1.3 Location for Solar Plant Installation - Near Truck Parking in Giridih area

The proposed site for commissioning of ground mounted solar power plant is near the Truck Parking of Giridih area. A satellite image of proposed site is shown in the Drawings.

The proposed site (near Truck Parking of Giridih area) is located at latitude of 24.166^0 N and longitude of 86.291^0 E with an avg. elevation of 275 mtrs from mean sea level. Total available land at the proposed location is around 8.15 Ha, out of which around 6.5 Ha land is used for installation of solar power plant of 4MW with additional DC overload capacity of 30%. The proposed location is almost shadow free. Chain-link fencing is proposed for the entire proposed location. Out of the total land area of around 8.15 Ha, the net area used around 6.5 Ha for installation of Solar Power Plant.

There are small bushes and trees within the site which need to be cleared by bidder for installation of PV Modules. Tree cutting permission, if required, shall be in the scope of CCL. However, uprooting, removal and transportation of trees and bushes shall be in the scope of Bidder. Providing hindrance free land shall be in the scope of CCL.

The net available area available for construction of Solar PV project was assessed by excluding the area required for: -

- Drains
- Internal Roads
- Walkways
- Space for indoor substation

It has a tropical climate with maximum summer temperatures soaring to 45-50^0C and minimum winter temperatures falling to 8-12^0C. Humidity is generally high with a maximum of around 95 % during the rainy season.

This tender document is prepared for installation of 4 MW Solar Power Plant in Giridih Area of CCL for captive power consumption. This tender document pertains to design, supply, and construction, commissioning and testing and operation & maintenance (O&M) for a period of five years. However, any damage/breakage due to the natural calamities or unsocial elements/theft will not be in the scope of the Bidder.

DISCLAIMER

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 the prescribed time

from the date of notification of NIT/ Issue of the NIT documents, it shall be considered that the NIT documents are complete in all respects has been received by the Bidder.

Employer, reserves the right to modify, amend or supplement this NIT documents including all formats and Annexures.

While this bidding documents have been prepared in good faith, neither Employer or its authorized 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.

CHAPTER-II

SCOPE OF WORK

1.0 SCOPE OF WORK

The scope of the proposal includes the design, engineering, supply, construction, storage at site, associated civil works, services, permits, licenses, installation, insurance at all stages, erection, testing and commissioning including five (05) years Operation and Maintenance (O&M) from the date of Operational Acceptance of ground mounted 5.2MW (DC) / 4.0 MW(AC) Solar Power Plant completely covering the following activities and services in respect of all the equipment & works specified and covered under the specifications.

The satisfactory operation of the Solar Power Plant and its integration with the power evacuation system shall be included in the scope of work of the Contractor and shall not be limited to the following:

a) Basic and detailed design Engineering including civil and other allied works of the plant including power evacuation system.
b) Review and approval of engineering drawings, calculations, structural design calculations, Equipment layout, Civil structural/architectural Drawings, Performance & Guarantee Test procedure etc.
c) Operation & Maintenance/ instruction manuals, as built drawings and other required information.
d) Providing training of Employer's personnel.
e) Packing and transportation from the manufacturer's works to the site including customs clearance & port clearance, port charges, (if any).
f) Reliability and Functional guarantee tests after successful completion of trial operation.
g) Satisfactory completion of the contract.
h) Supply of spares.
i) Special tools and tackles if any required for maintenance of the plant.

2.0 DESIGN AND ENGINEERING

2.1 The Contractor shall prepare the detailed design basis report along with relevant standards (with respective clause description) and PERT Chart. The Contractor shall submit a copy to Employer for review and approval prior to detail engineering.

2.2 Documents, drawings and design calculations shall be submitted to the Employer both in soft as well as hard copies (4 nos.) for review and approval. The Employer

shall return, as suitable, either soft or hard copies to the Contractor with category of approval marked thereon. The drawings/documents shall be approved in any one of the following categories based on nature of the comments/ type of drawing or document.

Sl. No.	Category	Status
1.	Category-I	Approved and Approved subject to incorporation of comments.
2.	Category-II	Commented and required resubmission for approval after incorporation of comments.
3.	Category-III	Vendor drawing kept for record/ reference.
4.	Category-IV	Resubmission for record/ reference after incorporation of Comments.

2.3 Approval of document/drawing/vendor drawing neither relieves the vendor/ contractor of his contractual obligations and responsibilities for correctness of design, drawings, dimensions, quality & specifications of materials, weights, quantities, assembly fits, systems/ performance requirement and conformity of supplies with Technical Specifications, Indian statutory laws as may be applicable, nor does it limit the Employer/ Purchaser's rights under the contract.

Submission of basic design data, design documents, drawings and engineering information including GTP and test reports to Employer or its authorized representative for review and approval in hard copy and soft copy from time to time as per project schedule. The documents typically include, but not limited to, the following:

a) Solar insolation data and basis for generation
b) Detailed general technical specifications (GTP) of all the equipment.
c) General arrangement and assembly drawings of all major equipment
d) Schematic diagram for entire electrical system (DC, AC and auxiliary systems)
e) GTP & G.A. drawings for all types of structures/ components, 33 kV switchgears & other interfacing panels.
f) Test reports
g) Design calculations and sheets
h) Geo technical investigation data and Topographical survey report including topographical survey data and Contour plan of the area.
i) GA drawings of the entire project including equipment rooms/ inverter control rooms, office cum control room, roads, storm water drainage, sewage networks, security gate, fire protection system, transformer yard fencing etc.
j) Transmission line drawings and erection plans as per DISCOM/ STU guidelines.

k) Quality assurance plans for manufacturing (MQP), Standard Operating procedure (SOP) and field activities (FQP).
l) Fire safety & evacuation plan and disaster management plan.
m) Detailed risk assessment and mitigation plan.
n) O&M Instruction's and maintenance manuals for major equipment.
o) As-built drawings / documents.

2.4 Estimation of the plant generation based on Solar Radiation and other climatic conditions prevailing at site.

2.5 Design of associated civil, structural, electrical & mechanical auxiliary systems includes preparation of single line diagrams and installation drawings, manuals, electrical layouts, design earthing system, indoor and outdoor lighting/ illumination etc., GTP and GA drawings for the major equipment including transmission line, design basis & calculation sheets, and other relevant drawings and documents required for engineering of all facilities within the periphery to be provided under this contract.

2.6 All drawings shall be fully corrected to match 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.

3.0 PROCUREMENT AND SUPPLY

3.1 Ground Mounted Solar PV modules with minimum 5.2 MWp DC capacity.

3.2 Module Mounting Structure (MMS) suitable for mounting PV modules.

3.3 Minimum clearance of module from ground shall be 300 mm.

3.4 Solar cables along with lugs, glands, ferrules, straight/Y-connectors, LT Power and Control Cables, DC and AC cables of appropriate sizes with termination kits and other materials required proper cable termination at both the ends.

3.5 Power Conditioning Units of suitable rating, step-up transformers (inverter duty) as per inverter manufacturer requirements.

3.6 Indoor/Outdoor switchgear panels including Vacuum Circuit Breakers, CT&PT, Relays and other accessories for complete protection.

3.7 Auxiliary transformer of adequate rating for plant internal consumption.

3.8 All necessary metering provisions at the plant take off point as well as at the substation as per CEA Metering Regulation 2006 as amended time to time and state metering code.

3.9 Supervisory Control and Data Acquisition (SCADA) system for 4.0MW remote monitoring/control of plant facilities along with required communication cables.

3.10 Sin Wave Inverter of 5kVA along with 4 nos. 150AH batteries and associated luminaires etc.

3.11 Earth strip/cables, earth electrodes, earth enhancing compound and all other associated materials for complete earthing of the plant as per the relevant standards and Lightning Protection System for entire plant area.

3.12 Testing instruments as specified.

3.13 Mandatory spares as required.

3.14 CCTV camera system along with monitoring station for plant surveillance for 4.0MW plant.

3.15 Fire detection and protection system in building, inverter station, transformer yard and switchyard.

3.16 Weather monitoring station shall include but not be limited to the following:

- Pyranometer / Albedometer
- Ultrasonic Anemometer (wind speed and direction)
- Temperature Sensor – Ambient and module surface
- Power source to all sensors
- Data Logger

3.17 Transmission poles suitable for 33kV voltage level from plant take off point to the existing 3x3 MVA, 33/6.6kV Main Substation, Giridih Area, CCL along with conductors, insulators, earth rods and other associated accessories or cables and other associated accessories as per Technical Specifications and DISCOM / TRANSCO requirements.

3.18 Obtaining Right of Way (RoW) if required, for transmission line / cable from Solar PV plant till the interconnecting 3x3MVA, Giridih Project Substation including all applicable documentation and compensation, if any.

3.19 Protection, metering and communication equipment and other associated equipment /materials required for evacuation at the interconnecting Main Substation as per DISCOM /TRANSCO requirements.

3.20 Materials and accessories, which are required for satisfactory and trouble-free operation and maintenance of the above equipment like module cleaning system, supply of spares for all equipment, supply of tools and tackles etc.

3.21 All safety equipment for safe working environment.

3.22 Any other equipment / material not mentioned but required to complete the Solar Power Plant facilities in all respect.

4.0 INSTALLATION, TESTING AND COMMISSIONING

The scope of installation, testing and commissioning for the plant facilities shall include, but not limited, to the following.

4.1 Installation of PV Modules on Module Mounting Structures and interconnection of PV Modules as per system requirement.

4.2 Laying of solar cables through HDPE conduits underground / along cable trays from PV Modules to PCU along with termination at both the ends.

4.3 Installation, Testing and Commissioning of String Monitoring Units.

4.4 Installation, Testing and Commissioning of Power Conditioning Units.

4.5 Installation, Testing and Commissioning of inverter-duty transformers.

4.6 Installation, Testing and Commissioning of switchgear panels.

4.7 Laying of HT AC cables underground / along cable trays from inverter-duty transformer to switchgear panel along with termination at both the ends.

4.8 Laying of HT AC cables underground / along cable trays from switchgear panel at Local Control Room / field to switchgear panel at Main Control Room along with termination at both the ends.

4.9 Installation, Testing and Commissioning of metering system

4.10 Installation, Testing and Commissioning of auxiliary power supply system consisting of auxiliary transformers, AC distribution boards, AC LT cables and related accessories

4.11 Installation, Testing and Commissioning of suitable communication system for interfacing PCU, Transformer, Switchgear panel, metering, UPS, Fire alarm panel and other plant equipment with SCADA.

4.12 Installation, Testing and Commissioning of data acquisition system.

4.13 Installation, Testing and Commissioning of Uninterrupted Power Supply (UPS) with battery bank.

4.14 Earthing and lightning protection system of PV Modules, Module Mounting Structures, PCU, switchgear panels and all other electrical equipment.

4.15 Installation of indoor & outdoor illumination system including all required accessories and laying of power supply cables.

4.16 Installation, Testing and Commissioning of Weather Monitoring Station along with laying of required power supply and communication cables.

4.17 Installation of CCTV cameras on strategic locations including all required accessories, laying of power/communication cables and installation of monitoring station and other associated equipment.

4.18 Installation of fire detection and fire protection system for buildings, transformer yard, sub-station.

4.19 Pre-commissioning checks and tests for all equipment.

4.20 Synchronization and Commissioning of plant as per DISCOM / TRANSCO requirements.

4.21 Installation, Testing and Commissioning of Transmission line / cable from plant take off point to the interconnecting substation including any re-arrangement / replacement of substation equipment / materials, if required, at the evacuating substation necessary for evacuation of power from the Plant.

4.22 Any other works related to installation, testing and commissioning not mentioned but required to complete the Solar Power Plant facilities in all respect.

5.0 CIVIL WORK

5.1 Conducting geotechnical investigation and topographical survey of the plant area. The land is covered bushes and some trees. Cleaning of such trees and bushes shall be under the scope of Contractor/Bidder.

5.2 Earthwork for site grading, cutting, filling, levelling & compaction of land as per requirement.

5.3 Construction of internal roads and peripheral roads.

5.4 Construction of storm water drainage and sewage network.

5.5 Construction of main gate and barbed wire fencing on the existing boundary wall.

5.6 Construction of foundation for Module Mounting Structures (MMS) and erection of MMS.

5.7 Construction of Local Control Rooms (indoor PCU/Switchgear), if required.

5.8 Construction of Master Control Room along with requisite furniture, air-conditioning and other equipment / material as per the specifications.

5.9 Construction of foundation and erection of mounting structure for String Monitoring Unit.

5.10 Foundation for PCU, inverter-duty transformer, switchgear panel, auxiliary transformer.

5.11 Construction of foundation for lightning mast, lighting poles, CCTV poles, weather monitoring station and other equipment.

5.12 Construction of underground/over ground tanks and plumbing network for drinking water and cleaning of PV Modules.

5.13 Suitable arrangement of water to cater to day-to-day requirement of drinking water and permanent water supply for module cleaning and other needs of SPV power plant during entire O&M period.

5.14 Construction of sufficient area for storing spare.

5.15 Construction of foundation for transmission tower / pole as per DISCOM / TRANSCO requirements from Solar PV Plant end till interconnecting substation.

5.16 Construction of equipment foundation at interconnecting substation as per DISCOM /TRANSCO requirements.

5.17 All approvals, equipment, items and works, which are not otherwise specifically mentioned in this document but are required for successful completion of the work in all aspects, including construction, commissioning, O&M of Solar PV Power Plant and guaranteed performance are deemed to be included in the scope of the contractor.

6.0 STATUTORY APPROVAL

6.1 Obtaining statutory approvals / clearances / compliances 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 approvals as and when necessary for setting up of a solar power plant, power evacuation, railways, power line crossing, panchayat, NHAI etc. as per the suggested guidelines.

6.2 All statutory approvals / permissions and/or No Objection Certificates (NoC) etc. from DISCOM / TRANSCO for obtaining connectivity at the substation as per Project Particulars provided above.

6.3 All other statutory approvals and permissions and their respective compliances, not mentioned specifically but are required to carry out hassle free Construction and O&M of the plant.