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TENDER DOCUMENT

FOR
DESIGN, SUPPLY, ERECTION, COMMISSIONING
AND TESTING
OF
GRID CONNECTED 1.02MWp SOLAR POWER PLANT
HAVING FIVE YEARS O&M
FOR
CENTRAL COALFIELDS LIMITED, RANCHI

AT

BARKASAYAL AREA, CENTRAL HOSPITAL, RAMGARH AND CENTRAL WORKSHOP, BARKAKANA

VOLUME – II

[TECHNICAL]

JANUARY, 2023

Central Mine Planning and Design Institute Ltd.
(A Subsidiary of Coal India Ltd.)
Gondwana Place, Kanke Road,
Ranchi - 834031 (Jharkhand)

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PROJECT SUMMARISED DATA

Sl. No.	Particulars	Description
A) Roof Top Solar Power Plant- 930kWp (Mono Crystalline)		
1.	Barka-Sayal Area ((5 nos. of Building)	378 kWp
2.	Ramgarh Area (4 nos. of Building)	394 kWp
3.	Barkakana CWS (2 nos. of Building)	88 kWp
B) Solar Power Plant- 160kWp Mono Crystalline (Ground Mounted)		
1.	Mine Rescue Station, Ramgarh	160kWp
C) General for Both Locations		
1.	Aggregate Plant Capacity (Nominal/system Power (DC)	1020kWp (Min)
2.	PV Module (Min.)	535 Wp, Mono Crystalline
3.	Plant Life	25 Years
4.	Comprehensive Operation and Maintenance of Plant	5 Years
5.	Power Feeding Point	Local Distribution Switchboard of the respective building

CHAPTER-I

INTRODUCTION

1.1 GENERAL

Central Coal Limited (CCL) has a number of projects which are spread in the state of Jharkhand. Geological Coal Reserves in CCL command area are up to 300m & above depth. For administrative purpose there are seven operating coalfields in the command area of CCL. The company operates around 62 coal projects which include underground and opencast mine. Out of 62 operative mines around 40 mines are opencast mine and remaining UG mines. Additionally, 7 coal washeries, (5 Coking Coal and 2 Non-Coking Coal washeries) are running under administrative control of CCL.

To supply power to various projects and other power consuming centers of the project, a number of substations have been installed. Most of these substations receive power from DVC. Total contract demand of CCL is around 152MVA.

1.2 Grid connected solar power plant

A solar photovoltaic (PV) system is a renewable energy power generation technology that uses photovoltaic modules to generate electricity directly from solar radiation, using a phenomenon called the photovoltaic effect. The electricity generated can be stored, used directly, or fed back into grid. Solar PV is a reliable and clean source of electricity that can suit a wide range of power generation applications for residential, industrial, agricultural, etc. consumers. Some common applications include solar generation for captive consumption, power sale and savings in electricity costs.

A grid-connected solar power plant refers to a solar PV system that is connected to the local distribution grid. It is a form of distributed power generation. This system includes different components that are selected depending on the system type, site location and application. Generally, components of this system comprise PV modules, mounting structures, inverter, transformers and miscellaneous items like meters, junction box, cables, etc.

A grid-connected solar PV system has following main features:

- Electricity generation during daytime
- Low maintenance requirement
- Simple installation
- Easy scalability
- Robustness
- Low investment compared to stand alone system with battery backup.

1.3 Roof Top Solar Power Plant

Roof top solar installation along with its operation & maintenance (O&M) as mentioned at various locations in the tender document shall be as per MNRE Latest guideline and circular **No.: 318/38/2018-GCRT dated 18/08/2021** and subsequent amendment/changes time to time**.**

Grid tied SPV system shall be without battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable.

1.4 Location and Connectivity

1.4.1 The following buildings have been identified for installation of Rooftop Solar Power Plant in the command area of CCL. The aggregate rooftop solar installation capacity for eleven locations (as mentioned below) is 0.86MWp.

i. P.O. office, Urimari OCP, Barkasayal Area
ii. P.O. office, Birsa OCP, Barkasayal Area
iii. D.A.V School, Urimari, Barkasayal Area
iv. Executive Hostel, Urimari, Barkasayal Area
v. AKC Hospital, Bhurkunda, Barkasayal Area
vi. Executive Hostel, CWS, Barkakana
vii. Regional Store, CWS, Barkakana
viii. MRS Office building, MRS, CCL
ix. Water Treatment Plant, MRS, CCL
x. Old Building, Central Hospital, Naisarai, Ramgarh
xi. Surgical Block, Central Hospital, Naisarai, Ramgarh

1.4.2 The sites identified for installation of ground mounted solar power plant is given below:

i. Behind Community Hall, Mine Rescue Station (MRS), Ramgarh
ii. Back-side of the guest house, MRS Ramgarh
iii. Near Switch room, MRS, Ramgarh

As mentioned above, ground mounted solar installation capacity for all the three locations is 0.16MWp. The total installed capacity for solar power installation (rooftop and ground mounted) will be 1.02 MWp.

The proposed sites for commissioning of solar power plant are almost shadow free. However, in some locations, if tree trimming required, it shall be in the Bidder's Scope. Tree cutting/trimming permission, if required, shall be in the scope of CCL.

This tender document is prepared for installation of 1.02 MW Solar Power Plant (roof top and ground mounted) in the command 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.

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 roof top installation of 860kWp (Barka-Sayal Area – 378kWp, Ramgarh Area – 394kWp, Barkakana Area – 88kWp) and ground mounted installation of 160kWp in Mine Rescue Station (MRS), Ramgarh. 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) Detailed general technical specifications (GTP) of all the equipment.
b) General arrangement and assembly drawings of all major equipment
c) Schematic diagram for entire electrical system (DC, AC and auxiliary systems)
d) GTP & G.A. drawings for all types of structures/ components, switchgears & other interfacing panels.
e) Test reports
f) Design calculations and sheets
g) Quality assurance plans for manufacturing (MQP), Standard Operating procedure (SOP).
h) O&M Instruction's and maintenance manuals for major equipment.
i) As-built drawings / documents.

2.4 Design of associated civil, structural, electrical & mechanical auxiliary systems includes preparation of single line diagrams and installation drawings, manuals, electrical layouts etc., GTP and GA drawings for the major equipment (module,

inverter etc.) 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.

2.5 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 Roof top Solar PV modules with minimum 860 kWp DC capacity.
3.2 Ground Solar PV modules with minimum 160 kWp DC capacity.
3.3 Module Mounting Structure (MMS) suitable for mounting PV modules.
3.4 Minimum clearance of module from ground shall be 300 mm.
3.5 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.
3.6 Power Conditioning Units of suitable rating.
3.7 Indoor/Outdoor switchgear panels with complete protection.
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 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 all the locations.
3.10 Testing instruments as required.
3.11 Mandatory spares as required.
3.12 Power evacuation arrangement in the nearest suitable switchboard.
3.13 Protection, metering and communication equipment and other associated equipment /materials required for evacuation of power.
3.14 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.
3.15 All safety equipment for safe working environment.
3.16 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 from PV Modules to PCU along with termination at both the ends.