Clause 39 except for Cargo insurance, workmen compensation insurance and Employer's liability insurance. All insurers' rights of subrogation against such co – insured for losses or claims arising out of the performance of the contract shall be waived under such policies.
- 39.8 All the insurance cover taken for the construction and O&M period shall be seamless in nature.
- 39.9 The insurance are to be suitably taken for the activity/ act which is required to cover all the risks associated to the activity / act. The contractor shall be responsible to take suitable insurance till the completion of the O&M contract and indemnify the Employer from all associated risks whatsoever.

40. Statutory Acts, Rules and Standards

The work shall be executed in conformity with the relevant standard of Bureau of Indian Specification (or equivalent International Standard), Indian Electricity Act 2003, Indian Electricity Rules 2005 (as amended up to date), Explosive Act 1948 (As amended), Petroleum Act 1934, National Building Code, Hazardous Waste Management Rules 2009, e – waste (Management & Handling) rules 2011 and relevant Rules/ acts in vogue at the time of execution including operation & maintenance period.

41. Hazardous Material

Any hazardous material used during construction or used as part of the plant has to be taken back by the supplier for recycling or dumping purpose after its operating / working life, so that it may not affect the environment or any living being. Bidder(s) have to comply with Tamilnadu State Pollution Board regulation.

42. Stoppage of Work

Employer shall not be responsible and not liable to pay any compensation due to stoppage of work as a reaction from local public due to any undue action on the part of the Contractor causing annoyance to local people.

43. Hindrance Register

The Contractor may also maintain a Hindrance Register where reasons for delay/ fault may be recorded from time to time and at the time of occurrence of the hindrance and get it duly certified by the Project Manager or his authorized representative.

44. Manuals

The Contractor shall supply all necessary erection and commissioning manuals, O&M manuals etc. as and when required. 3 sets of test results, manuals etc. shall be submitted by the Contractor on completion of the work.

45. Delivery of Equipment

- 45.1 The Contractor shall deliver the equipment of the Plant and machineries in accordance with the terms of the Contract at the time(s) to the place(s) and in the manner specified in the Contract. The Contractor shall comply with instructions that may be given by the Employer from time to time regarding the transit of the Plant and material.
- 45.2 Notification of delivery or dispatch in regard to each and every consignment shall be made to the Employer immediately after dispatch or delivery from the manufacturing works. The Contractor shall supply to the consignee Invoice in triplicate and packing account of all stores delivered or dispatched by him.
- 45.3 In case of any occurrence of loss or damage in transit, it shall be the liability of the Contractor to initiate or pursue the claim with insurance company. It should take immediate steps to repair the damaged apparatus or replacement thereto.

46. Liabilities during Transit

All the supplies mentioned/ required under this NIT shall be FOR destination basis. The Contractor shall be responsible for loss, damages or depreciation to goods or of plant, equipment, and machineries up to delivery at Site. The replacement of the affected item shall also to be carried out by the contractor to meet the performance of the contract within the specified time.

47. Deduction from Contract Price

- 47.1 All costs, claims, damages or expenses, which the Employer may have paid for which the Contractor is liable, will be deducted by the Employer from deposited Performance Bank Guarantee (s).

- 47.2 Any sum of money due and payable to the Contractor, as per the Contract Agreement, may be appropriated by the Employer and set off against any claim of the Employer, for the payment of a sum of money arising out of or under any other contract made by the Contractor with the Employer. It is an agreed term of the Contract that the sum of money, withheld or obtained under this clause by the Employer, will be kept withheld or retained as such by the Employer or till the claim arising out of in the same Contract is either mutually settled or determined by the arbitrator, or by competent court, as the case may be, and that the Contractor shall have no claim for interest or damages whatsoever on this account or any other account in respect of any sum of money

48. Warranty / Guarantee

- 48.1 PV modules to be used in grid connected Solar Power Plant must be warranted for peak output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.
- 48.2 The modules shall be warranted for at least 5 years for failures due to material defects and workmanship.
- 48.3 The mechanical structures, electrical works and overall workmanship of the grid connected Solar Power Plant must be warranted for a minimum of 5 year.
- 48.4 The Contractor must ensure that the goods supplied under the Contract are new, unused and of most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.
- 48.5 The warranty / guarantee period shall be as follows:

The modules shall be warranted for at least 5 years for failures due to material defects and workmanship.

PowerConditioningUnits(PCU)/Inverters:PCUs shall be warranted for the minimum period of 5 years or guarantee period provided by the OEM, whichever is higher.

Transformers, associated switch gear and others: Bidder must furnish in detail its warranties / guarantees for these items.

- 48.6 During the period of Warranty / Guarantee the Contractor shall remain liable to replace any defective parts, that becomes defective in the Plant, of its own manufacture or that of its sub-Contractors, under the conditions provided for by the Contract under and arising solely from faulty design, materials, workmanship or any reason attributable to works carried out by the contractor, provided such defective parts are not repairable at Site. After replacement, the defective parts shall be returned to the Contractors works at the expense of the Contractor unless otherwise arranged.
- 48.7 At the end of guarantee period, the Contractor's liability shall cease. In respect of goods not covered by the GCC Sub Clause 48.5, the Employer shall be entitled to the benefit of such guarantee given to the Contractor by the original Contractor or manufacturer of such goods.

- 48.8 During the Operation & Maintenance and guarantee period, the Contractor shall be responsible for any defects in the work due to faulty workmanship or due to use of sub-standard materials in the work. Any defects in the work during the guarantee period shall therefore, be rectified by the Contractor without any extra cost to the Employer within a reasonable time as may be considered from the date of receipt of such intimation from the Employer failing which the Employer reserves the right to take up rectification work at the risk and cost of the Contractor.

49. Final Bill/ Final Due Payment

The final bill relating to the EPC Contract or its parts viz. Supply, Erection and Civil Works contract, shall be prepared only after the Guaranteed Performance of the Plant has been observed. It will include the adjustments of all claims against the Contractor by the Employer and awarded in its favor by the adjudicator or arbitrator, as the case may be, up to the date of preparation of the final bill.

50. Operation and Maintenance

- 50.1 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 & Maintenance shall have two distinct components as described below:
- 50.2 **Preventive / Routine Maintenance:**

This shall be done by the Contractor regularly and shall include activities such as cleaning and checking the health of the Solar PV system, cleaning of module surface, tightening of all electrical connections, and any other activity including the associated civil works, as mentioned in TS Clause 3, wear and tear that may be required for proper functioning of the Solar PV system as a whole. Necessary maintenance activities, Preventive and Routine for Transformers and associated switch gears and transmission line also shall be included.

50.3 Breakdown / Corrective maintenance:

Whenever a fault/failure/breakdown/malfunctioning occurs, the Contractor has to attend to rectify the fault & the fault must be rectified within the 48 hours from the time of occurrence of fault, failing which LD will be applicable in line with SCC Clause 25.2 or 25.4 depending upon nature of fault/failure/defect/ breakdown/malfunctioning. The contractor must maintain all the records pertaining to such faults/failure/breakdown/malfunctioning and necessary measures taken.

The date of Comprehensive Operation & Maintenance Contract period shall begin on the date of Successful demonstration of guaranteed PR i.e., Operational acceptance. However, operation of the Power Plant means operation of system as per bid and workmanship in order to keep the project trouble free covering the guarantee period. The contractor must demonstrate the committed CUF at the end of every year in accordance with commitment made in the Techno-Commercial Enclosures of the Bid.

50.4 Serviceability Level Agreement (SLA)

- 50.4.1 Contractor shall make efforts to maintain 100% service ability of complete Plant including all other associated infrastructure developed by the Contractor during execution of project as its scope of work.
- 50.4.2 Contractor shall produce monthly service ability report for individual components of the plant & associated infrastructure to the employer by 5th of next month.
- 50.4.3 Contractor shall maintain a Complaint log book, which shall include the timing of logging of complaint including unique Complaint number, time of closure of complaint & it's Root Cause Analysis.
- 50.4.4 Any complaint related to unservice ability/improper functioning of any&all component of the plant including but not limited to PV Module, PCU, Transformers, switchgears, SCADA, roads, drainage, water supply lighting system, office infrastructure, CCTV system which is not attended & rectified within 48 hours, shall attract a penalty of Rs. 500 per 24 hours, which shall be over & above GCC Clause 34 & 50.3. If such complaint is not rectified within 480 hours from logging of complaint. Employer may choose to rectify the same through any other agency at the risk of Contractor and Employer shall recover 110% of such cost incurred from subsequent payment to the contractor. Cumulative value of such LD shall be limited to 50% of yearly O&M Cost
- 50.4.5 Such rectification work carried out by employer doesn't exempts/relieves Contractor from its responsibility towards subsequent operation, maintenance, repair & replacement of such component/ infrastructure of the Plant or meeting the performance parameters of the Plant.

50.4.6 O&M Routine&Manpower:Contractor shall provide Preventive/Routine Maintenance schedule based on Original Equipment manufacturer and good engineering practices. The team deployed for the O&M must have a minimum manpower structure with following qualification;
Project Manager (B.E./B.Tech Electrical, with minimum 5 years of relevant experience) -
1 No. Shift Engineers (BE/B-Tech Electrical, with minimum 3 years of relevant experience) -1 No / Shift Polytechnic/Diploma Electrical (with minimum 3 years of relevant experience) -2 / shift Polytechnic/Diploma Mechanical or Civil (with minimum 3 years of relevant experience) -1/shift Unskilled for cleaning & other unskilled works with respect to Plant – As per requirement. However contractor shall engage additional manpower as and when need arise.

51. Risk Purchase

If the Contractor fails, on receipt of the LOI, to take up the work within a reasonable period or leave the work Site after partial execution of the work, the Employer shall have the liberty to get the work done through other agency at the Contractor's own risk and additional cost if any has to be borne by the Contractor. If the situation, so warrants, to compel the Employer to cancel the LOI placed on the Contractor, the Contractor shall be liable to compensate the loss or damage, which the Employer may sustain due to reasons of failure on Contractor's part to execute the work in time.

52. Unforeseen/ Differing site Conditions

52.1 If, during the execution of the Contract, the Contractor shall encounter on the Site any physical conditions (other than climatic conditions) or artificial obstructions that could not have been reasonably foreseen prior to the date of the Contract Agreement by an experienced contractor on the basis of reasonable examination of the data relating to the Facilities, and on the basis of information that it could have obtained from a visual inspection of the Site (if access thereto was available) or other data readily available to it relating to the Facilities, and if the Contractor determines that it will in consequence of such conditions or obstructions incur additional cost and expense or require additional time to perform its obligations under the Contract that would not have been required if such physical conditions or artificial obstructions had not been encountered, the Contractor shall promptly, and before performing additional work or using additional Plant and Equipment or Contractor's Equipment, notify the Project Manager in writing of

- The physical conditions or artificial obstructions on the Site that could not have been reasonably foreseen
- The additional work and/or Plant and Equipment and/ or Contractor's Equipment required, including the steps which the Contractor will or proposes to take to overcome such conditions or obstructions
- The extent of the anticipated delay
- The additional cost and expense that the Contractor is likely to incur and the breakup of the same.
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On receiving any notice from the Contractor under this GCC Sub- Clause 52.1, the Project Manager shall consult and decide upon the actions to be taken to overcome the physical conditions or artificial obstructions encountered. Following such consultations, the Project Manager shall instruct the Contractor of the actions to be taken.

52.2 Any reasonable additional cost and expense incurred by the Contractor in following the instructions from the Project Manager to overcome such physical conditions or artificial obstructions referred to in GCC Sub-Clause 52.1 shall be paid by the Employer to the Contractor as an addition to the Contract Price, after submission of relevant documents justifying same.

52.3 If the Contractor is delayed or impeded in the Performance of the Contract because of any such physical conditions or artificial obstructions referred to in GCC Sub-Clause 52.1, the Time for Completion shall be extended in accordance with GCC Clause 54.

53. Change in Laws and Regulations

If, after the date seven (7) days prior to the date of Bid submission, in the country where the Site is located, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the costs and expenses of the Contractor and/or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the Performance of any of its obligations under the Contract. However, these adjustments would be restricted to direct transactions between the Employer and the Contractor/assignee of Foreign Contractor (if applicable). This adjustment shall not be applicable on procurement of raw materials, intermediary components etc. by the Contractor and shall also not be applicable on bought out items dispatched directly from sub- vendor works to site. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable.

54. Extension of Time for Completion

- 54.1 The Time(s) for Completion specified in the SCC shall be extended if the Contractor is delayed or impeded in the Performance of any of its obligations under the Contract by reason of any of the following:
 - 54.1.1 Any occurrence of Force Majeure as provided in GCC Clause 38 (Force Majeure), unforeseen/ differed site conditions as provided in GCC Clause 52 (Unforeseen/ differed site Conditions).
 - 54.1.2 Any changes in laws and regulations as provided in GCC Clause 53 (Change in Laws and Regulations) or by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impediment sustained by the Contractor.
- 54.2 Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Project Manager a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Employer and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Employer's estimate of a fair and reasonable time extension, then the matter will be settled in accordance with the provisions of GCC Sub-Clause 6.1 (Adjudicator).
- 54.3 The Contractor shall at all times use its reasonable efforts to minimize any delay in the Performance of its obligations under the Contract.

54.4 The Contractor shall be required to attend all weekly site progress review meetings organized by the 'Project Manager' or his authorized representative. The deliberations in the meetings shall include the weekly program, progress of work (including details of manpower, tools and plants deployed by the Contractor vis-à-vis agreed schedule), inputs to be provided by Employer, delays, if any and recovery program, specific hindrances to work and work instructions by Employer. The minutes of the weekly meetings shall be recorded in triplicate in a numbered register available with the 'Project Manager' or his authorized representative. These recordings shall be jointly signed by the 'Project Manager' or his authorized representative and the Contractor and one copy of the signed records shall be handed over to the Contractor.

55. Care of Facilities

The Contractor shall be responsible for the care and custody of the Facilities or any part thereof until the date of Completion of the Facilities pursuant to GCC Clause 18 or, where the Contract provides for Completion of the Facilities in parts, until the date of Completion of the relevant part, and shall make good at its own cost any loss or damage that may occur to the Facilities or the relevant part thereof from any cause whatsoever during such period. The Contractor shall also be responsible for any loss or damage to the Facilities caused by the Contractor or its Subcontractors in the course of any work carried out, pursuant to GCC Clause 35 (Defect Liability).

56. Contractor Performance & Feedback and Evaluation System

The Employer has in place an established 'Contractor Performance and Feedback System' against which the Contractor's Performance during the execution of Contract shall be evaluated on a continuous basis at regular intervals. In case, the Performance of the Contractor is found unsatisfactory on any of the following four parameters, the Contractor shall be considered ineligible for participating in future tenders for a period as may be decided by the Employer:

- Financial Status
- Project Execution and Project Management Capability
- Engineering & QA Capability
- Claims & Disputes

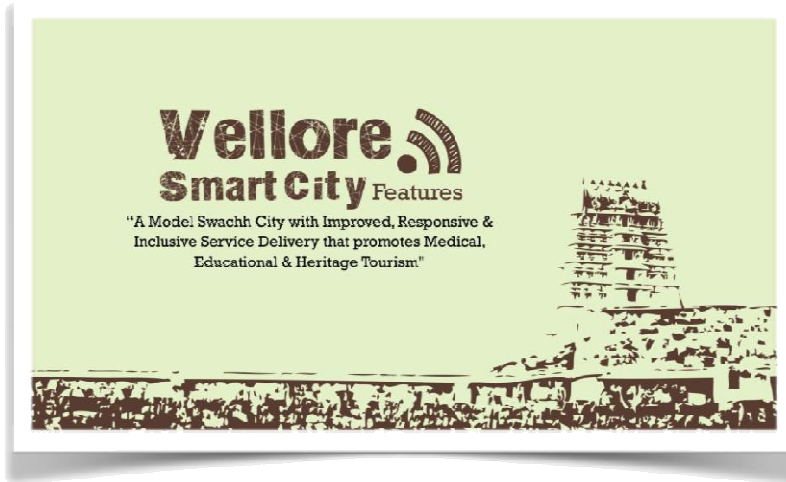
57. Documents constituting the Contract

The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read construed as an integral part of the contract:

- a) Contract Agreement
- b) Letter of Intent / Notice to proceed
- c) Special Conditions of Contract
- d) General Conditions of Contract
- e) Technical Specifications and Drawings
- f) The Bid and Price schedules submitted by the contractor

58.Fraud Prevention Policy

The Contractor along with their Associate/ Collaborator/ Sub- contractors/ Sub-vendors/ Consultants/ Service Providers shall observe the highest standard of ethics and shall not indulge or allow anybody else working in their organization to indulge in fraudulent activities during execution of the Contract. The Contractor shall immediately apprise the Employer about any fraud or suspected fraud as soon as it comes to their notice.



SECTION - IV

SPECIAL CONDITIONS OF CONTRACT

(Roc No.6209/2020/S1)

Tender Inviting Authority

The Managing Director,
Vellore Smart City Limited,
Vellore Corporation Building,
Infantry Road, Vellore 632 001
Tel: +91-416-2220578
e-mail:commr.vellore@tn.gov.in

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1.0 Project description

Design, Supply, Installation, Commissioning, Operation & Maintenance of Solar Power Plant for 10 ten years at North Side of Vellore Corporation STP area near palar river, Vellore

2.0 Project Site

Project site is located inside North Side of Vellore Corporation STP area near palar river, Vellore, available area is 5 acres. The contractor has to suitably plan the layout of the Plant for optimum utilisation of land. The designated substation at Katpadi, Vellore is located near the proposed site (for actual distance, Bidders are advised to visit the site), where the Plant is to be connected for power evacuation.

3.0 Appointing Authority

Appointing Authority of Adjudicator and Arbitrator shall be **Managing Director, VSCL**.

4.0 Project Manager/ Engineer in - Charge

Project Manager/ Engineer in - Charge will be appointed by Managing Director, VSCL and will be intimated after award of the contract.

5.0 Scope of Works

The detailed scope of works under this contract shall be referred at Section V: Technical Specifications.

6.0 Training of Employer's Personnel

On successful commissioning of the Plant, the Bidder shall provide training on Plant operations and maintenance to a team of 5 – 10 personnel (Engineers and Technician/ Operators) as nominated by Employer, within first two months of Operation of Plant

7.0 Performance Guarantee

7.1 The Plant performance will be evaluated through Performance Ratio (PR) test as per IEC 61724 and Capacity Utilization Factor (CUF) calculation as per the formulas and procedures mentioned under Section-V (Technical Specification).

7.2 The minimum acceptable PR of the Plant is 0.78 and CUF shall be 18% against installed rated DC capacity at STC.

As the PR of the Plant is dependent on the quality of Plant equipment and optimum design of the Plant, the bidders shall demonstrate the PR of 0.78 as per the procedure mentioned at TS Clause 10 for Operational Acceptance of the Plant.

The initial acceptance of the Plant will be evaluated during commissioning by measuring PR for continuous 7 days. However, contractor must demonstrate the PR for a period of 30 days as per the PR test procedure specified in TS Clause 10.

The performance of Plant will be evaluated based on minimum CUF demonstrated at the end of every year from the date of Operational Acceptance till the culmination of the O&M period. During this period, the contractor shall operate and maintain the Plant with full reliability and up keep.

During O&M contract, the Plant performance will be evaluated based on annual Capacity Utilization Factor. Second year onwards 1% degradation of the module output (i.e., 1% of DC capacity at STC per year) shall be considered for the calculated CUF every year.

During the O&M period, the bidders need to maintain 99% uptime of the Plant to achieve the proposed CUF at the end of each year. Any routine repair, replacement, overhauling, etc. are to be performed during night times so that no generation loss will be there in day time

Bidders are expected to make their own study of solar radiation profile and other related parameters of the area & make sound commercial judgment about the Performance Ratio and CUF. It shall be the responsibility of the Bidder to assess the corresponding solar insolation values and related factors of solar Plant along with expected grid availability. The Bidder should access all related factors about the selected Site for the Project before giving commitments of PR and CUF of the proposed Project.

The bidders are free to install additional DC capacity any time during O&M period, with proper consent by the Employer, to meet the desired performance parameters with no additional cost to the Employer.

The Contractor shall be responsible for achieving PR and CUF.

8.0 Project Time lines:

The time lines for Completion of the EPC Works is 180 days from from the handing over of final 5 acres of Land.

S.No	Stage	Reference form D
1	Issue of LOI/NTP/Handing over of land	Zero Date(D)
2	Approval Major Drawings	D + 30 Days
3	Site Development Work	D + 60 days
4	Completion of supply of major equipments like SPV modules, Power conditioning units , mounting structures, Transformers etc.,	D + 120 days
5	Installation of Major Equipments	D + 140 days
6	Interconnection of all major equipments & Completion of instlation	D+ 150 days

S.No	Stage	Reference form D
7	Completion, testing and Pre-commissioning of Solar PV Power Plant of 1.2	D + 170 days
8	Commissioning of Plant along with Completion of Facilities in line with Technical/Functional/Performance Requirement stated under this Tender Document.	D + 180 days

PR Demonstration Test as Per Technical Specification Clause-10 for Operational Acceptance shall be done only after commissioning of Plant & Completion of all associated infrastructure as mentioned under Section-V (Technical Specification).

9.0 Mode of Execution

The entire work shall be executed on turnkey basis. Any item(s) not included in the schedule but essentially required for completion of the work shall have to be carried out/ supplied without any extra cost. Such works, not listed in the schedule of works but elaborately described to perform or to facilitate particular operation(s) required for completion of the project shall deemed to have been included in the scope of this work and the **Contractor shall supply, install the same without any extra cost.**

10.0 Programme of Work

The Contractor shall submit the detailed programme of work within 15 days from the date of receipt of Letter of Intent. The programme shall include a Bar/ Gantt chart indicating there in the starting position and completion date of each of the major items of work.

11.0 Starting of Work

The date of issue of LOI/NTP shall be treated as the Zero day for the start of work & there by Contract Timeline. The Contractor shall be required to start the work within 15 (fifteen) days from the date of issue of Letter of Intent (LOI) / NTP and shall thereof, report to the Employer accordingly. During these 15 days following things are to be accomplished;

- I. Employer at its own discretion may call a kick-off meeting, where broader guidelines of EPC shall be discussed.
- II. Contractor's representative from Procurement, design, Project Execution team shall participate in this meeting & submit their Plan with respect to EPC works.
- III. Contractor shall submit the L-2 schedule of Project activities.
- IV. Communication Protocol for Project coordination to be frozen by the Employer, within this timeline Contractor must identify & communicate the details of their nodal persons for Procurement, Design & Execution.

12.0 Completion Schedule

The Contractor shall inform the Employer through advance information at least 30 days in advance in written notice, and a final notice 7days in advance to enable the Employer inform the commissioning committee of the date on which it intends to synchronize the Power Project to the Grid System.

The Contractor shall prepare the completion schedule accordingly and in conformity with provisions of technical specifications and carry out the work as per this schedule subject to “Force Majeure” conditions. The Contractor shall mobilize resources keeping in view, the above scheduled completion period.

13.0 Site Inspection & Basis of Bid

The volume and quantity of work indicated in schedule of works may vary. The Contractor should survey the proposed land at North side vellore corporation's STP area near palar river, Vellore visit the Site before quoting rate for EPC & O&M works. After taking in to consideration all aspects of the site, condition of soil, distance of designated substation etc., the Contractor should quote for EPC works. No extra claim will be entertained at post bidding stage. All the work including foundation design of module structure and the building shall have to be approved by the Employer. In case of any defects arising in such installations during guarantee/O&M period, the Contractor shall have to rectify the same at its own cost.

14.0 Terms of Payment

Payments shall be released against each component of Price Bid in the following manner after submission by the contractor and acceptance of Security cum Performance Bank Guarantee by Employer and signing of Agreement as per provisions of bidding document.

- 14.1 In accordance with the provisions of GCC Clause 11 (Terms of Payment), the Employer shall pay the Contractor in the following manner and at the following times: For **Supply of Plant & Equipment** including PV Modules, Inverter and BOS up to site (FOR basis) including transportation and insurance along with mandatory spares
- I. 90% of the total price of supplies of Plant and Equipment shall be paid against delivery of supplies on pro-rata basis against receipt of material at site under the Contract.
 - II. 10 % of the total price of supplies of Plant and Equipment shall be paid on Operational Acceptance of the Facility pursuant to successful Guarantee Tests and demonstration of PR and submission of all as – built documentation. BG for an amount equivalent to 10 % of total supplies shall be submitted in the in the following manner,
 1. 2% of total price of supplies for a period of 1 Year
 2. 2% of total price of supplies for a period of 2 Year
 3. 2% of total price of supplies for a period of 3 Year
 4. 2% of total price of supplies for a period of 4 Year
 5. 2% of total price of supplies for a period of 5 Year

14.1.2 For Erection, Testing and Commissioning

- I. 90% of the total price of Erection, Testing and Commissioning shall be paid on pro-rata basis on completion of installation of equipment on certification by the Engineer-In- Charge/ Project Manager for the quantum of work completed after successful clearance of quality check points involved in the quantum of work billed.
- II. 10% of the total price of Erection, Testing and Commissioning shall be paid on Operational Acceptance of the Facility pursuant to successful Guarantee Tests and demonstration of PR. BG for an amount equivalent to 10 % of total supplies shall be submitted in the in the following manner,
 1. 2% of total price of Erection, Testing and Commissioning for a period of 1 Year
 2. 2% of total price of Erection, Testing and Commissioning for a period of 2 Year
 3. 2% of total price of Erection, Testing and Commissioning for a period of 3 Year
 4. 2% of total price of Erection, Testing and Commissioning for a period of 4 Year
 5. 2% of total price of Erection, Testing and Commissioning for a period of 5 Year

14.1.3 On successful Operation and Maintenance of the Solar Power Plant on **quarterly** basis at the end of every quarter for each year till 10 years. The O&M of the Plant starts after Operational Acceptance.

I. Year 1: OM -1

II. Year 2: OM -2

III. Year 3:OM-3

IV. Year 4: OM -4

V. Year 5: OM -5

VI. Year 6: OM -6

VII. Year 7: OM -7

VIII. Year 8: OM -8

IX. Year 9: OM -9

X. Year 10: OM -10

'OM' indicates the O&M Contract Value quoted by the Successful Bidder for each individual year in its Financial Proposal.

14.2 Recovery of interest bearing Mobilization advance: NOT APPLICABLE

14.3.1 All the transactions shall be made directly between the Employer (Vellore Smart City Limited) and the contractor. Hence for every consignment, the consignee must be in the name of "The Managing Director, VSCL".

14.3.2 The bidder shall furnish a detailed break-up, including bill of materials, for the Price Component of all the packages which shall be mutually discussed and finalized with the Employer. Progressive payment for Erection and Civil works will be made against monthly bills based on certification by the Project Manager/ Engineer In – Charge for the work completed.

14.3.3 The release of first progressive payment for Civil Works shall also be subject to submission of documentary evidence by the Contractor towards having taken the insurance policy (ies) in terms of relevant provisions of GCC Clause 39 (Insurance) and acceptance of same by the Project Manager/ Engineer-In-Charge.

14.3.4 All the applicable Taxes and Duties which are payable by the Employer under the Contract, pursuant to GCC Sub – Clause 13.5, shall be reimbursed to the Contractor upon the production of satisfactory Tax Invoice (s) by the Contractor subjected to maximum of which has been considered during evaluation.

14.3.5 Contract Value (CV):

The firm sum quoted by the Successful Bidder in its Final Financial Proposal is the sum of individual contract values for Design, supply, erection, Installation & Commissioning of the plant as mentioned below:

a. Supply Contract Value: Total value mentioned against the Supply package mentioned at SCC clause 14.1.1 and Bill of Quantities.

b. Erection, Installation & Commissioning Contract Value: Total value mentioned under the Erection, Installation & Commissioning package mentioned at SCC clause 14.1.2 and Bill of Quantities.

d. O&M Contract Value: Total value mentioned under the Operation & Maintenance works mentioned at SCC clause 14.1.4 and Bill of Quantities

Employer shall issue LOI's for different components of the contract i.e.,

- a. Supply Contract, Erection, Testing and Commissioning Contract
- b. O&M Contract

14.4 Mobilisation Advance: **NOT APPLICABLE**

14.5 **NOT USED.**

14.6 The Employer will withhold / deduct / under this Contract, and or to any additions or deductions provided for in this Contract, the statutory deductions as per provisions of the laws in force before making payments. Accordingly the contractor shall submit Bills / Invoices after incorporating and in line with the following:

14.6.1 All payments shall be made in Indian Rupees, unless otherwise specified in the LOI/PO/ NTP/ Contract Agreement. All payment shall be made on the basis of actual measurement for the quantified items as per schedule of works and approved by Project Manager/ EIC within 14 days of submission of duly certified invoice by the Contractor. The Contractor shall submit the bill / invoice for the work executed showing separately VAT, and any other statutory levies in the bill / invoice.

14.6.2 All taxes and deductions shall be applicable as per prevailing income tax and other statutory rules and provisions in force. Bidders are requested to take in account while quoting their bids.

14.6.7 The Contractor, while raising Bills / Invoices shall raise separate Bills / Invoices against individual contracts with reference to the LOI/ Contract number and indicating applicable taxes / duties on the contract. Bills / Invoices for more than one contract package shall not be clubbed together

15.0 Price Escalation

No Price escalation is allowed. The rate(s) quoted against the work shall remain firm during the entire Contract period. Any change in Forex rate less than 5% shall not be considered for price variation.

16.0 Taxes and Duties:

Proper tax invoices, raised against the different work packages viz. Supply, Erection and Civil works must be submitted mentioning the tax component clearly and separately.

Bidder will quote the rates of taxes & duties based on the concessional rate or exemption in the same (as applicable) that can be availed by the bidder on its own.

17.0 Procurement of Materials

The Contractor shall procure all necessary material required for the project work and arrange to store them properly. Test certificate in accordance with the specifications are to be furnished by the Contractor to the Employer for approval in respect of the materials procured by the Contractor.

18.0 Samples

The Contractor shall within 30 days of issue of Letter of Intent/NTP, provide to the Employer detailed Technical literature &/or test certificates of all major materials it proposes to use irrespective of the fact that specific make/material might have been stipulated. The Employer shall check the compliance of the proposed items and give its comments and/or approval to the same.

19.0 Notice of Operation

The Contractor shall not carry out important operation without the consent in writing of the Employer or his representative. For carrying out such important activity, the Contractor shall intimate to the Employer at least 72 hours before starting of the job.

20.0 Rejection of Materials

The Project Manager's decision in regard to the quality of the material and workmanship will be final. The Contractor at its own cost and risk without any compensation shall immediately remove any material rejected by the Project Manager from the Site of work.

21.0 Construction Power & Water Supply

- 21.1 The Contractor has to arrange Construction Power and water at the site for construction purpose at its own cost.

- 21.2 Cost of electricity required during construction shall be payable by the bidder. For construction, temporary connection for construction power from DISCOM/suitable supply source shall be arranged by the bidder as per applicable tariff.
- 21.3 The Employer shall not provide facility for storage of material, and accommodation for labours at site. The Contractor shall make his own arrangement for the above.

22.0 Labour Engagement

The Contractor shall be responsible to provide all wages and allied benefits to its labours engaged for execution of the project work and also to carry out Operation & Maintenance service. The Contractor shall remain liable to the authorities concerned for compliance of the respective existing rules and regulations of the government for this purpose and shall remain liable for any contravention thereof.

The contractor is encouraged to use local manpower as per the local statutory (labour) requirement, if any.

23.0 Handing Over -Taking Over

The work shall be taken over by the Employer upon successful completion of all tasks to be performed at Site(s) on equipment supplied, installed, erected and commissioned by the Contractor in accordance with provision of Tender Document. During handing over complete project work, the Contractor shall submit the following for considering final payment:

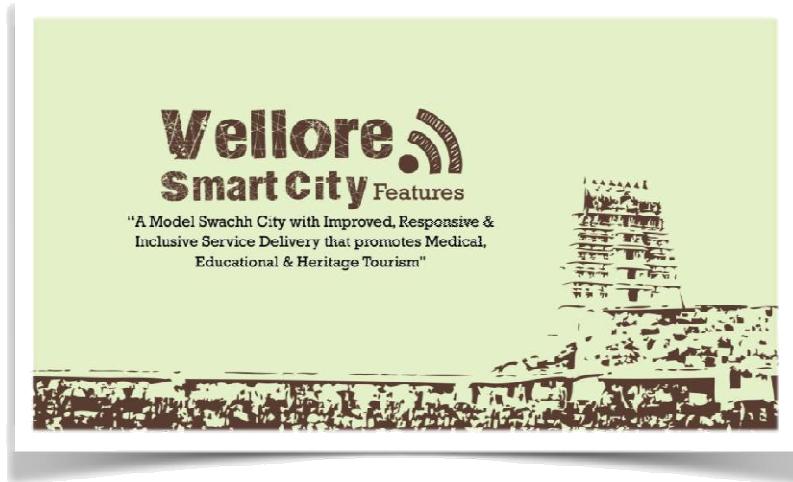
- 23.1 All as- Built Drawings and documents as per the contract coordination procedure set out for the successful completion of the project
- 23.2 Detailed Engineering Document with detailed specification, schematic drawing, circuit drawing, cable routing plans and test results, manuals for all deliverable items, Operation, Maintenance & Safety Instruction Manual and other information about the project.
- 23.3 Bill of material.
- 23.4 Inventory of recommended and mandatory spares at project Site.
- 23.5 Immediately after taking over of complete facilities (s), the same will be handed over to the Contractor for Operation & Maintenance for a period of as mentioned in the bidding document.

24.0 Liquidated Damages

Liquidated damages for the delay in construction of the Plant shall be as per the GCC Clause 34.

25.0 Miscellaneous

- 25.1 Based on reviewing the Project, if the progress is below expectation as demanded by the Employer then, the employer reserves right to reduce the Scope of the Contractor in part or full and assign the same to other contractor(s) and get the work done at the risk and cost of the existing Contractor.
- 25.2 The Contractor shall continue to provide all the monitoring services, licenses, software, access to all information (real-time or stored) that were being used during the O&M to the Employer.
- 25.3 The Contractor will construct/ provide a separate temporary facility/ arrangement at site (including office furniture, computer, vehicle etc) for the office of Employer's employee/ consultant/VSCL's employees at the time of construction of the Solar Power Plant. All the temporary facilities constructed for the purpose of execution of the contract shall be removed after taking necessary permissions from the Employer immediately after Operational Acceptance
- 25.4 Provision for installing any additional monitoring equipment to facilitate on- line transfer of data shall be provided by the Contractor.
- 25.5 In case of discrepancy between GCC Clause and SCC Clause on a particular subject, SCC conditions will prevail.



SECTION - V

Technical Specification

(Roc No.6209/2020/S1)

Tender Inviting Authority

The Managing Director,
Vellore Smart City Limited,
Vellore Corporation Building,
Infantry Road, Vellore 632 001
Tel: +91-416-2220578
e-mail:commr.vellore@tn.gov.in

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DISCLAIMER:

- I. Though adequate care has been taken while preparing the Bidding documents, the Bidders/ Applicants shall satisfy themselves that the document is complete in all respects. Intimation of any discrepancy shall be given to this office immediately. If no intimation is received from any Bidder within twenty (20) days from the date of notification of IFB/Issue of the IFB documents, it shall be considered that the IFB documents are complete in all respects has been received by the Bidder.
- II. The Managing Director, Vellore Smart City Limited, (VSCL), The Employer, reserves the right to modify, amend or supplement this IFB documents including all formats and Annexure.
- III. While this bidding documents have been prepared in good faith, neither Employer or its authorised representatives nor their employees or advisors make any representation or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this bidding documents, even if any loss or damage is caused by any act or omission on their part.
- IV. The specification mentioned for all the equipment which include Solar modules, PCU, combiner boxes, DC cables, module mounting structures, transformer, CT, PT, LT/ HT cables, interfacing panels, switch gears & other associated equipment etc., to complete the power generation to the designated transformer at North Side of Vellore Corporation STP area near palar river , Vellore in the present bidding documents is for the **reference** only. It is subject to revise/ alter as per the design/ planning/Good engineering practices etc., to be carried out by the selected bidder, to the satisfaction of the Employer or its authorised representatives. It is advised that the bidders must satisfy himself with the prevailing site conditions before design/ plan. The design must be optimised for the site conditions and directed to achieve the maximum output form the installed capacity at all times. Moreover, the components not separately mentioned, but are required to complete the Plant for operation is also included in the scope of bidder and shall be vetted by the Employer or its authorised representatives.

Place:

Date:

Name and Designation of bidder

Introduction

1.0 Site Description

- 1.1 The suitable and requisite land for the proposed 1.2 Mw (DC), AC Solar PV power Plant is in the VSCL premises, in the state of Tamilnadu.
- 1.2 This land is owned by Vellore City Municipal Corporation and located within the premises, in Vellore District of Tamilnadu.
- 1.3 Interconnection point for evacuation of Power from the Plant will be designated Substation at Katpadi, Vellore 11 kV level.

System Design and Philosophy

2.0 Design Philosophy

- 2.1 The main objective of the design philosophy is to construct the Plant with in-built Quality and appropriate redundancy to achieve high availability and reliability with minimum maintenance efforts. In order to achieve this, the following principles shall be adopted while designing system.
- 2.2 Technology: Solar PV Mono/ multi-crystalline modules of high efficiency (>15.5% Multi, >17% mono, Fill factor of the module shall not be less than 72 %.) and the cells and modules shall either be manufactured in India or shall be imported.
- 2.3 Adequate capacity of SPV module, PCUs, Junction boxes etc. to ensure generation of power as per design estimates. This to be done by applying liberal de-rating factors for the array and recognizing the efficiency parameters of PCUs, transformers, conductor loss etc.
- 2.4 Use of equipment and systems with proven design and performance that have a high availability track record under similar service conditions.
- 2.5 Selection of the equipment's and adoption of a Plant layout to ensure ease of maintenance.
- 2.6 Strict compliance with the approved and proven quality assurance systems and procedures during the different stages of the project starting from sizing, selection of make, shipment, storage (at site) , during erection, testing and commissioning.
- 2.7 Proper monitoring in the synchronizations which ensures the availability of power to the grid/DISCOM.
- 2.8 The Plant instrumentation and control system should be designed to ensure high availability and reliability of the Plant to assist the operators in the safe and efficient operation of the Plant with minimum effort.
- 2.9 It should also provide for the analysis of the historical data and help in the Plant maintenance people to take up the Plant and equipment on predictive maintenance.

- 2.10 Inverter output voltage of 230-415V has to be stepped up to 11 kV to connect it to the grid at the point of interconnection as per the **TS Clause 1.3**.
- 2.11 The power Plant has to satisfactorily operate in parallel with the grid system which is infinite electrical system. Any faults generated from Solar Plant, if not taken care will result in damage of only SPV power Plant without affecting state Grid/downstream distribution system. Thus suitable protective measure is to be in built so that any disturbance of the grid will not cause any damage of the equipment's of the Solar Power Plant.
- 2.12 Very fast responsive microprocessor based Directional and Reverse power flow protection should be provided to ensure isolation of the Solar Power Plant from the grid at the time of any fault or/and during maintenance, Contractor may provide any additional suitable protection.
- 2.13 The basic and detailed engineering of the Plant shall aim at achieving high standards of operational performance especially considering following:
- 2.13.1 Plant layout to ensure optimum availability for generation during the day time without any shading.
- 2.13.2 High DC system voltage and low current handling requirements.
- 2.13.3. Selection of PCUs with proven reliability and minimum downtime. Ready availability of requisite spares.
- 2.13.4 Based on the SOLAR INSOLATION data from reliable sources, the solar PV system should be so designed that it shall take into account the mean energy output after allowing for various losses, temperature corrections, on an average day for each month of the year.
- 2.13.5 Careful logging of operational data / historical information from the Data Monitoring Systems, and periodically processing it to determine abnormal or slowly deteriorating conditions.
- 2.13.6 SPV power Plant should be designed to operate satisfactorily in parallel with the DISCOM/grid within permissible limits of high voltage and frequency fluctuation conditions, so as to export the maximum possible units generated to the grid. It is also extremely important to safeguard the system during major disturbances, like tripping / pulling out of big generating stations and sudden overloading during falling of portion of the grid loads on the power Plant unit in island mode, under fault / feeder tripping conditions.
- 2.13.7 Generally, flat plate SPV arrays are held fixed at an optimum tilted angle and face towards the equator and the angle of tilt should be approximately equal to the angle of latitude for the site. A steeper angle increases the output in winter; while a shallower angle more output in summer. It should be arranged in such a manner that optimum generation is achieved. Seasonal tilt mechanism is also allowed for meeting CUF & PR Requirement. Seasonal tilt mechanism is also allowed for meeting CUF & PR Requirement.

- 2.14 The specifications provided with this bid document are a functional ones; any design provided in this document is only meant as an example. The Bidder must submit a proposal based upon their own design. Bidder must optimise their own design for Solar Photovoltaic (SPV) system with proven technology so that it shall best meet to guarantee the performance factors as it is a part of the acceptance criteria given in this bid document. The bidders are advised to visit the site before designing the Plant.
- 2.15 The minimum array capacity at STC shall be determined to have 1.2 Mwp (DC) output at the time of installation. If the bidder anticipates any degradation of the modules more than 1% of the module output during the first year, it shall be taken care of to meet guaranteed generation to avoid liquidated damages/ compensation on account of Generation Performance Guarantees.
- 2.16 This Bid document specifically cover the rest of the requirements for Grid Connected 1.2MW (DC) for Solar Power Plant along with their associated equipment. The capacity of the Plant shall be determined to attain minimum of 1.2 Mwp (DC) at the point of evacuation.
- 2.17 Successful Bidder (Contractor) shall prepare the detailed project report & design basis report and submit a copy to Employer for evaluation within 4 weeks from the date of issue of LOI
- 2.18 Component and equipment reliability: Each component offered by the bidder shall be of established reliability. The minimum target reliability of each equipment shall be established by the bidder considering its failure, mean time between failures and mean time to restore, such that the availability of complete system is assured. The guaranteed annual system availability shall not be less than 99%. Bidder recommendation of the spares shall be on the basis of established reliability.
- 2.19 The Contractor shall design the equipment and Plant in order to have sustained life of 25 years with minimum maintenance efforts.
- 2.20 The supply, erection, testing, commissioning and all other allied works for 1.2 Mwp (DC) Solar PV Power Plant at North side of vellore corporation area, Near palar rive, Vellore in the state of Tamilnadu shall be completed within 180 days from the date of order/ LOI/ NTP and shall follow timelines under SCC Clause 8.

Scope of Supply and Work

3.0 Detailed Scope of Work

- 3.1 The Scope of Work under this package, includes all design & engineering, procurement & supply of equipment and materials, testing at manufacturers works, inspection, packing and forwarding, supply, receipt, unloading and storage at site, associated civil works, services, permits, licences, installation and incidentals, insurance at all stages, erection, testing and commissioning of 1.2 Mw(DC). Ground Mounted Solar PV Power Plant and performance demonstration with associated equipment and materials along with associated transmission system up to 11 kV Transformer located at the site of North Side of Vellore corporation's STP area near palar river, Vellore on turnkey basis in the state of Tamilnadu, India and 10 (Ten) years comprehensive operation and maintenance from the date of Operational Acceptance, whichever is later.
- 3.2 The equipment and materials for 1.2 Mwp (DC) Ground Mounted Solar PV Power Plant with associated system (Typical) shall include but not be limited to the receipt, unloading, storage, erection, testing and commissioning of all supplied material for the following:
 - 3.2.1 The bidder/Contractor is required to keep in mind the connectivity of the Plant at 11 kV level at designated substation at Katpadi, Vellore.
 - 3.2.2 Solar PV modules of suitable rating, in array totalling minimum of 1.0 x 1.2 Mwp (under STC Condition to meet 1.2 AC output) including mounting frames, structures, fasteners, array foundation and module interconnection.
 - 3.2.3 Array Junction boxes, distribution boxes and Fuse boxes: MCBs, Surge Arrestors with string monitoring capabilities and with proper lugs, glands, ferrules, terminations and mounting structures.
 - 3.2.4 DC and AC cables of appropriate sizes with adequate safety and insulation
 - 3.2.5 Power Conditioning Units (PCU) with SCADA compatibility, common AC power evacuation panel with bus bars and circuit breakers LT & HT Power Interfacing Panels, Plant Monitoring Desk, AC & DC Distribution boards.
 - 3.2.6 Step up transformers (Inverter Duty with suitable intermediate voltage but not less than 11 kV) in relevance with state grid code and inverter manufacturer requirements
 - 3.2.7 Internal 415V interconnection & Indoor feeder panels to cater auxiliary needs of Plant
 - 3.2.8 Metering and protection system along with battery system.
 - 3.2.9 LT Power and Control Cables including end terminations and other required accessories for both AC & DC power
 - 3.2.10 NA
 - 3.2.11 11 kV indoor/ outdoor panels having incoming and outgoing feeders with VCBs, CTs, PTs, Bus bars, cables terminals kits and Main Bus. Each bay shall consist of VCB, CT, Isolators with earth switch, LAs and PT's etc.

- 3.2.12 ABT meters (Main, Check & standby 0.2 s class accuracy) with all necessary metering rated CT's and PT's at the Plant take off point as per CEA Metering Regulation 2006 as amended time to time and state metering code.
- 3.2.13 Data acquisition system with remote monitoring facilities. Provision for specific data transfer to the State Load Dispatch Centre (SLDC) shall also be provided.
- 3.2.14 Lightning arrestors for entire Solar Power Plant area.
- 3.2.15 PVC pipes, cable conduits, cable trays and accessories/trenches.
- 3.2.16 Earthing of the entire Solar Power Plant as per relevant standards.
- 3.2.17 Control room equipment related to solar system etc.
- 3.2.18 Testing, maintenance and monitoring of equipment.
- 3.2.19 Spares & consumables, as required or recommended, for 10 years O&M period.
- 3.2.20 All safety gadgets during Construction and O&M period including but not limited to, anti-static rubber mats of appropriate grade, PPE, rubber gloves and shoes etc.
- 3.2.21 Design of 1.2 Mw (DC) Ground Mounted Solar Power Plant and its associated civil, structural, electrical & mechanical auxiliary systems includes preparation of single line diagrams and installation drawings, manuals, electrical layouts, erection key diagrams, electrical and physical clearance diagrams, design calculations for Earth- mat, Bus Bar & Spacers indoor and outdoor lighting/ illumination etc. design memorandum, GTP and GA drawings for the major equipment & Facilities, design basis & calculation sheets, and other relevant drawings and documents required for engineering of all facilities within the fencing to be provided under this contract, are covered under Contractor's scope of work.
- 3.2.22 In addition to above, the Contractor is required to measure the Solar Radiation and other climatic conditions relevant to measure the Plant performance. This is necessary to study Solar Level and Guaranteed Performance of the Solar Power Plant. The satellite based analysis is to be combined with direct ground based measurement equipment in order to achieve the necessary accuracy and level of detail in the assessment of solar radiation levels and climatic conditions.
- 3.2.23 Estimation and determination of the Plant generation on daily basis in form of look ahead scheduling of power output.
- 3.2.24 Any other equipment / material, not mentioned but essentially required to complete the 1.2 Mwp (DC) Solar Power Plant in all respect.
- 3.3 **During the O&M period, the Contractor shall,**
- 3.3.1 Keep the measured daily generation, radiation, fault log data at regular interval and provide the same to Employer in electronic form compatible in CSV format. The right to use the data shall remain with Employer. Generation data shall be provided in the form of continuous day around generation curve viz a viz radiation data as automatically generated SCADA or Centralized Monitoring System (CMS) Report.

- 3.3.2 Keep men, materials, spares, tools & tackles, logistics and accessories, which are necessary or usual for satisfactory and trouble-free operation and maintenance of the above equipment.
- 3.3.3 Keep the availability of vehicles for O&M staff and for inspection by Employer as per requirement may be ensured, failing which Employer shall have full right for alternate arrangement at the risk & cost of contractor.
- 3.4 The items of civil design and construction work shall include all works required for solar PV project and should be performed specifically with respect to following but not limited to:
- 3.4.1 Construction of foundation for mounting structures for SPV panels, considering life of Plant & existing soil/ natural conditions.
- 3.4.2 Construction of foundation for transformers, switchgears, buildings, equipment etc.
- 3.4.3 Construction of Equipment room with necessary illumination system and finishing as required.
- 3.4.4 A suitable arrangement of water shall be ensured to cater the day-to-day requirement of drinking water and service water supply for module cleaning and other needs of SPV power Plant during entire O&M period. Necessary permanent arrangement for module cleaning shall be made available in SPV array yard, this shall include installing tube well/bore well (including permission for doing bore well) with pump and motor and laying network of GI/HDPE/UPVC pipe in each row/as required for cleaning of SPV panels. (Contractor shall provide single line diagram of water cleaning arrangement). Drainage systems to be designed in such a way that there is no water logging happening from cleaning or any other manmade/natural causes within the Plant.
- 3.4.5 Galvanized steel/ HDPE conduits and their accessories and Pre-cast concrete pipes with accessories for Road/ Drain and other crossings.
- 3.4.6 Supply of ferrules, lugs, glands, terminal blocks, galvanized sheet steel junction boxes with powder coating paint for internal fixtures, cable fixing clamps, nuts and bolts etc. of appropriate sizes as required in the Plant.
- 3.4.7 Power Cables laying underground / over ground with proper cable tray arrangements
- 3.4.8 Entire GI cable tray with proper support and accessories inside equipment room and control room building and other locations as required.
- 3.4.9 Obtaining statutory approvals /clearances on behalf of the Employer from various Government Departments, not limited to, the following-
- Pollution control board clearance, if required
 - Mining Department, if required
 - Forest Department, if required
 - All other statutory approvals and permissions, not mentioned specifically but are required to carry out hassle free Construction and O&M of the Plant prevailing at site
- 3.5 Though any statutory fee required to be paid by the owner of the Solar Power Plant shall be reimbursed by to the Contractor after production of the original receipt.

- 3.6 The Contractor shall arrange deployment of qualified and suitable manpower and required necessary tools, logistics, spares & consumables during construction, commissioning and O&M.
- 3.7 Construction Power & construction Water as required for construction and completion of this contract are to be arranged by the Contractor.
- 3.8 Complete responsibility of total Operation & Maintenance of Solar Photovoltaic Power Plant including all the infrastructure developed as a part of EPC Contract for 10 year from Operational Acceptance of the Plant, including deployment of engineering personnel, technicians and security personnel after the commissioning till final acceptance shall be with the Contractor.
- 3.9 All approvals, equipment, item and works which are not specifically mentioned in this document but are required for successful completion of work including construction, commissioning, O&M of Solar PV Power Plant in every respect and for safe and efficient construction & erection, operation and guaranteed performance are included in the scope of the Contractor.
- 3.10 Submission of following documents, drawings, data design, and engineering information to Employer or its authorized representative for review and approval in hard copy and soft copy from time to time as per project schedule.
- 3.11 Submission of following documents, drawings, data design, and engineering information to Employer or its authorized representative for review and approval in hard copy and soft copy from time to time as per project schedule.
 - 3.11.1 Contour plan including digital record of spot levels, Geotechnical Investigation Report and data representative of complete LAND Area.
 - 3.11.2 GA drawings of the entire project including roads, drains, storm water drainage, sewage networks and treatment facilities, Equipment rooms, Main Control Room (office cum control room), Local control rooms, Security gate, Fire protection system, Rain water harvesting etc.
 - 3.11.3 Design basis criteria along with relevant standards (list of standards and respective clause description only)
 - 3.11.4 Solar insolation data and basis for generation data.
 - 3.11.5 Design calculations and sheets with expected power loss at each stage and backup sheets, if any. Lightning arrestor with area coverage also to be provided.
 - 3.11.6 Detailed technical specifications of all the equipment.
 - 3.11.7 General arrangement and assembly drawings of all major equipment.
 - 3.11.8 Schematic diagram for entire electrical system.
 - 3.11.9 GTP & G.A. drawings for all types of structures/ components, 11 kV switchgears & other interfacing panels..
 - 3.11.10 Relay setting charts.
 - 3.11.11 Quality assurance plans for manufacturing and field activities

- 3.11.12 Detailed site EHS plan, fire safety & evacuation plan and disaster management plan.
- 3.11.13 Detailed risk assessment and mitigation plan
- 3.11.14 Test reports (for type, acceptance, and routine tests).
- 3.11.15 O&M Instruction's manuals and its drawings.
- 3.11.16 As-built drawings/documents and deviation list from good for construction (GFC)
- 3.11.17 O&M plans, schedules and operational manuals for all equipment etc. Daily/ Weekly site work progress report with catch-up plan(s), as necessary to monitor actual timelines of the project during construction period along with the real time snap shots during the time of construction.
- 3.11.18 Quarterly O&M reports after commissioning of the project.
- 3.12 All drawings shall be fully corrected to agree with the actual "as built" site conditions and submitted to Employer after commissioning of the project for record purpose. All as-built drawings must include the Good for Construction deviation list.
- 3.13 The contractor shall forward the following to Employer within a specified timeline as given below;
 - 3.13.1 Schedule for various activities in the form of PERT Chart: within two weeks from the issue of LOI/NTP/PO.
 - 3.13.2 Detailed engineering calculations, Design basis report and complete layout of the Plant: within four weeks from the issue of LOI/NTP/PO
 - 3.13.3 Equipment data sheets, Guaranteed technical particular of equipment and GA drawings of major equipment like, inverter, mounting structure and transformer: within four weeks from the issue of LOI/NTP/PO.
- 3.14 The Contractor shall provide a detailed training plan for all operation, maintenance procedures, which shall after approval by Employer form the basis of the training program. The contractor, shall also provide training to Employer's nominated staff.
- 3.15 The Contractor shall employ and coordinate the training of contractors' personnel who will be qualified and experienced to operate and monitor the facility and to coordinate operations of the facility with the grid system.
- 3.16 Establishing a system to maintain an inventory of spare parts, tools, equipment, consumables and other supplies required for the facility's hassle free operation.
- 3.17 Adequate and seamless insurance coverage during EPC and O&M period to cater all risks related to construction and O&M of Plant to indemnify the Employer.
- 3.18 Maintain at the facility accurate and up-to-date operating logs, records and monthly reports regarding the generation, Operation & Maintenance of facility.
- 3.19 Perform or contract for and oversee the performance of periodic overhauls or maintenance required for the facility in accordance with the recommendations of the original equipment manufacturer (OEM).