OREDA LIMITED

(Under the Department of Energy Government of Odisha)

(CIN No: U35105OD2024SGC045786)
(ISO 9001:2008 / ISO 14001:2004)
S/59, MANCHESWAR INDUSTRIAL ESTATE
BHUBANESWAR-751010, ODISHA

Website: www.oredaodisha.com **E-mail:** ceoreda@oredaorissa.com

EOI No.: 718, Dated: 28.02.2025

EXPRESSION OF INTEREST (EOI) INVITED FOR EPC CONTRACTORS: COLLABORATE WITH LAND OWNERS/FARMERS TO LEASE LAND AND EXECUTE THE PM KUSUM A PROJECT, INCLUDING ITS DESIGN, ENGINEERING, SUPPLY, CONSTRUCTION, ERECTION, TESTING, COMMISSIONING, POWER EVACUATION & OPERATION, MAINTAINANCE FOR 10 YEARS OF SOLAR PV TECHNOLOGY-BASED GRID INTERACTIVE POWER PLANTS

Contact details:
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Expression of Interest (EOI)

EOI no.: 718, dated 28.02.2025

Type of bidding: Expression of Interest (EOI)

Mode of bidding: Open bidding, Single stage two envelope, E-bidding

OREDA Limited, hereinafter referred to as "OREDA" invites e-tender for Expression of Interest (EOI) Invited for EPC Contractors: Collaborate with Landowners/Farmers to Lease Land and Execute the PM Kusum A Project, Including Design, Engineering, Supply, Construction, Erection, Testing, Commissioning, power evacuation & operation, maintenance for 10 years of Solar PV Technology-Based Grid Interactive Power Plants.

The Schedule of Events is given below:

Sl. No.	Events	Schedule
1.	Date of publication of Expression of Interest (EOI) on E-procurement Website and OREDA Website	28.02.2025
2.	Due date and time for receipt of pre-bid queries on the EOI	11.03.2025
3.	Date and time for the pre-bid meeting through online mode only. Meeting invite link on google hangout platform: https://meet.google.com/woh-oewz-god	12.03.2025
4.	Due date and time for submission of online copies of Technical Bid and Price Bid	29.03.2025, Time: 5.00 PM
5.	Due date and time for submission of hard copies of Technical Bid for select Bid Forms only **Bidders must submit the COST OF BID, EMD, POWER OF ATTORNEY ONLY, Self declaration form of the Farmer/land owner and Declaration Form of EPC in hard copy as specified in the tender documents. Submitting any additional documents in hard copy, contrary to the tender requirements, may result in rejection of the tender.**	5.04.2025, Time: 5.00 PM
6.	Tentative date and time for the opening of Technical Bid for both online copies and hard copies, except Price Bid	7.04.2025, Time: 3.00 PM
7.	Tentative date and time for the opening of online Price Bid, applicable only for the Bidders whose Technical Bids shall be responsive	To be intimated latter

The EOI providing requisite details about the bidding process shall be made available on the E-procurement Website (www.tenderwizard.com/OREDA) on or before the due date mentioned above. In addition, the EOI shall be provided on the OREDA Website (http://oredaodisha.com/) for viewing purposes only. The Bidders may write to us at the email id ceoreda@oredaorissa.com, Assistant Director (Technical), any time during the office hours for any additional information.

The Bidders are also requested to contact the E-procurement Service Provider (M/s. Tender Wizard) for online registration on the E-procurement Website. The Bidders may contact the E-procurement Service Provider at 080-40482000/ 121/ 133/ 140 and +91 70085 21627 at any time during the office hours for any additional information.

Note: OREDA reserves all the right to annul the bidding process and invite fresh Bids without liability or obligation for such invitation and without assigning any reasons.

Sd by

Chief Executive Officer, OREDA

Disclaimer

To whomsoever it may concern, kindly note the following:

1. This EOI is meant for the exclusive purpose of bidding against this EOI No. XXX dated [DD] [MMM] 2025 and shall not be transferred, reproduced, or otherwise used for purposes other than that for which it is specifically issued.
2. Though adequate care has been taken for the preparation of this EOI, the Bidder shall satisfy itself that the EOI is complete in all respect. Intimation of any discrepancy shall be given to OREDA immediately. If no intimation is received from any Bidder in their pre-bid queries, it shall be considered that the EOI is complete in all respects and has been accepted by the Bidder.
3. OREDA reserves all the right to modify, amend, or supplement this EOI by issuing Addendum from time to time in the interest of the Project.
4. OREDA reserves all the right to extend the timelines mentioned in the Schedule of Events of EOI by issuing Corrigendum from time to time in the interest of the Project.
5. While the EOI has been prepared in good faith, neither OREDA nor OREDA's employees or advisors make any representation, warranty, express or implied or accept any responsibility or liability, whatsoever, in respect of any statements or omissions or absence herein, or the accuracy, completeness or reliability of the information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability, and completeness of this EOI, even if any loss or damage is caused by any act or omission on OREDA's part.
6. In case of any discrepancy in the documents uploaded on the websites of OREDA, e-Procurement website (www.tenderwizard.com/OREDA), the documents uploaded on tender wizard website will prevail.

Exhibit

Definitions

The following definitions and abbreviation shall have the meanings hereby assigned to them, as mentioned under the description herewith:

Definitions and abbreviation	:	Description
ACT or ELECTRICITY ACT, 2003		shall mean the Electricity Act, 2003 and include any modifications, amendments and substitution from time to time.
AFFILIATE		shall mean a company that, directly or indirectly, controls, is controlled by, or is under common control with, a company developing a Project or a Member in a Consortium developing the Project and control means ownership, directly or indirectly, of more than 50% of the voting shares of such Company or right to appoint majority Directors.
APPLICABLE LAW		shall mean the Electricity Act 2003 and the Rules and Regulations made thereunder from time to time along with amendments thereto and replacements thereof and any other Law pertaining to electricity including regulations framed by the Appropriate Commission or Central Electricity Authority.
APPROPRIATE COMMISSION / COMMISSION / OERC		shall mean the Odisha Electricity Regulatory Commission.
ARRAY		means a collection of electrically connected photovoltaic (PV) modules.
ARRAY CURRENT		means the electrical current produced by a PV array when it is exposed to sunlight.
AUTHORIZED REPRESENTATIVE		shall mean any authorized personnel of the Employer or the contractor to perform the duties and obligations of the Contract as the context may require.
Beneficiary		Means OREDA LIMITED
BACKUP METER		means the meter installed, operated and maintained by the Solar Power Company, which shall be connected to the same core of the current transformer (CT) and voltage transformer (VT) to which the Main Meter is connected and shall be used for accounting and billing of electricity in case of failure/repair/maintenance of Main Meter.
BID		shall mean the Techno Commercial bid and the Price bid submitted by the Bidder along with all documents/credentials/attachments annexure etc., in response to this EOI, in accordance with the terms and conditions hereof.
BIDDER		shall mean Bidding Company or a Bidding Consortium submitting the Bid. Any reference to the Bidder includes Bidding Company/ Bidding Consortium, Member of a Bidding Consortium including its successors, executors and permitted assigns and Lead Member of the Bidding Consortium jointly and severally, as the context may require.
BIDDING CONSORTIUM or CONSORTIUM		shall refer to a group of Companies that have collectively submitted the response in accordance with the provisions of this tender under a Consortium Agreement, who shall be responsible for ensuring the completion of all the Projects and the successful fulfilment of all the rights and performance of all the duties and obligations of such Consortium.
BIDDING PROCESS		shall mean the process adopted by OREDA for awarding of the contract including but not restricted to inviting response to tender, inviting Bids, selecting EPC contractor and adopting the terms and conditions stated in the contract.
BID DEADLINE		shall mean the last date and time for submission of Bid in response to this EOI.
BOM		means the Bill of Materials.

Definitions and abbreviation	:	Description
BUSINESS DAY		shall mean with respect to Parties, a day other than Sunday or a statutory holiday, on which the banks remain open for business in the State of Odisha.
BYPASS DIODE		means a diode connected across one or more solar cells in a photovoltaic module such that the diode will conduct if the cell(s) become reverse biased. Alternatively, diode connected anti-parallel across a part of the solar cells of a PV module. It protects these solar cells from thermal destruction in case of total or partial shading of individual solar cells while other cells are exposed to full light.
BOUGHT OUT ITEMS		shall mean the items purchased by the Contractor for the purpose of supply as covered under Contract Agreement.
CAPACITY UTILIZATION FACTOR OR CUF		shall be based on Contracted Capacity as per respective site location and shall have the same meaning as provided in OERC (Terms and Conditions for Determination of RE Tariff) Regulations, 2010 as amended from time to time. For illustration, CUF shall be calculated based on the annual energy injected and metered at the Delivery Point. In any Contract Year, if 'X' MWh of energy has been metered out at the Delivery Point for 'Y' MW Project capacity, CUF= (X MWh / (Y MW*8766)) X100%.
CHARTERED ACCOUNTANT		shall mean a person practicing in India or a firm whereof all the partners practicing in India as a Chartered Accountant(s) within the meaning of the Chartered Accountants Act, 1949. For bidders incorporated in countries other than India, "Chartered Accountant" shall mean a person or a firm practicing in the respective country and designated/ registered under the corresponding Statutes/ laws of the respective country;
COMMERCIAL OPERATION DATE (COD) / SCHEDULED COD		shall have the same meaning as defined in the Contract;
COMMISSIONING		shall have the same meaning as defined in the Contract;
COMPANY		shall mean a body corporate incorporated in India under the Companies Act, 1956 or the Companies Act, 2013, as applicable
CC		shall mean the Conditions of the Contract under which the current project is executed/operated;
CONSENTS, CLEARANCES AND PERMITS		shall mean all authorizations, licenses, approvals, registrations, permits, waivers, privileges, acknowledgements, agreements, or concessions required to be obtained from or provided by any concerned authority for the purpose of setting up of the SPP for supply of power;
CONTRACT/ CONTRACT AGREEMENT/ AGREEMENT		shall mean the Agreement entered into between the Employer and the Contractor signed by the parties including all attachments and appendices thereto and all documents incorporated by reference therein.
CONTRACT DOCUMENT		shall mean collectively the documents listed in tender documents including any amendments thereto.
CONTRACTOR/EPC CONTRACTOR		means the successful bidder whose bid to perform the Contract has been accepted by the Employer for issue of the Letter of Award and is named as such in the Contract Agreement and includes the legal Successors or permitted assigns of the Contractor.
CONTRACTOR'S EQUIPMENT		means all Plant, facilities, equipment, machinery, tools, apparatus, appliances or things of every kind that are to be provided by the Contractor and required in or for installation, completion of the Facilities and maintenance thereof, but does not include Plant and Equipment, or other things intended to form or forming part of the Facilities.
CONTRACT PRICE		means the firm sum specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions therefrom, as may be made pursuant to the Contract.
CONTRACT YEAR		shall have the same meaning as defined in the Contract;

Definitions and abbreviation	:	Description
CONTROL		shall mean the ownership, directly or indirectly, of more than 51% (fifty percent) of the voting shares of such Company or right to appoint majority Directors;
CONTROLLING SHAREHOLDING		shall mean more than 51% of the voting rights and paid-up share capital in the Company/ Consortium;
CRYSTALLINE SILICON		means a type of PV cell made from a single crystal or polycrystalline and/or Monocrystalline slice of silicon;
DAY		shall mean calendar day;
DELIVERY POINT		shall mean the Grid Substation;
DETAILED DRAWINGS		means the execution drawings, which will be furnished by the Solar Power Company for execution of the work that will form part of the Contract;
DRAWINGS		means collectively all the accompanying general drawings as well as all detailed drawings, which may be used from time to time;
DISCOM		means Power Distribution Company of the state, responsible for distribution of Electrical power in the region and associated activities.
DRAWINGS, PLANS		shall mean all Drawings or Plans submitted by the Contractor with his Bid, Drawings, Engineering data and Plans submitted by the Contractor during the progress of the work.
EFFECTIVE DATE		shall have the same meaning as defined in the Contract;
EFFICIENCY		means the ratio of output power (or energy) to input power (or energy), expressed in Percent;
ELECTRICAL GRID		means an integrated system of electricity distribution, usually covering a large area;
EMPLOYER'S REPRESENTATIVE		shall mean any person, persons or consulting firm appointed by the Employer to supervise the work, inspect and examine workmanship and test materials/equipment to be supplied; ENGINEER-IN-CHARGE OR EIC means the person appointed by the Employer to perform the duties delegated by the Employer;
FACILITIES		shall mean all Plant and Equipment, Tools and Works to be supplied, erected, tested and commissioned as well as pre-commissioning, commissioning and all related services including Performance Guarantee Test to be carried out within thirty (30) days of the COD, in accordance with the contract by the Contractor under this Contract;
FILL FACTOR (FF)		means for an I-V curve, the ratio of the maximum power to the product of the open-circuit voltage and the short-circuit current. Fill Factor is a measure of the "squareness" of the I-V curve;
FINANCIAL BID		shall mean Envelope II of the Bid, containing the price offered to OREDA by the Bidder as per this EOI;
FINAL ACCEPTANCE TEST		shall have the same meaning as defined in the Contract;
FINANCIAL YEAR or FISCAL YEAR		runs from April 1 of any year through March 31 of the next year;
FINANCIALLY EVALUATED ENTITY		shall mean the company which has been evaluated for the satisfaction of the financial requirement set forth of this EOI;
FREQUENCY		means the number of repetitions per uEOI time of a complete waveform, expressed in Hertz (Hz);
GRID		means term used to describe an electrical utility distribution network;
GRID CONNECTED PV SYSTEM		means a PV system in which the PV array acts like a central generating plant, supplying power directly to the grid;
GRID INTERACTIVE		means a grid connected system which can feed in power to the grid as per the relevant Indian grid standards;
GOODS AND SERVICE TAX OR GST		shall mean taxes or cess levied under the Central Goods and Services Tax Act, Integrated Goods and Services Tax Act, Goods and Services Tax (Compensation to States) Act and various State/Union Territory Goods and Services Tax Laws and applicable cesses, if any under the laws in force (hereinafter referred to as relevant GST Laws) w.e.f. 01.07.2017, which shall be fully complied with by Bidders;

Definitions and abbreviation	:	Description
GOVERNMENT		shall mean the Government of Odisha or the Government of India, as the case may be;
GTP / GUARANTEED TECHNICAL PARAMETERS		shall mean a document confirming all technical and physical parameters of a component or system, which shall be stamped and signed by the manufacturer / supplier of the particular item and the Bidder;
IEC		means International Electro technical Commission; is the world's leading organization that prepares and publishes International Standards for all electrical, electronic and related technologies;
INSOLATION		means the solar radiation incident on an area over time, equivalent to energy and usually expressed in kilowatt-hours per square meter;
INSPECTOR		shall mean the Employer or any other person nominated by the Employer from time to time, to inspect the equipment, stores and the works under the Contract and/or the duly authorized representative of the Employer;
INSTALLATION SERVICES		means all those services ancillary to the supply of the Plant and Equipment for the Facilities, to be provided by the Contractor under the Contract; e.g., transportation and provision of marine or other similar insurance (s), inspection, expediting, site preparation works (including the provision and use of Contractor's Equipment and the supply of all use structural and construction materials required), installation including civil and allied works etc., testing, pre-commissioning, commissioning, PG Test, operation, maintenance, the provision of operations and maintenance manuals, training of Employer's Personnel etc.
INVERTER / POWER CONDITIONING UEOI (PCU) / POWER CONDITIONING SYSTEM (PCS)		means in a PV system, an inverter converts DC power from the PV array to AC power compatible with the utility and AC loads;
IRRADIANCE		means the solar power incident on a surface; usually expressed in kilowatts per square meter. Irradiance multiplied by time equals Insolation;
JUNCTION BOX		means a PV generator junction box is an enclosure on the module where PV strings are electrically connected and where protection devices can be located, if necessary;
KV		shall mean Kilovolts;
KILOWATT (KW)		means one thousand watts; a uEOI of power;
KILOWATT HOUR (kWh)		means one thousand watt-hours, a uEOI of energy. Power multiplied by time equals energy;
LABOURER		shall mean all categories of labour engaged by the Contractor, his sub-Contractors and his piece workers for work in connection with the execution of the work covered by the specifications. All these labourers will be deemed to the employed primarily by the Contractor.
LETTER OF AWARD (LOA)		means the letter from OREDA conveying its acceptance of the bid submitted by the Successful Bidder subject to such reservations/ conditions as may have been stated therein;
MAXIMUM POWER POINT (MPP)		Means the point on the current-voltage (I-V) curve of a module under illumination, where the product of current and voltage is maximum.
MAXIMUM POWER POINT TRACKER (MPPT)		Means the means of a power conditioning uEOI that automatically operates the PV-generator at its MPP under all conditions.
MANUFACTURER'S WORKS / CONTRACTOR'S WORKS		Shall mean the place of work used by the manufacturer, the Contractor or the Sub-Contractors for the performance of the work.
OREDA LTD		Means Orissa Renewable Energy Development Agency, assistance to state to promote and develop new and renewable sources of energy and technologies and to promote and implement energy conservation.
MODULE		Means the smallest replaceable uEOI in a PV array. It is an integral, encapsulated uEOI containing a number of PV cells.
MONTH		Shall mean a calendar month.
OPTCL		Shall mean Odisha Power Transmission Company Limited.

Definitions and abbreviation	:	Description
MW		Shall mean Megawatt.
NABL		Shall mean National Accreditation Board for Testing and Calibration Laboratories, an autonomous body under the aegis of Department of Science and Technology, Government of India.
NEWLY INCORPORATED COMPANY		Shall mean a company which has been in existence for less than a year.
NET WORTH		Shall mean the Net-Worth as defined section 2 of the company Act, 2013.
ONSHORE SUPPLIES/SERVICES		Shall mean indigenous supplies/services.
OFFSHORE SUPPLIES/ SERVICES		Shall mean supplies/services procured from outside India.
OPERATION AND MAINTENANCE / O&M		Shall have the same meaning as defined in the Contract.
OPERATIONAL ACCEPTANCE		Means the acceptance by the Employer of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts), which certifies the Contractor's fulfillment of the Contract in respect of Performance Guarantee Test of the Facilities.
OPEN CIRCUIT VOLTAGE		Means the maximum voltage produced by an illuminated photovoltaic cell, module, or array with no load connected. This value will increase as the temperature of the PV material decreases.
PARENT COMPANY/HOLDING COMPANY		Shall mean a company that holds at least fifty one percent (51%) of the paid-up equity capital directly or indirectly in the Bidding Company or in the Member of a Bidding Consortium, as the case may be.
PARTY		Shall mean the Employer or the Contractor, as the context requires.
PERSON		Shall include firms, companies, corporations and associations or bodies of individuals, whether incorporated or not. 'Singular' or 'masculine' includes 'plural' or 'feminine' and vice-versa in their respective context.
PEAK WATT (Wp)		Means the amount of power a photovoltaic module will produce at standard test conditions (normally 1000 W/m² and 25°C cell temperature).
PHOTOVOLTAIC SYSTEM		Means an installation of PV modules and other components designed to produce power from sunlight and meet the power demand for a designated load or feed energy to the grid.
PLANT, EQUIPMENT, MACHINERY, MATERIAL		Shall mean permanent plant, equipment, machinery, apparatus, system, articles and things of all kinds to be provided and incorporated in the facilities by the Contractor under this Contract including the spare parts, tools and tackles to be supplied by the Contractor but does not include Contractor's equipment.
POWER PROJECT / PROJECT		Shall mean the Solar power generation facility comprising single uEOI at identified location, having multi points of injection into the grid at Interconnection/ Delivery/ Metering Point. The Project shall include all uEOIs and auxiliaries such as water supply, treatment or storage facilities, and all the other assets, buildings/structures, equipment, plant and machinery, facilities and related assets required for the efficient and economic operation of the power generation facility.
POWER FACTOR		Means the Cosine of the phase angle between the voltage and the current waveforms in an AC circuit. This is used as a designator for inverter performance. A power factor of 1 indicates current and voltage are in phase and power is equal to the product of Volt-Amperes (no reactive power).
PRICE BID		Shall mean the Total Bid price per Wp quoted by the bidder for setting up the Solar PV Project inclusive of all the taxes & duties.
PROJECT CAPACITY		Shall mean the maximum AC capacity at the delivery point that can be scheduled on which the Contract shall be signed.
PROJECT COMPLETION		Shall have the same meaning as defined in the Contract.
PROJECT COMMISSIONING		Shall mean that the Project will be considered as commissioned if all equipment as per rated project capacity has been installed and energy

Definitions and abbreviation	:	Description
		has flown into grid, in line with the Commissioning procedures defined in the EOI.
PMC / PROJECT MANAGEMENT CONSULTANT / OWNER'S ENGINEER		Shall mean the agency and/ or person(s) so designated by OREDA to overlook, supervise & moEOIor project work, approve the drawings, report & witness for various testing, inspection of material at factory & site, check the Quality of work and to certify the work of the Solar Power Company's work so as to ensure compliance with the project's scope of work and terms of the Contract.
PROJECT MANAGER / SITE - IN - CHARGE		Means the Project Manager appointed by OREDA or its duly authorized representative to direct, supervise and be in-charge of the works for the purpose of the Contract.
PYRANOMETER		Means an instrument used for measuring global solar irradiance.
QUALIFICATION REQUIREMENTS		Shall mean the qualification requirements as set forth in this EOI.
RATED MODULE CURRENT		Means the current output of a PV module measured at standard test conditions of 1,000 w/m² and 25°C cell temperature.
REACTIVE POWER		Means the sine of the phase angle between the current & voltage waveforms in an AC system.
RfP DOCUMENT		Shall mean the bidding document issued by OREDA including all attachments, clarifications and amendments thereof.
EXPRESSION FOR INTEREST (EOI)		a formal document that conveys interest in a business opportuEOIy, transaction, or project.
REVISED SCHEDULED COD		Shall have the same meaning as defined in the Contract.
RFP		Shall mean this Request for Proposal dated along with all formats and RFP Documents attached hereto and shall include any modifications, amendments alterations or clarifications thereto.
SCHEDULED COMMISSIONING DATE / SCOD		Shall mean means 12 (Twelve) months or 365 days whichever is later, from the date of handing over of project land proposed for 2 MW Solar Power Project. Partial Commissioning of the Project would be allowed subject to land availability and duration for SCOD shall be computed based on the date of NTP issued by the OREDA.
SHORT CIRCUIT CURRENT		Means the current produced by an illuminated PV cell, module, or array when its output terminals are shorted.
SITE		Means the land on, under in or through which the works are to be executed or carried out and such lands will be decided by OREDA.
SPECIFICATIONS		Means collectively all the terms and stipulations contained in this document including the conditions of contract, technical provisions and attachments thereto and list of corrections and amendments.
STANDARD TEST CONDITIONS		Means conditions under which a module is typically tested in a laboratory: (1) Irradiance intensity of 1000 W/M² (2) AM1.5 solar reference spectrum and (3) cell (module) temperature of 25°C.
STRING		Means a number of modules or panels interconnected electrically in series to produce the operating voltage required by the load.
SOLAR PV PROJECT		Shall mean the Solar Photo Voltaic Power Project that uses sunlight for direct conversion into electricity through Photo Voltaic Technology.
SUB-CONTRACTORS / SUB-VENDORS		Refers to a party or parties having direct contract with the Contractor and to whom any part of the contract has been sublet by the Contractor without any waiver to terms and conditions and responsibilities agreed with OREDA.
SUB-SYSTEM		Means any one of several components in a PV system (i.e., Array, controller, batteries, inverter, load).
SUBSTATION		Shall mean a point (at 11/22 kV) where Solar PV Project shall connect to a Distribution System.
SUCCESSFUL COMPLETION OF O&M PERIOD		Means contractor shall fulfil following conditions: i. The actual UEOIs (kWh) generated during 10 years of the operation and maintenance is expected to be more than or equal to Quoted Electrical Energy Generation (QEEG) in the bid offer by the bidder. ii. EPC Contractor

Definitions and abbreviation	:	Description
		shall demonstrate that Solar Plant Generation at the end of 5th year is more than quoted 6th yearly guaranteed generation quoted for contracted capacity.
SUCCESSFUL BIDDER/CONTRACTOR		Shall mean the Bidder whose Bid has been accepted by OREDA and to whom Letter of Award (LOA) has been issued and shall include such successful Bidder's legal representatives, successors and permitted assigns.
SUN PATH DIAGRAM		Means graphical representation of the Sun's height and azimuth.
SYSTEM OPERATING VOLTAGE		Means the Array output voltage under load. The system operating voltage is dependent on the load or batteries connected to the output terminals.
TESTS ON COMPLETION		Shall mean all such tests as are prescribed by the specification to be made by the Contractor to the satisfaction of the OREDA before the plant and equipment are taken over by the OREDA and this also includes those tests not specifically mentioned in the specification but required under various BIS codes and relevant Applicable Laws.
TILT ANGLE		Means the angle of inclination of a solar collector measured from the horizontal.
TRACKING ARRAY		Means a PV Array that follows the path of the Sun. This can mean one-axis, East to West daily tracking or two-axis tracking, where the Array follows the Sun in azimuth and elevation.
TRANSFORMER (STEP-UP)		Means a transformer that converts the generator's low-voltage electricity to higher voltage levels for transmission to the grid or load center.
UNINTERRUPTED POWER SUPPLY (UPS)		Means the designation of a power supply providing continuous uninterruptible service. The UPS will include batteries.
UTILITY (GRID) INTERACTIVE INVERTER		Means an inverter that can function only when tied to the utility grid, and uses the prevailing line-voltage frequency on the utility line as a control parameter to ensure that the PV system's output is fully synchronized with the utility power.
VENDOR'S CREDENTIALS		Shall mean, unless specifically mentioned otherwise, the copies of Purchase Orders / Supply Invoices or Chartered Accountant's certificate clearly stating the extent of meeting eligibility criteria.
WATT (W)		Means the uEOI of electrical power. The power developed when a current of one ampere flows through a potential difference of one volt.
WATT HOUR (Wh)		Means a uEOI of energy equal to one watt of power connected for one hour.
WEEK		Shall mean calendar week.
WORKING DAY		Shall mean the part of the day devoted or allotted to work.

Introduction & Invitation for Bids

The **OREDA Limited** was constituted as a State Nodal agency in the 1984 under aegis of Dept. of Science and Technology. Govt. of Odisha with a view to popularize the exploitation and use of renewable energy resources in the State. Over last 39 years OREDA is being pioneer in implementing renewable energy-based solutions across Odisha. With increasing mandate and requirement about reduction of carbon footprint OREDA is assisting other state departments in planning and implementing the decarbonization strategies. It also provides technical and financial support for initiatives like the **PM-KUSUM Scheme** and the **solarization of agricultural pumps**.

In line with India's target of achieving **500 GW of installed renewable energy capacity by 2030**, various government bodies have taken proactive measures to install **grid-connected** and **off-grid rooftop solar PV projects** on government buildings to boost renewable energy consumption.

Ministry of New and Renewable Energy, Govt. of India has given a target to all States for solarization of all government buildings by December 2025. **The government of Odisha has authorized OREDA Limited (OREDA), now under aegis of Energy Department to implement the scheme in the State**.

OREDA is spearheading the solarization of government buildings in Odisha, with an estimated capacity of **927 MW**. These installations will be implemented using various models such as **RESCO**, **CAPEX**, and **Virtual Net Metering (VNM)**.

OREDA ("Employer", "Developer", "Owner") invites online Bids on open tender basis for Techno-Commercial Bid for "Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning including power evacuation of solar PV technology-based grid interactive power plants. The Solar Modules to be used for this project shall be sourced only from the Model and Manufactures included in the latest "Approved List of Models and Manufactures (ALMM)" issued by MNRE.

Project Capacity: The Projects shall be installed at single location and can be multiple 2 MW Capacity sites. The total cumulative project capacity is initially capped at 20 MW. OREDA reserves the right to increase or decrease the total cumulative project capacity and can also decide on the capacity of project to be allocated at a single site or multiple sites at its own discretion.

Interpretation

In the Bidding Document and Work Order, except where the context requires otherwise:

I. words indicating one gender include all genders;
II. words indicating the singular also include the plural and words indicating the plural also include the singular;
III. provisions including the word “agree”, “agreed” or “agreement” require the agreement to be recorded in writing;
IV. “written” or “in writing” means hand-written, type-written, printed, or electronically made, and resulting in a permanent record; and
V. The marginal words and other headings shall not be taken into consideration in the interpretation of these conditions.
VI. An applicable law shall be construed as reference to such applicable law including its amendments or re-enactments from time to time.
VII. A time of day shall save as otherwise provided in any agreement or document be construed as a reference to Indian Standard Time.
VIII. Different parts of this contract are to be taken as mutually explanatory and supplementary to each other and if there is any differentiation between or among the parts of this contract, they shall be interpreted in a harmonious manner so as to give effect to each part.
IX. The table of contents and any headings or sub-headings in the contract has been inserted for case of reference only & shall not affect the interpretation of this agreement.

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1. Instruction to Bidders (ITB)

Section 1 (ITB) provides general overview and contents of EOI along with the preparation, submission, opening, evaluation, comparison of Bids, issuance of Letter of Intent and Work Order, etc. Section 1 (ITB) shall be read in conjunction with Section 2 (BDS) and other provisions listed therein, shall be a complete document expressing all terms and conditions. In case of any interpretation issues, Section 2 (BDS) including any associated Addendum, Corrigendum and Clarification will supersede Section 1 (ITB).

1.1. General

1.1.1. **Scope of EOI**

1.1.1.1. In connection with the EOI, OREDA issues this EOI containing all the terms and conditions mentioned herein.

1.1.1.2. The contractor's obligations under the contract shall include Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning power evacuation of solar PV technology-based grid interactive power plants.

1.1.1.3. All Works to be carried out under this contract shall be in accordance with the requirements, conditions, appendices etc. given in technical details (Section 3.3) together with those stated in other Sections/Sub- sections of this Bid Documents, which shall be considered as a part of this volume completely as if bound herewith. Further, all the works to be carried out under the scope should also comply all the technical requirements.

1.1.1.4. The EOI along with the EOI and any Addendum, Corrigendum, and Clarification, to be issued from time to time, shall be collectively termed as the Bidding Document. Such a Bidding Document shall be published on the E-procurement Website. In addition, such a Bidding Document shall also be uploaded on OREDA Website, but for viewing purposes only.

1.1.1.5. The name of the SOW including the associated EOI no., EOI no. and other details are specified in Section 2 (BDS).

1.1.2. **Integrity Violation**

1.1.2.1. The Bidder observes the highest standard of ethics all the time.

1.1.2.2. OREDA defines, for the purposes of this provision, the terms set forth below as follows:

"Corrupt Practice" means the offering, giving, receiving or soliciting, directly or indirectly, anything of value to influence improperly the actions of another Party;

"Fraudulent Practice" means any act or omission including a misrepresentation that knowingly or recklessly misleads or attempts to mislead a Party to obtain a financial or other benefit or to avoid an obligation;

"Coercive Practice" means impairing or harming or threatening to impair or harm, directly or indirectly, any Party or the property of a Party to influence improperly the actions of the other Party;

"Collusive Practice" means an arrangement between two or more Parties designed to achieve an improper purpose, including influencing improperly the actions of other Party;

"Obstructive Practice" means

i. deliberately destroying, falsifying, altering, or concealing of evidence material to OREDA's investigation;

ii. making false statements to investigators in order to materially impede OREDA's investigation;

iii. failing to comply with requests to provide information, documents or records in connection with OREDA's investigation;

iv. threatening, harassing, or intimidating any Party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

v. materially impeding OREDA's contractual rights of audit or access to information;

"Integrity Violation" is an act which violates OREDA's policies, including (a) to (e) given above in the ITB Clause 1.1.2.2 and the following abuse, conflict of interest, retaliation against whistleblowers or witnesses, and other violations of OREDA's policies, including failure to adhere to the highest ethical standard.

1.1.2.3. OREDA will reject a Bid if it determines that the Bidder has, directly or indirectly through an agent, engaged in Integrity Violation including but limited to any Corrupt Practice, Fraudulent Practice, Coercive Practice, Collusive Practice and Obstructive Practice;

1.1.2.4. OREDA will impose remedial actions on any Bidder or an individual, at any time, in accordance with its policies and guidelines (both as amended from time to time), including declaring ineligible, either indefiEOIely or for a stated period of time, to participate in OREDA-managed, -administered, or -supported activities or to benefit from an OREDA-managed, -administered, or -supported, financially or otherwise, if it at any time determines that the Bidder or individual has, directly or through an agent, engaged in Corrupt Practice, Fraudulent Practice, Coercive Practice, Collusive Practice, Obstructive Practice or Integrity Violation; and

1.1.2.5. OREDA will have the right to inspect the accounts, records, other documents, etc. of the Bidders and relating to the Bid submission and to have them audited at any point in time.

1.2. Contents of the EOI

1.2.1. **Sections of the EOI**

1.2.1.1. The EOI consists of the following Sections as indicated below and should be read in conjunction with the EOI and any Addendum, Corrigendum and Clarification.

a) Exhibits

i. Definitions

ii. Interpretations

Section 1 – Instructions to Bidders (ITB)

Section 2 – Bid Data Sheet (BDS)

Section 3 – Scope of Work (SOW)

Section 4 – Qualification Requirement (QR)

Section 5 – General Conditions of Contract (GCC)

Section 6 – Special Conditions of Contract (SCC)

Section 7 – Annexure

1.2.1.2. OREDA is not responsible for the completeness of the Bidding Document if they were not obtained directly from E-procurement Website.

1.2.1.3. The Bidder is expected to examine the complete Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the Bid.

1.2.2. **Clarification on EOI, Site Visit and Pre-Bid Meeting**

1.2.2.1. A prospective Bidder requiring any clarification on the EOI shall contact at OREDA's Office Address or write to OREDA's Official Email Id, prior to the pre-bid meeting, in accordance with ITB Clause 1.2.2.2. The queries shall be raised as per the format provided in Annexure Clause 04.

1.2.2.2. The pre-bid meeting shall be conducted in the manner specified in Section 2 (BDS). The Bidder's designated representative may attend the pre-bid meeting. The purpose of the pre-bid meeting will be to clarify issues and to prepare Clarification against the queries received from the Bidders on any matter that may be raised at that stage. OREDA may respond to any query for providing Clarification in writing, provided that such queries are received as per the timelines given in the EOI and any Corrigendum.

1.2.2.3. The Clarification against the queries raised, without identifying the source of the prospective Bidder, may be uploaded on the E-procurement Website and OREDA Website. Any modification to the EOI shall be made by OREDA exclusively through the issue of an Addendum.

1.2.2.4. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.

1.2.2.5. The Bidder and any of its personnel and/ or agents will be granted permission by OREDA to enter the Project site for the purpose of such visit, but only upon the express condition that the Bidder, its personnel and/ or agents will release and indemnify OREDA and its personnel, agents, etc. from and against any liability in respect thereof, and the Bidder shall be responsible for any death or personal injury, loss of or damage to property, and any other loss, damage, costs, expenses, etc. incurred as a result of the inspection during the Project site visit.

1.2.3. **Addendum, Corrigendum, and Clarification to the EOI**

1.2.3.1. At any time, prior to the deadline for submission of Bids, OREDA may issue an Addendum, Corrigendum and Clarification.

1.2.3.2. OREDA may, at its discretion, extend the deadline for the submission of Bids by issuing a Corrigendum in order to give prospective Bidders reasonable time in preparing their Bids. At any point in time, the latest Corrigendum will supersede the Schedule of Events mentioned in the EOI or any previously issued Corrigendum.

1.2.3.3. OREDA may, at its discretion, modify or change any specific provisions of terms and conditions of the EOI or any Addendum issued previously by issuing an Addendum for such specific provisions. At any point in time, the provisions provided against a specific Clause in the latest Addendum shall supersede such provisions already provided in the EOI or any previously issued Addendum.

1.3. Preparation of Bids

1.3.1. **Cost for preparation of Bid**

1.3.1.1. The Bidder shall bear all the costs associated with the preparation and submission of the Bid, and OREDA shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

1.3.2. **Language of Bid**

1.3.2.1. The Bid, as well as all correspondence and documents for any communications exchanged by the Bidder and OREDA, shall be written in the English language only.

1.3.2.2. Any supporting documents and printed literature that are part of the Bid may be submitted in another language provided they are accompanied by an accurate translation of the relevant passages in the English language only, in which case, for purposes of interpretation of the Bid, such English translation shall govern. In case of any misrepresentations in the English language vis-à-vis another language, OREDA, at its discretion, can reject the Bid submitted by the Bidder on the ground of misrepresentation of the information.

1.3.3. **Documents comprising the Bid**

1.3.3.1. The Bid shall comprise of the Technical Bid and Expression of Interest(Price Bid). The Technical Bid and Price Bid shall be submitted online pursuant to ITB Clause 1.3.3.2, as per all the terms and conditions of the Bidding Document. In addition, the select original hard copies of the Bid shall be submitted pursuant to ITB Clause **Error! Reference source not found.** at OREDA's Office A ddress.

1.3.3.2. The online submission of the Technical Bid shall comprise the following:

Bid Form	Particulars
Bid Form 1 (Bid Processing Fee)	Copy of the "**e-payment**" for an amount and other details as mentioned in Section 2 (BDS) already made by the Bidder as per the various e-payment options (credit card, debit card, net baking, etc.) available on the E-procurement Website towards "**Bid Processing Fee**". **This shall be a non-refundable fee.** This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 1 of Section 7 (Annexure).
Bid Form 2 (Cost of Bid)	Copy of the "**Demand Draft**" for an amount and other details as mentioned in Section 2 (BDS) issued by a nationalized/ commercial bank in India towards "**Cost of Bid**" issued in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha. **This shall be a non-refundable fee.** This shall be payable by all the Bidders, subject to any exemption. In case of an exemption as admissible, the copy of the proof of exemption issued by an appropriate government authority (as applicable) shall be submitted. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 2 of Section 7 (Annexure).
Bid Form 3 (Bid Security)	Copy of the "**Demand Draft**" or "**Fixed Deposit Receipt**" or "**Bank Guarantee**" for an amount and other details as mentioned in Section 2 (BDS) issued by a nationalized/ commercial bank in India towards "**Bid Security**". In case of a Demand Draft, it shall be issued in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha. In case of a Fixed Deposit Receipt, it shall be pledged in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha and unconditionally discharged on demand. The Bidders must note that in case of absence of the endorsement that "This Fixed Deposit Receipt shall be unconditionally discharged in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha on demand" on the back of the Fixed Deposit Receipt, such Bid Security shall be liable for rejection. In case of a Bank Guarantee, it shall be issued in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha with an expiry date and a claim date as mentioned in Section 2 (BDS). This shall be payable by all the Bidders, subject to any exemption as provided in Section 2 (BDS). In case of an exempt as admissible, the copy of the proof of exemption issued by an appropriate government authority (as applicable) shall be submitted. **This shall be a refundable fee, subject to the various provisions as mentioned in ITB Clause 1.3.7.** This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 3 of Section 7 (Annexure).
Bid Form 4 (Power of Attorney)	Copy of the "**Power of Attorney**" issued in the name of the Authorized Signatory of the Bidder supported by the required Board Resolution for submitting the Bid on behalf of the Bidder. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 4 of Section 7 (Annexure).

Bid Form 5 (Covering Letter of Technical Bid)	Copy of the "**Covering Letter of Technical Bid**" duly signed by the Authorized Signatory and stamped by the Bidder to unconditionally accept all terms of the Bidding Document along with an undertaking of select clauses of the Bidding Document. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 5 of Section 7 (Annexure).
Bid Form 6 (Technical Qualification)	Copy of the "**Technical Qualification**" certificate duly signed by the Authorized Signatory and stamped by the Bidder citing the Bidder's technical qualification pursuant to the requirements mentioned under Section 4 (QR). This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 6 of Section 7 (Annexure).
Bid Form 7 (Financial Qualification)	Copy of the "**Financial Qualification**" certificate duly signed and stamped by a chartered accountant citing the Bidder's financial qualification pursuant to the requirements mentioned under Section 4 (QR). This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 7 of Section 7 (Annexure).
Bid Form 8 (Test Certificates)	Copy of the declaration of the "**Test Certificates**" for the Equipment as issued in the name of the OEM from any valid MNRE/ NABL/Govt accredited test labs as given in as mentioned in QR Clause 4.2.1 and shall be in line with Appendix Form 8 of Appendix Clause 7.5.8 and Appendix Form 8 of Appendix Clause 7.6.8. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 8 of Section 7 (Annexure).
Bid Form 9 (Self-certificate)	Copy of the declaration of the "**Self-certificate**" duly signed by the Authorized Signatory and stamped by the Bidder to declare that it has not been debarred/ blacklisted/ defaulted by any Government, agency, Public Sector Undertaking (PSU), institution/ autonomous organizations in the past. In case of any such events, the Bidder shall provide the case details and its current status in the format therein. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 9 of Section 7 (Annexure).
Bid Form 10 (Undertaking for Indigenousness)	Copy of the "**Undertaking for Indigenousness**" certificate duly signed by the Authorized Signatory and stamped by the Bidder to showcase the use of domestic contents of the Equipment to be supplied during the performance of the Work Order. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 10 of Section 7 (Annexure).
Bid Form 11 (No Deviation Certificate)	Copy of the "**No Deviation Certificate**" duly signed by the Authorized Signatory and stamped by the Bidder stating that the Bidder has not taken any deviation in the Bidding Document. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 11 of Section 7 (Annexure).
Bid Form 12 (Registration details)	Copy of the relevant documents issued by an appropriate Government authority in India. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 12 of Section 7 (Annexure).

Bid Form 13 (PAN)	Copy of the **PAN** card of the Bidder. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 13 of Section 7 (Annexure).
Bid Form 14 (GST Certificate)	Copy of the "**GST Certificate**" of the Bidder. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 14 of Section 7 (Annexure).
Bid Form 15 (Income Tax Return)	Copy of the last three (3) assessment year's "**Income Tax Return**" filing document. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 15 of Section 7 (Annexure).
Bid Form 16 (Quality Assurance)	Copy of the declaration of "**Quality Assurance**" of the Bidder. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 16 of Section 7 (Annexure).
Bid Form 17 (Summary of the Bidder)	Copy of the "**Summary of the Technical Bid**" in Microsoft .xls or .xlsx format as per the checklist given therein. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 17 of Section 7 (Annexure).
Bid Form 18 (Declaration form of the Farmer/land owner and of the EPC)	Copy of Self declaration form of the farmer/land owner in the prescribed format at Annexure – 7 Copy of Declaration form of the EPC in the prescribed format at Annexure - 7
Bid Form 19 (Covering letter along with the Price Bid)	Copy of the "**Covering Letter of Expression of interest (Price Bid)**" duly signed by the Authorized Signatory and stamped by the Bidder to unconditionally accept all terms of the Bidding Document. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 18 of Section 7 (Annexure). Copy of the "Price Bid" duly filled and to be uploaded on the e-tendering portal. This is a mandatory submission and shall be submitted in Microsoft xls. Or .xlsx format only as per the requirements given in Bid Form 18 of Section 7 (Annexure).

1.3.3.3. The hardcopy submission of the Technical Bid shall comprise the following:

Bid Form	Particulars
Bid Form 2 (Cost of Bid)	Original of the "**Demand Draft**" for an amount and other details as mentioned in Section 2 (BDS) issued by a nationalized/ commercial bank in India towards "**Cost of Bid**" issued in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha. **This shall be a non-refundable fee.** This shall be payable by all the Bidders, subject to any exemption as provided in Section 2 (BDS). In case of an exempt as admissible, the copy of the proof of exemption issued by an appropriate government authority (as applicable) shall be submitted. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 2 of Section 7 (Annexure).

Bid Form 3 (Bid Security)	Original of the "**Demand Draft**" or "**Fixed Deposit Receipt**" OR the "**Bank Guarantee**" for an amount and other details as mentioned in Section 2 (BDS) issued by a nationalized/ commercial bank in India towards "**Bid Security**". In case of a Demand Draft/ Fixed Deposit Receipt, it shall be issued in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha. In case of a Bank Guarantee, it shall be issued in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha with an expiry date and a claim date as mentioned in Section 2 (BDS). This shall be payable by all the Bidders, subject to any exemption as provided in Section 2 (BDS). In case of an exempt as admissible, the copy of the proof of exemption issued by an appropriate government authority (as applicable) shall be submitted. This shall be a refundable fee, subject to the various provisions as mentioned in ITB Clause 1.3.7. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 3 of Section 7 (Annexure).
Bid Form 4 (Power of Attorney)	Original of the "**Power of Attorney**" issued in the name of the Authorized Signatory of the Bidder supported by the required Board Resolution for submitting the Bid on behalf of the Bidder. This is a mandatory submission and shall be submitted as per the requirements given in Bid Form 4 of Section 7 (Annexure).
Bid Form 18 (Summary of the Bidder)	Copy of Self declaration form of the farmer/land owner in the prescribed format at Annexure – 7 Copy of Declaration form of the EPC in the prescribed format at Annexure - 7

1.3.3.4. For online submission of the Technical Bid and Price Bid, the Bidder shall submit each Bid Form as a separate copy and name the Bid Form as given under the column "Bid Form" given in ITB Clause 1.3.3.2 and ITB Clause 1.3.3.3. **For example, the name of the online copy while uploading Form 1 shall be "Bid Form 1 (Covering Letter of Technical Bid)"** to be submitted either in **.pdf or .jpg or .jpeg** format.

1.3.3.5. The Bid Forms must be submitted without any alterations to the text, and no substitutes shall be accepted in whatsoever condition, else the Bids shall be liable for rejection.

1.3.3.6. In case a submission is a mandatory submission as per all terms of the Bidding Document then the Bidder shall adhere to the same, else the Bids shall be liable for rejection.

1.3.4. **Bid Prices**

1.3.4.1. The Bidder shall fill in the Price Bid in line with the instructions mentioned in the Price Bid format as given under Bid Form 11 and Bid Form 12.

1.3.4.2. The Bid prices in the Price Bid shall be made at FOR destination at Project site basis, which means that the Bidder shall be responsible for bringing all Equipment to be used in this Project and maintain it in their safe custody until the Acceptance of the Project is completed with the issuance of Acceptance Certificate and beyond that during the CMC Period as per the terms and conditions of the EOI.

1.3.5. **Currencies of Bid and Payment**

1.3.5.1. The Price Bid shall be quoted by the Bidder entirely in the currency "Indian Rupees" or "INR".

1.3.6. **Period of Validity of Bids**

1.3.6.1. Bids shall remain valid for the time period as specified in Section 2 (BDS) after the last date of Bid submission as prescribed in the EOI or its subsequent Corrigendum. A Bid valid for a shorter period than the above shall be liable for rejection by OREDA.

1.3.6.2. In exceptional circumstances, prior to the expiration of the Bid validity period, OREDA may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB 1.3.7, it shall also be extended suitably beyond the deadline of the extended validity period on a mutual basis beyond the initial validity period. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its Bid.

1.3.7. **Bid Security**

1.3.7.1. The Bidder shall furnish Bid Security as per the Bid Form 2 pursuant to ITB Clause 1.3.3.2.

1.3.7.2. Unless otherwise specified in Section 2 (BDS), any Bid not accompanied by a fully compliant Bid Security in case one is required in accordance with ITB Clause 1.3.7.1, shall be liable for rejection by OREDA as non-responsive Bid.

1.3.7.3. If a Bid Security is specified pursuant to ITB Clause 1.3.7.1, the Bid Security of unsuccessful Bidders shall be returned within a maximum time period of thirty (30) Days upon the Qualified Bidder accepting the Letter of Intent (LOI) with required formalities.

1.3.7.4. If a Bid Security is specified pursuant to ITB Clause 1.3.7.1, the Bid Security of the Qualified Bidder shall be returned within a maximum time period of thirty (30) Days after completion of work with required formalities.

1.3.7.5. The Bid Security received against the previous EOIs shall not be adjusted towards the Bid Security to be submitted against this EOI.

1.3.7.6. The Bid Security amount/BG/FDR should remain with OREDA in case a vendor/bidder is awarded the Work. The bid security should be valid for a period of 420 days from the date of the award of work.

1.3.7.7. The Bid Security shall be forfeited,

a) if a Bidder withdraws its Bid during the period of Bid validity specified by the Bidder on the respective Covering Letters of Technical Bid and Price Bid; or

if the Bidder accepting L1 price (LOI for work) fails to

i. accept the arithmetical correction of its Price Bid pursuant to ITB Clause 1.5.6; or

ii. furnish the Performance Security pursuant to ITB Clause **Error! Reference source not found.** ; or

iii. accept the Letter of Award (LOA) pursuant to ITB Clause **Error! Reference source not found.**

1.3.8. **Deadline for submission of Bids**

1.3.8.1. The Bids must be submitted to OREDA through E-procurement Website only and no later than the date and time indicated in the EOI or any Corrigendum.

1.3.8.2. OREDA may, at its discretion, extend the deadline for the submission of Bids through the publication of a Corrigendum in accordance with ITB Clause 1.2.3.2, in which case all rights and obligations of OREDA and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

1.3.9. **Format and Signing of Bid**

1.3.9.1. The Bid Form as given in ITB Clause 1.3.3 or any electronic form, if any and as available on the E-procurement Website, or any external form in Microsoft .xls or.xlsx format for the Technical Bid and the Price Bid shall be duly filled and scanned copies or Microsoft .xls or .xlsx or electronic form as available on the E-procurement Website shall be duly uploaded as per the instructions mentioned in ITB Clause 1.4.1.1, unless a specific instruction provided therein in the EOI Document.

1.3.9.2. The original documents of the Bid shall be typed or written in indelible ink and shall be signed by the Authorized Signatory supported by the seal of the Bidder. In case the original documents are issued by any third party (for example - the chartered accountant, etc.) then the same shall be signed by a person duly authorized to sign on behalf of the third party supported by the seal of the third party along with other details as required.

1.3.9.3. The name and position held by each person signing or accepting the authorization must be typed or printed below the signature.

1.3.9.4. Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

1.4. Submission and Opening of Bids

1.4.1. **Sealing and Marking of Bids**

1.4.1.1. The Technical Bid and Price Bid shall be submitted as per the procedures mentioned in Section 2 (BDS).

1.4.2. **Late Bids**

1.4.2.1. OREDA shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB Clause 1.3.8. Any Bid (either online or offline) received by OREDA after the deadline for submission of Bids shall be declared as a late Bid. Such late Bids shall be liable for rejection online, and the online copy of the Bid uploaded on the E-procurement Website shall be sent unopened to “Archive” and shall not be considered at all any further for evaluation. In such a case, the hardcopies in the original form shall be returned unopened to the Bidder.

The acceptance or rejection of the bid rests solely with the committee members designated by OREDA.

1.4.3. **Withdrawal, Substitution, and Modification of Bids**

1.4.3.1. A Bidder may withdraw, substitute, or modify its Technical Bid or Price Bid after it has been submitted as per the procedure mentioned in the E-procurement Website and as per the instructions mentioned in ITB Clause 1.4.1.1.

1.4.3.2. No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of Bid validity period specified by the Bidder on the Covering Letters of Technical Bid and Price Bid or any extension thereof as per the terms of Bidding Document.

1.4.3.3. Bidder may modify or withdraw their Bids through the relevant provisions on the E-procurement Website until the last date for submission of Bid as per the timelines mentioned in the EOI or any Corrigendum.

1.4.3.4. The Bidders may modify, resubmit, or withdraw their Bids as per the provisions given on the E-procurement Website.

1.4.3.5. In the case of original hard copies of the Bidder, such Bids will be considered based on the latest submission made by the Bidder. In such a case, any previous original hard copies shall be returned unopened to the Bidder.

1.4.4. **Acceptance/ rejection of the Bids**

1.4.4.1. The Bids submitted by the Bidders shall be liable for rejection in case

a) Any incomplete or non-submission of any mandatory Bid Form or document mentioned under online submission of Technical Bid pursuant to ITB Clause 1.3.3.2.

b) Any incomplete or non-submission of any mandatory Bid Form or document mentioned under the online submission of Price Bid pursuant to ITB Clause 1.3.3.3.

c) Any incomplete or non-submission of any mandatory Bid Form or document mentioned under hardcopy submission of Bid pursuant to ITB Clause **Error! Reference source not f ound.**

d) Late Bids received as per ITB Clause 1.4.2.

e) Canvassing in any manner shall not be entertained and will be viewed seriously and shall be liable for rejection.

f) The Bids are found non-responsive pursuant to all the relevant clauses in the Bidding Document.

1.4.5. **Bid Opening**

1.4.5.1. Technical Bid (Online and hardcopies)

a) Online Technical Bid:

i. OREDA shall open the online Technical Bids on the E-procurement Website as per the timelines mentioned in the EOI or any Corrigendum.

b) Hardcopies of Technical Bid:

i. OREDA shall open the hardcopies of the Technical Bids at OREDA's Office Address as per the timelines mentioned in the EOI or any Corrigendum. Such Technical Bid shall be opened in the presence of Bidders' designated representatives who chooses to attend. In such cases, the Bidder's designated representative must carry a letter of authorization issued by the Bidder's Authorized Signatory.

ii. The Bidders' representatives who are present during the opening of hardcopies of the Technical Bids may be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.

c) OREDA shall prepare a record of the opening of Technical Bids as per the internal guidelines notified from time to time.

1.4.5.2. Price Bid (online):

a) OREDA shall conduct the opening of the Price Bids for all Bidders who are responsive in their Technical Bids after the evaluation being conducted by OREDA pursuant to ITB Clause 1.5.

The Price Bids shall be opened online after the complete evaluation of the Technical Bids by OREDA. OREDA shall open the online Price Bids on the E-procurement Website as per the timelines mentioned in the EOI or any Corrigendum.

1.5. Evaluation and Comparison of Bids

1.5.1. **Confidentiality**

1.5.1.1. Information relating to the examination, evaluation, comparison, and post qualification of Bids and recommendation for the issue of Work Order, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on the issuance of Work Order is communicated to all Bidders, unless it is specifically required by OREDA to do such disclosure as per the specific requirements.

1.5.1.2. Any attempt by a Bidder to influence OREDA's decision in the evaluation of the Bids or issuance of Work Order may result in the rejection of its Bid.

1.5.1.3. Notwithstanding ITB Clause 1.5.1.2, from the time of Bid opening to the time of issuance of Work Order, if any Bidder wishes to contact OREDA on any matter related to the bidding process, it may do so in writing only.

1.5.2. **Clarification of Bids**

1.5.2.1. To assist in the examination, evaluation, and comparison of the Technical Bid and Price Bid, OREDA may, at its discretion, ask any Bidder for a clarification of its Bid. OREDA's request for clarification and the response shall be in writing only. No change in the substance of the Technical Bid or prices in the Price Bid shall besought, offered, or permitted. OREDA reserves all the rights to evaluate any such response received from the Bidder based on the clarification to be sought.

1.5.2.2. If a Bidder does not provide clarification of its Bid by the date and time set in OREDA's request for clarification, such Bid shall be liable for rejection.

1.5.3. **Examination of Technical Bids**

1.5.3.1. OREDA shall examine the Technical Bid to confirm that all documents and information requested in ITB Clause 1.3.3.2 for online submission and ITB Clause **Error! Reference source not found.** f or hardcopy submission have been provided in order to assess the completeness of the Technical Bid.

1.5.3.2. OREDA shall confirm that all the requirements have been provided in the Technical Bid in all respect. If any of the documents or information is missing, the Bid shall be liable for rejection.

1.5.4. **Responsiveness of Technical Bid**

1.5.4.1. OREDA's determination of a Technical Bid's responsiveness shall be strictly based on the contents of the Technical Bid, as mentioned in ITB Clause 1.3.3.2 and ITB Clause **Error! Reference source not found.**.

1.5.4.2. If a Bid is not responsive to the requirements of the EOI, it shall be liable for rejection by OREDA and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

1.5.5. **Qualification of the Bidder**

1.5.5.1. OREDA shall determine to its satisfaction during the evaluation of Technical Bids whether Bidders meet the qualifying requirements specified in Section 4 (QR).

1.5.5.2. The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB Clause 1.3.3.

1.5.5.3. An affirmative determination shall be a pre-requisite for the opening and evaluation of a Bidder's Price Bid. A negative determination shall result in the disqualification of the Bid.

1.5.6. **Correction of Arithmetical Errors**

1.5.6.1. During the evaluation of Price Bids, OREDA shall correct arithmetical errors on the following basis:

a) If there is a discrepancy between the uEOI price and the total price that is obtained by multiplying the uEOI price and quantity, the uEOI price shall prevail, and the total price shall be corrected.

b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail, and the total shall be corrected.

If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to a) and b) above.

1.5.6.2. If the Bidder that submitted the lowest evaluated (L1) Bid does not accept the correction of errors, its Bid shall be disqualified, and its Bid Security shall be forfeited.

1.5.7. **Evaluation and comparison of Bids**

1.5.7.1. OREDA shall compare all responsive Bids to determine the lowest evaluated Bid, in accordance with ITB Clause 1.5.6.2 & BDS Clause 2.1.6.

1.5.8. **OREDA's right to accept any Bid, and to reject any or all Bids**

1.5.8.1. OREDA reserves all the right to accept or reject any Bid or to annul the bidding process or reject all Bids at any time prior to the issue of Work Order, without thereby incurring any liability to Bidders. In case of annulment, the Bids shall be liable for rejection online and the online copy of the Bid uploaded on the E-procurement Website shall be sent unopened to "Archive" and shall not be considered at all any further for evaluation. In such a case, the hard copies in the original form shall be returned unopened to the Bidder.

1.6. Work Order

1.6.1. **Award Criteria**

1.6.1.1. The Successful Bidders shall be selected as per the procedures mentioned in Section 2 (BDS).

1.6.2. **Issue of Letter of Intent**

1.6.2.1. Prior to the expiry of the period of Bid validity, OREDA shall notify the Qualified Bidder(s), in writing, that its Technical Bid has been accepted. At the same time, OREDA may also notify all other Bidders of the results of the bidding. In addition, OREDA may publish the results on the OREDA Website and E-procurement Website.

1.6.2.2. OREDA shall issue a Letter of Intent to all selected bidder, as per LOI Form 1 under Section 7 (Annexure), subject to the Bidder whose Price Bid has been determined to be the lowest evaluated (L1) Bid and is responsive to the Bidding Document. Further, the quoted price is subject to approval from the authorities of OREDA or Department of Energy, GoO. The Bidder is also determined to be qualified for the issuance of Letter of Intent satisfactorily.

1.6.2.3. Upon receiving the Letter of Intent, the Successful Bidder shall fulfil all other requirements given under the Letter of Intent and submit the below mentioned critical documents within a maximum time period of fifteen (15) Days from the date of Letter of Intent and provide its acceptance, without any fail, else such Bids shall be liable for rejection and the Bid Security shall be forfeited.

Sl. No	Critical documents
1.	Acceptance to the Letter of Intent by signing the copy of the Letter of Intent along with an official seal, date, and submission to OREDA
2.	Land Lease Agreement (LLA) to be signed along with the sketch map of the land issued by the tahsil office. (OREDA will share the format along with LOI)
3.	Submission of Minimum Guaranteed Monthly power generation from the Solar Power Plant under normal operating conditions (Format will be provided by OREDA) as per the quoted price bid MU generation by the bidder
4.	Submission of Performance Security as per ITB Clause 1.6.3
5.	Submission of a Detailed Workplan in line with the Project Timelines mentioned in the SOW Clause 3.4.1 for the implementation of Project.
6.	Single line diagram of the Project.
7.	Design document of the module mounting structure and other mounting structure, of the Project along with a STAD pro analysis report as a part of the mandatory submission, if applicable.
8.	Bill of materials along with spares and all relevant equipment test certificates
9.	Proof of Local office (registered office address in Odisha)

Note: The Requirement of the critical documents shall be mentioned in the actual issue of LOI.

1.6.3. **Performance Security**

1.6.3.1. Within fifteen (15) Days of the receipt of Letter of Intent from OREDA as per ITB Clause 1.6.2, the Successful Bidder shall furnish the Performance Security as per LOI Form 2 under Section 7 (Annexure).

1.6.3.2. The Performance Security shall be denominated in Indian Rupees only.

1.6.3.3. The Performance Security shall be submitted as per the details given in Section 2 (BDS). The Performance Security shall be submitted only in the form of a Bank Guarantee and the Bank Guarantee shall be issued in favour of Chief Executive Officer, OREDA payable at

Bhubaneswar, Odisha for an amount, expiry date and claim date as mentioned in Section 2 (BDS).

1.6.4. **Issue of Work Order**

1.6.4.1. OREDA shall nominate a committee which will evaluate each bid in terms of project viability, return on investment (ROI), project completion timeline, cost of Lease of selected project land and project cost as quoted by the bidder. Based on the above mention criteria, the committee shall select or reject the responsive bidders. OREDA shall have the right to select the Successful Bidder or call for price negotiations or annul the bidding process, at its own discretion.

1.6.4.2. Upon completion of all the formalities mentioned in the Letter of Intent within the stipulated timeline by the Bidder, OREDA shall issue the Work Order to the Successful Bidder within a maximum time period of fifteen (15) Days.

2. Bid Data Sheet (BDS)

Section 2 (BDS)shall supplement the Clauses mentioned in Section 1 (ITB). Whenever there is a conflict or interpretation issue, the provisions herein shall prevail over those in Section 2 (BDS). The Clause number of Section 2 (BDS) is the corresponding Clause number of Section 1 (ITB).

2.1. Specific provisions of ITB

<table>
<tr><th>BDS Clause reference</th><th>ITB Clause reference</th><th>Detailed Clause</th></tr>
<tr><td>2.1.1.</td><td>ITB Clause 1.1.1.5</td><td>Name of the Project:
Expression of Interest (EOI) Invited for EPC Contractors: Collaborate with Landowners/Farmers to Lease Land and Execute the PM Kusum A Project, Including Design, Engineering, Supply, Construction, Erection, Testing, Commissioning, power evacuation & operation, maintenance for 10 years of Solar PV Technology-Based Grid Interactive Power Plants.

EOI no.: [xxx]/OREDA/[xxx]/2025 dated 27.02.2025</td></tr>
<tr><td>2.1.2.</td><td>ITB Clause 1.2.2.2</td><td>The pre-bid meeting shall be conducted through an online pre-bid meeting.</td></tr>
<tr><td>2.1.3.</td><td>ITB Clause 1.3.3.2 and ITB Clause Error! R eference source not found.</td><td>
<table>
<tr><th>Bid Security (INR)</th><th>Cost of bid (INR)</th><th>Bid processing fee (INR)</th></tr>
<tr><td>2,00,000</td><td>10,500/-+ GST</td><td>1,000/- + GST</td></tr>
</table>

For the purpose of making Demand Draft or Bank Guarantee (BG) in favour of Chief Executive Officer, OREDA Ltd payable at Bhubaneswar; The following bank details may be considered:

Account No: 924020075365443

IFSC: UTIB0000024

Axis Bank Ltd, Satyanagar, Bhubaneswar

The Bid Processing Fee shall be made in favour of “KSEDC Limited” payable at “Bengaluru”.
In case of the Bid Security submitted is in the form of a Bank Guarantee/Fixed deposit receipt/Demand Draft, it shall issue in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar. The expiry date, and claim date are as follows:
• Expiry date: Four hundred and Twenty (420) Days from the original last date of submission of online Technical Bid
• Claim date: Three (3) Months from the date of expiry

Note:</td></tr>
</table>

BDS Clause reference	ITB Clause reference	Detailed Clause
		1. Bid Security Declaration shall be submitted by bidders as per Bid Form 2 and disciplinary action mentioned in Bid Security Declaration will be applicable in place of forfeiture of the Bid Security wherever applicable in this EOI. The Bid Processing Fee shall be made in favour of "KSEDC Limited payable at "Bengaluru". This can be submitted as per Bid Form 2.
2.1.4.	ITB Clause 1.3.6.1	**Bid validity period**: Four hundred and Twenty (420) Days from the last date of Bid submission.
2.1.5.	ITB Clause 1.4.1.1	**Procedure for submission of Bid**: • For participating in the Bid, it is mandatory to procure the Digital Signature Certificate (DSC) of class-III only. • The Bidders are advised to register their user id, password, and company id on the E-procurement Website by clicking on the hyperlink "Register Me" to fill in the online registration form. • The unregistered Bidders are required to pay a registration fee in favour of M/s. KSEDC Limited (Karnataka State Electronics Development Corporation Limited) payable at Bangalore on the E-procurement Website through e-payment mode only as per the instruction given therein. • As soon as the verification is done by the E-procurement Website, the user id will be enabled/ provided. • After viewing the EOI on the E-procurement Website, if the Bidder intends to submit its Bid, the Bidder shall use the user id and password that has been received after registration and use the DSC. The step-by-step instructions are given below: - Insert the Public Key Infrastructure (PKI), which consists of the DSC in the system. Ensure that the necessary software of PKI has been installed. - Click/ Double Click to open the Microsoft Internet Explorer - Go to Start > Programs > Internet Explorer. Type the E-procurement Website address "www.tenderwizard.com/OREDA" in the address bar of Internet Explorer to access the Login Screen. - Enter user id and password, click on "Go". - Click on "Click here to login" to select the DSC and enter the DSC Password. Re-enter the user id and password. - Click "Un Applied" to view/ apply for a new EOI. - Click on the "Request" icon for online requests. After making the request, the Bidder shall pay the requisite Bid Processing Fee (as indicated in the EOI) through e-payment mode only available on the E-procurement Website. The Bidders can download the Bidding Document by following the below steps. ◦ Click on the "Show Form" icon. ◦ Bidding Document will appear on the screen. ◦ Click "Click here to download" to download the Bidding Document. • The Bidder shall submit the Bid as per the terms of the Bidding Document. • All the softcopies of the Bid shall be properly scanned and shall be legible and such softcopies shall be either uploaded in .pdf or.jpg or .jpeg format.

BDS Clause reference	ITB Clause reference	Detailed Clause
		• Prior to submission, verify whether all the required documents as a part of Technical Bid and Price Bid have been attached and uploaded against the particular Bidding Document or not. • The Price Bid shall be uploaded on the E-procurement Website only in Microsoft .xls or .xlsx format only. **By no other means, except online through E-procurement Website, the Price Bid shall be accepted for evaluation of the Bids.** • The hardcopies as required to be submitted shall be submitted OREDA's Office Address as per the timelines mentioned in EOI or any Corrigendum. • Please note down or take a print of the bid control number once it is displayed on the screen. • Bid opening events can be viewed online. • The Bids submitted by one Bidder can be viewed by other Bidders.
2.1.6.	ITB Clause	The selection of bidder will include: Any Bidder registered pan India who meets the Qualification Requirement as per Section 4 (QR) can participate in bidding process. Bidder with lowest Project Contract Price (L) will be considered the Successful Bidder.
2.1.7.	ITB Clause	OREDA shall appoint a dedicated committee to evaluate each bid based on key parameters, including project viability, return on investment (ROI), project completion timeline, lease cost of the selected project land, and the total project cost as quoted by the bidder. The committee will assess all bids to determine their responsiveness and feasibility. Based on this evaluation, OREDA reserves the right to select or reject bidders, initiate price negotiations, or annul the bidding process at its sole discretion. **Allocation of Work to Successful Bidders** • The proposed land details shall undergo verification and scrutiny. • Upon finalization of the land, the EPC contractor will engage in negotiations regarding the quoted price as per the Price Bid. • Once the price is justified and agreed upon among committee members, the successful bidders shall be issued the LOI. **Note:** • OREDA reserves the right to negotiate with the any responsive bidder to finalize the total price for the bid. • The Bank Guarantee (BG) shall remain valid for up to 10 years and may be renewed as per the applicable terms and conditions.
2.1.8.	ITB Clause	**Performance Security after allocation of EPC project to the bidder**: Performance Bank Guarantee = 10% of the Work order Value in the form of BG at the time of Acceptance of LOI The Bank Guarantee (BG) shall be renewed as per the applicable terms and conditions and will remain valid for up to 10 years. **Note: No waiver or concession of any kind will be granted for the submission of the Performance Bank Guarantee (PBG).**

3. Scope of Work (SOW)

Section 3 (SOW) contains about the Project, roles, and responsibilities of the individual Parties, Equipment requirements, Technical Specifications, Designs and Drawings, Supplementary Information, Spares, Project Timelines, etc. that describe the SOW under the EOI.

3.1. About the Project

3.1.1. **Introduction**

3.1.1.1. The scope of the proposal shall be expression of interest (EOI) invited for EPC Contractors: Collaborate with Landowners/Farmers to Lease Land and Execute the PM Kusum A Project, Including Design, Engineering, Supply, Construction, Erection, Testing, Commissioning, power evacuation & operation, maintenance for 10 years of Solar PV Technology-Based Grid Interactive Power Plants.

3.1.1.2. Educating Farmers and Landowners on the PM KUSUM-A initiative.

3.1.1.3. Identification & documentation of the Land owners / Farmers for lease agreement with OREDA.

3.1.1.4. The scope of the contractor shall be deemed to include all equipment, materials and services which although are not specifically mentioned in the bid documents and/or in contractor's proposal but are necessary for the satisfactory operation of the Solar PV system and its integration with evacuation.

3.1.1.5. Following will be the Scope of Work for different types of projects during contract.

Sr. No.	Type of Project	Description of Scope
1	Identification of farmers/ land owners for leasing lands for PM KUSUM-A & On-grid Ground Mount solar project system including transmission line and power evacuation.	Expression of Interest (EOI) invited for EPC Contractors: Collaborate with Landowners/Farmers to Lease Land and Execute the PM Kusum A Project, Including Design, Engineering, Supply, Construction, Erection, Testing, Commissioning, power evacuation & operation, maintenance for 10 years of Solar PV Technology-Based Grid Interactive Power Plants.

3.1.1.6. The program of execution of the supply, installation and commissioning of Projects shall be carried out as per the work order and instruction of OREDA. However, upon issuance of work order, project shall be executed strictly as per the timelines mentioned in the SOW Clause 3.4 of the EOI.

3.2. Roles and Responsibilities

3.2.1. **Roles and Responsibilities of the Bidder**

3.2.1.1. Educating and Engaging Farmers and Landowners on the PM KUSUM-A initiative.

3.2.1.2. This involves raising awareness among farmers and landowners about the benefits and provisions of the PM KUSUM-A initiative.

3.2.1.3. The process includes identifying a new farmer/land owner and assist the eligible landowners/farmers to execute the land lease agreements (LLA) with OREDA and ensuring smooth collaboration for development of the grid interactive solar power plant project under PM-KUSUM A initiative.

3.2.1.4. **Design and Engineering**

a) The successful bidder shall design, procure/ manufacture (including associated purchases), Construct, install, commission and complete the Facilities, carry out the Operational Acceptance tests and Operation and Maintenance (O&M) of the entire plant for the prescribed period with due care and diligence in accordance with the Contract provisions.

b) The Contractor confirms that it has entered into this Contract on the basis of a proper examination of the data relating to the Facilities provided by the Employer and assessed by himself at the site location, and on the basis of information that the Contractor could have obtained from a visual inspection of the Site (if access thereto was available) and of other data readily available to it only after proper due diligence relating to the Facilities prior to bid submission. The Contractor acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility for properly estimating the difficulty or cost of successfully performing the Facilities.

c) The Successful Bidder shall complete the design and engineering of the Project as per the Technical Specification given in SOW Clause 3.3.1.2 using the Equipment as given in SOW Clause 3.2.1.5 and shall be developed as per the Applicable Law and the Prudent Utility Practices prevailing in Odisha.

d) The Successful Bidder shall ensure that the Web Monitoring facility is available with the project. The Successful Bidder shall share the remote communication protocol as well as the login credentials (username, password, etc.) to OREDA for each project.

e) The Successful bidder shall be responsible for commissioning of the project site on-behalf of the beneficiary. The bay extension, transmission line, ROW clearances & power termination required for successful power evacuation of the generated electricity from the commissioned solar power plant shall be done by the bidder on-behalf of the beneficiary.

f) The Successful Bidder shall design for an adequate protection system as per the requirement of the site by taking lightning, wind speed, rainy season, other climatic conditions, sudden surges in voltage and current, etc.

g) The indicative drawing and design of a module mounting structure that can withstand a wind speed up to 200 km per hour shall be provided by the bidder. However, depending on the actual site conditions, the Successful Bidder may propose for a change in the design of module mounting structures with due certification from a chartered engineer with regards to quality, durability and wind resistance capability for the abovementioned speed and install the same only after getting due approval from the Authorized Representative of OREDA.

h) The Successful Bidder shall mandatorily visit the site and submit single line diagrams indicating all wiring details, connectivity details, etc. as per the Applicable Law and Prudent Utility Practices, prior to the procurement of Equipment and commencement of construction works at the site.

i) The Successful Bidder shall submit the final civil, mechanical and electrical design & diagram, etc. to OREDA and obtain the approval from OREDA prior to the commencement of installation works.

3.2.1.5. **Supply of Equipment**

a) The Successful Bidder shall supply all the Equipment as per the Technical Specification given in SOW Clause 3.3.1.1.

b) The Successful Bidder shall be responsible for the supply of all Equipment required for setting up respective power plant.

c) The Successful Bidder shall be responsible for procuring, packing, forwarding, loading, unloading, safekeeping, and handling of all Equipment including insurance coverage all the time until Acceptance of the Project pursuant to SOW Clause 3.2.1.8.

d) The Successful Bidder shall be responsible to maintain the spares all the time until the expiry of the CMC Period. In no case, OREDA shall provide any spares until the expiry of CMC Period of the Plant and the Successful Bidder shall be responsible solely for the replacement of the spares for the reasons attributable to the Successful Bidder.

3.2.1.6. **Installation**

a) The Successful Bidder shall be responsible for carrying out the installation of all Equipment as per the design, SLDs, etc. approved by OREDA pursuant to SOW Clause 3.1.1.1

b) The Successful Bidder shall be responsible for installation of the Solar Power plant, BOS, solar PV array and required material as per the technical specifications and standards provided in the tender and testing the same in the presence of Authorized Officer.

c) The Successful Bidder shall install display boards mentioning the name of the Department, Project capacity, date of Commissioning, date of Acceptance, contact details of OREDA, CRC, and Successful Bidder at prominent places near to the project sites

d) The Successful Bidder shall install danger boards, safety boards, etc. at suitable locations as per the Applicable Law and Prudent Utility Practices.

e) The installation process shall be documented step-by-step as per the instructions given in the Mobile Application (currently "ReSolve" application) developed by OREDA through its Customer Relationship Centre (CRC). The Successful Bidder shall mandatorily install the Mobile Application from the CRC team (currently "ReSolve" application) and get itself trained if required. The instructions are given in SOW Clause 3.3.1.4.

f) Installation of plant end switchyard along with associated protection devices.

g) The lightning protection system includes lightning terminal, Down conductor, test ink, earth electrode, installation of lightning terminal, down conductor and earth electrode in suitable pit size, construction of earth pit with cover for the installation, connection of earth electrode with lightning terminal.

3.2.1.7. **Testing and Commissioning**

a) Contractor has completed the supply installation, testing & commissioning of all the components of the Plant & Equipment along with its associated infrastructure & facilities in all respect, successfully completed all outstanding works and completion of all facilities in accordance with scope of works as specified in Technical Specifications as per satisfaction of Engineer-in-Charge and has submitted all technical documentation and acceptance of the same by Engineer-in- Charge.
b) The Employer/EIC has to issued Operational Acceptance Certificate for the entire capacity of the project.
c) After completion of installation works, the Successful Bidder shall complete the testing and Commissioning in the presence of the Assistant Director of OREDA as well as the designated representative of the beneficiary. The committee comprising of the above persons shall be termed as the Commissioning Committee.
d) The Successful Bidder shall take consultation from the Commissioning Committee on finalizing a date and time of testing and Commissioning.
e) Upon completion of testing and Commissioning, the Commissioning Committee shall issue the Joint Commissioning Certificate to the Successful Bidder as per the format given in SOW Clause 3.3.1.3.
f) Obtaining all clearances, permits, licenses including arrangement of land and connectivity to the Grid and access (if applicable) prior to scheduled date of commencement of supply of power shall be the responsibility of the Generator and the Procurer shall not be responsible in case of delay in obtaining such clearances, permits, licenses etc.
g) The testing and Commissioning process shall be documented step-by-step as per the instructions given in the Mobile App developed by OREDA through CRC ((currently "ReSolve" application).
h) The format for the Commissioning Report is given in SOW Clause **Error! Reference source not found.**.
i) The Contractor has paid the Liquidated Damages as per the Clause No. 5.5.1 (if applicable)

3.2.1.8. **Acceptance**

a) Work Completion Certificate will be issued by Employer /EIC on occurrence of Final Acceptance.
b) The Commissioning Report followed during Commissioning as given in SOW Clause; shall be performed again before issuance of the Acceptance Certificate as per format given in SOW Clause 3.3.1.3.

c) Upon Acceptance of the Project, the Comprehensive Maintenance of the Project shall begin as per SOW Clause 3.3.1.3.

3.2.1.9. **Rejection Of Defective Plant**

a) If, during the progress of works, the Engineer-in-Charge shall decide and inform in writing to the Contractor that the Contractor has assembled any plant or part of the plant unsound or imperfect or has furnished any plant inferior to the quality specified, the Contractor, on receiving details of such defects or deficiencies shall, at his own expense, within 7 (Seven) days of receiving notice or otherwise, and for a period of time as may be decided by the Engineer-in- Charge for making it good, proceed to alter, reconstruct or remove such work and furnish fresh equipment up to the standard of specifications. In case the Contractor fails to do so, the Engineer-in-charge may, on giving the Contractor minimum 7 (Seven) days' notice in writing of his intentions to do so, proceed to remove the portion of the work so complained of and at the risk and cost of the Contractor, perform all such work or furnish all such equipment, provided that nothing in this Clause shall be deemed to deprive the Employer of or affect any rights under the Contract which the Employer may otherwise have in respect of such defects and deficiencies.

b) In case of such replacement / rectification by the Employer, the Contractor shall be liable to pay to the Employer the extra cost, if any, for such replacement/by delivery and/or erected, as provided for in the original Contract, such extra cost being the ascertained difference between the price by the Employer under the provision above mentioned, for such replacement and the Contract price for the plant so replaced. If the Employer/EIC does not so replace the rejected plant, the Contractor shall be liable only to repay to the Employer/EIC all money paid by the Employer to him in respect of such plant.

c) In the event of such rejection, the Employer shall be entitled to the use of the plant in responsible and proper manner till a time reasonably sufficient to enable him to obtain other replacement plant.

3.2.1.10. **Comprehensive Maintenance**

a) The Successful Bidder shall be required to undertake Scheduled Maintenance, Corrective Maintenance, and Breakdown Maintenance during the CMC Period.
b) The Successful Bidder shall adhere to all maintenance procedures as required from time to time, without any protest or hesitation.
c) The Successful Bidder shall undertake the Scheduled Maintenance as per the standard maintenance protocol given in SOW Clause 3.3.1.6. The Scheduled Maintenance process shall be documented step-by-step as per the instructions given in the Mobile App developed by OREDA through CRC ((currently "ReSolve" application).
d) The Successful Bidder shall also undertake Corrective Maintenance and Breakdown Maintenance as and when required upon receipt of service request from CRC or OREDA or Department raised through the Mobile App ((currently "ReSolve" application) or any other medium as suggested by OREDA or Department from time to time. Such service request shall be resolved and made functional within a maximum period of seven (7) Days from the date of such service request raised through Mobile App (currently "ReSolve" application), failing which might restrict the Successful Bidder in participating in the future opportunities of OREDA, subject to the final decision at the discretion of OREDA only.
e) The performance bank guarantee (PBG) will be forfeited for the year if the vendor fails to meet the criteria as specified in CMC Performance Report 7.5.8.
f) In case failure in CMC Performance for any two years within the CMC period of 10 years, OREDA may debar/ blacklist the bidder for at least one year to participate directly/ indirectly in future tenders by OREDA.
g) The Successful Bidder is required to train and guide the beneficiary for day-to-day Comprehensive Maintenance and upkeep of the Project.
h) The Successful Bidder shall maintain the safety stock of spares required to Repair and Maintain Project all the time until the expiry of the Work Order and during CMC period.
i) The Successful Bidder shall establish a local office in Odisha, so as to deliver uninterrupted and sustainable Comprehensive Maintenance during the CMC Period duly headed by a Service Engineer.

j) While submitting the CMC performance report (Appendix 8) every year for clearance of CMC bill by vendors, the vendor should submit the supporting reports generated from CRC portal duly signed by concerned Assistant Director/ authority from OREDA.
k) The before and after photograph should be uploaded on CRC portal for every ticket closures.
l) At the end of each completed CMC year, the CMC charges should be claimed within 60 days of the last date of 1st / 2nd / ……. / 9th/ 10thyear of the CMC period, failing which, it will be lapsed and the amount shall not be carried forward to the next year.
m) There would be performance evaluation of every vendor based on asset maintenance during CMC period and it will be an important parameter / clause in the future EOI/EOI/tender to be floated by OREDA.

3.2.2. **Insurance**

a) The Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified below. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, who should not unreasonably withhold such approval.

i. Cargo/Marine All Risk Insurance: Covering loss or damage occurring, while in transit from the Contractor's or Subcontractor's works or stores until arrival at the site including unloading, to the Plant and Equipment (including spare parts thereof) and to the Contractor's Equipment. This policy shall cover 'ALL RISKS' under and /or on deck as per Institute Cargo Clause 'A'.

ii. Erection All Risks Insurance

Covering any physical loss or damage to the equipment during handling, transportation, storage, erection of the Facilities at the Site, occurring prior to completion of the Facilities, with extended maintenance coverage for the Contractor's liability in respect of any loss or damage occurring during the Defects Liability Period while the Contractor is on the Site for the purpose of performing its obligations during the Defect Liability Period.

iii. Third Party Insurance

Before receipt of equipment at site but without limiting his obligations and responsibilities under this clause hereof, the Contractor shall insure against his liability for any equipment, material, property (including the Employer's property and any parts of the facilities that have been accepted by the Employer),or physical damage covering bodily injury or death suffered by third parties (including the Employer's personnel) by or arising out of the execution of the contract or in the carrying out of contract.

iv. Workmen's Compensation Insurance

The contractor shall protect himself against all claims applicable under the Workmen's Compensation Act, 1923. This policy shall also cover the contractor against claims for injury, disability, disease or death of his or his sub-contractor's employees, which for any reason are not covered under the Workmen's Compensation Act, 1923. The liabilities under Workmen's Compensation Insurance shall be as per statutory provisions.

Employer shall not be liable for or in respect of any damage or compensation payable in law in respect or in consequence of any accident or injury to any workman or other person in the employment of the contractor(s) or any sub-contractor(s), save and except an accident or injury resulting from any act or default of the Employer.

b) The Contractor has to submit the Insurance Policy covering CMC period for risks of Theft, Burglary & Non-Warranty parts coverage for the period of Ten years to OREDA immediately.

c) The insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of members of public or damage to property of others, due to any act or omission on the part of the Contractor, his agents, his employees, his representatives and Sub Contractors or from riots, strikes and civil commotion.
d) A copy of the policy should be handed over to OREDA after commissioning of the project, failing which, the payment towards installation and commissioning will not be released.

Note: The contractor is obliged to take all the O&M Insurances mentioned above for the project immediately after the commissioning of the plant.

3.2.3. **Plant Performance Evaluation**

a) Operational Acceptance shall occur in respect of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts) when the Performance Guarantee Test, as specified and in accordance with the procedure(s) specified in clause 7.5.1: Technical Specifications, have been successfully completed.

Month	**Solar Insolation (kWhr/m^2)**	Target Generation (MWh) **Fixed/Seasonal tilt** Quoted by Bidder	Month wise Generation (MWh) fromFixed/Seasonal tilt
		A	B=A X …..
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
Total			

b) At any time after successful completion of Guarantee Test(s) for Operational Acceptance, the Contractor shall give a notice of seven (07) days to the Employer requesting the issue of Operational Acceptance Certificate in respect of the Facilities or the part thereof specified in such notice. The Employer shall issue an Operational Acceptance Certificate upon the receipt of such notice provided Commissioning Certificate has been issued by the State Nodal Agency or Implementing Agency and COD of the entire plant or part thereof has been declared.

c) In case of any shortfall in the Performance Guarantee, the contractor shall make all necessary corrections in minimum possible time and shall repeat the Plant Performance Guarantee Test (PG Test) and any other Guarantee Tests as specified in the specifications in accordance with the procedure specified in the specifications within thirty (30) days of unsuccessful PG attempt, so as to demonstrate the PG as specified in Technical Specification.

Note: The bidder is required to pay a penalty @Rs 4.40 per kWh for any generation shortfall as per the declaration by the bidder for the minimum power generation guarantee; in the form of a Demand Draft (DD) in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar to release the annual O&M Payment.

3.2.4. **Roles and Responsibilities of OREDA**

3.2.4.1. OREDA shall provide all information and/or data to be supplied by the Employer as described in the Scope of Works and Supply by the Employer to the Contractor, except when otherwise expressly stated in the Contract.

3.2.4.2. OREDA shall negotiate the lease amount per year or per month with the selected farmer/land owner and execute the land lease agreement (LLA) with the interested farmer/land owner.

3.2.4.3. OREDA shall handover the land to the contractor as per timelines stipulated in bid document.

3.2.4.4. OREDA shall pay fees for all permits, approvals and/or licenses from all local, state or national government authorities or public service authorities in the country where the Site is located for the plant establishment, which such authorities or undertakings require the Employer to obtain them in the Employer's name, are necessary for the execution of the Contract as specified in the Scope of the Bid Document.

3.2.4.5. OREDA shall be responsible for providing its approval on the final Designs and Drawings consisting of the detailed designs, single line diagram, etc. after the obtaining such document from the Successful Bidder pursuant to SOW Clause 3.2.1.1i).

3.2.4.6. All tests and inspections shall be made at the Project site. The Authorized Representative of OREDA shall be entitled at all reasonable times to inspect, supervise and test during the implementation of the Project. Such inspection will not relieve the Successful Bidder of their obligation in the Work Order. OREDA shall have the right to have the tests carried out at its own cost by an independent agency at any point in time.

3.3. Technical details of Project

3.3.1. **Technical details of project**

3.3.1.1. **Technical Specifications**: The Technical Specification of all Equipment are provided in Annexure 7.4.6.

3.3.1.2. **Designs and Drawings**: The Designs and Drawings of the Project to be developed by contractor to achieve the required minimum generation ("G").

3.1.1. **Spares**: The list of mandatory spares envisaged by the Employer has been mentioned in Appendix 7.5.1 (Spares). All spares for the equipment under the Contract will strictly conform to the specification and will be identical to the corresponding main equipment/components supplied under the Contract and shall be interchangeable

3.3.1.3. **Joint Commissioning Certificate**: The format of the Joint Commissioning Certificate shall be provided along with the Work order.

3.3.1.4. **Acceptance Certificate**: The format of the Acceptance shall be provided along with the Work order.

3.3.1.5. **CRC guidelines**: The CRC guidelines are provided in Appendix 2.

3.3.1.6. **Scheduled Maintenance**: The detailed procedure and checklist for performing Scheduled Maintenance are provided in Annexure 7.

3.3.1.7. **Test Certificates**: The required test certificates are provided in Annexure 7.

3.3.1.8. **Insurance Document:** The requires Insurance documents to be provided by the selected bidder.

3.4. Project Timelines

3.4.1. **The following are the Project Timelines for developing the Project:**

Activities	**Project Timelines**
Timeline for Work Order of the bidders	
Signing of LLA & Issue of Letter of Intent by OREDA	T0 (start date)
Acceptance of Letter of Intent for Work Order by Qualified Bidder(s) along with supporting documents as asked in the LOI	T1= T0 + seven (7) days
Issue Work Order order	T2 = T1 + fifteen (15) days

Activities	Project Timelines
Furnishing of site details by OREDA for taking up of various testing and design activities and Notice to Proceed by OREDA for identified Land segment	T3 = T2 + Thirty (30) days
Submission of Detailed Design Document for the Project by the Contractor for which NTP has been issued	T4= T3 + Thirty (30) days
Handing over of complete site by OREDA for site mobilization by the contractor	T5= T4 + Thirty (30) days
Commencement of Site development Work	T6= T5 + Five (5) days
Commencement of Civil Work	T7= T6 + Five (5) days
Detailed engineering and approvals	T8= T7+ Ten (10) days
Completion of supply of major balance of Items (MMS, Power Conditioning UEOIs, Transformers, cables etc.)	T9= T8+ Forty (40) days
Completion of Civil Work & Erection of MMS as per agreed schedule	T10= T9+ Thirty (30) days
Completion of Civil Work for Inverter Room, Control room, Switchyard & general civil work as per agreed schedule	T11= T10+ Twenty (20) days
Completion of supply of Solar PV Modules as per agreed schedule.	T12= T11+ Twenty (20) days
Completion of Erection & Interconnection of Modules as per agreed schedule	T13= T12+ Forty (40) days
Installation and interconnection of all DC & AC circuit	T14= T13+ Twenty (20) days
Interconnection of entire Plant & Testing	T15= T14+ Twenty (20) days
Commissioning of Entire Plant in line with The procedure elaborated in Standard PPA document	T16= T15+ Fifteen (15) days
Operational Acceptance Test	T17= T16+ Ten (10) days
Final Acceptance	T18= T17+ Ten (10) days
CMC start date	T19 = T18 + one (1) day
CMC end date	T20 = T19 + Ten (10) years

T0: start date

Note: The detailed milestone wise project activity timeline shall be submitted by the selected successful bidder along with the Acceptance copy of the LOI for approval at OREDA.

4. Qualification Requirement (QR)

Section 4 (QR) contains all the Qualification Requirements that OREDA shall use to evaluate the Technical Bids and qualify Bidders for during the evaluation of Technical Bids.

The Bidder shall fulfill the below Qualification Requirement in order to submit the Bid. Any discrepancy or deviation from the stated Qualification Requirement shall make the Bidder ineligible to submit the Bid and such Bid shall be liable for rejection.

4.1. General Qualification Requirement

Clause no.	Qualification Requirement	Support document
4.1.1.	The Bidder should meet the qualifying requirements stipulated hereunder in the last seven (07) years prior to the date of EOI. The Bidder must be a 4.1.1.1. company registered under The Indian Companies Act, 1956/ 2013; or 4.1.1.2. partnership firm registered under The Indian Partnership Act, 1932; or 4.1.1.3. sole proprietorship firm under the relevant laws in India. 4.1.1.4. Bidder should have a valid electrical license for performing Electrical work along with the valid license of Supervisor and Lineman. 4.1.1.5. If the bidder does not hold the license within their own company/firm, they may declare an electrical license partner along with a copy of the partner's electrical license.	The Bidder must submit a copy of the relevant documents issued by an appropriate Government authority in India. Electrical Contractor's License issued by Electrical Licensing Board/Authority of any Indian State/UT, in accordance with IE Rule-45
4.1.2.	The Bidder must not be debarred/ blacklisted/ defaulted by any Government, agency, Public Sector Undertaking (PSU), institution/ autonomous organizations in the past.	The Bidder shall submit a self-certification by an authorized person duly notarized to this effect. The Bidder must submit Bid Form 7.

4.2. Specific Qualification Requirement

Clause no.	Qualification Requirement	Support document
4.2.1.	OEMs for solar PV panels, inverters, and structures.	The Bidder must use the OEM after the following: - Prior approval from OREDA. - Submission of the latest datasheets and test reports from MNRE-approved labs. The Bidder must submit Bid Form 6 of Section 7 (Annexure), as a part of declaration only.

Clause no.	Qualification Requirement	Support document
		Note: The proof of all documents showcasing the possession of such copies of the Test Certificates by the Bidder shall be submitted as per the instructions given under the Letter of Intent and not at the time of Bid submission.
4.2.2.	The Bidder must possess established high standards for 'quality' and 'environment health and safety' in line with ISO 9001 and ISO 14001 certifications respectively for but not limited to Solar PV modules, Inverters used in Projects	The Bidder shall declare that it has a copy of ISO certificate for ISO 9001 and ISO 14001 certificates in the name of the Original Equipment Manufacturer (OEM), supported by a letter of authorization from the OEM for its implementation. The Bidder must submit Bid Form 16 of Section 7 (Annexure). **Note**: The documentary evidences shall be submitted as a part of response to the Letter of Intent and prior to issuance of the Work Order, and not at the time of bidding.

4.3. Technical Qualification Requirement

Clause no.	Qualification Requirement	Support document
4.3.1. 4.3.2.	The Bidder should have designed, supplied, constructed, erected and commissioned the Solar Photo Voltaic (SPV) based grid connected power plant(s) of cumulative installed capacity of **5 MWp** or higher capacity out of which at least one solar power plant must be of **1 MWp or higher capacity.** The reference plant of 1 MWp or higher capacity must be in successful operation for at least three (3) months prior to the date of EOI. **OR** The Bidder should be an Indian company registered in India and should be Group company/Holding Company/Subsidiary company of a firm meeting the requirement (s) of clause 4.3.1 above.	The Bidder must submit Bid Form 4 of Section 7 (Annexure). a) The reference SPV based grid-connected power plant of 1 MWp or above capacity should be at a single location developed by Bidder for itself or any other client. b) SPV based Roof-top/Floating solar power projects, which are grid connected, shall also be considered eligible for QR purposes. c) For clause 4.3.1, Bidder shall submit LOA, certificate of successful completion and operation from the Owner. d) Direct/Indirect Order The Bidder shall also be considered qualified, in case the award for executing the reference work has been received by the Bidder either directly from the owner of the plant or any other intermediary organization. In such a case, a certificate from such owner of plant or any other intermediary organization shall be required to be furnished by the Bidder along with its Techno-Commercial bid in support of Bidder's claim of meeting the qualification requirement as per clause e) The Clause 4.3.1, refers to works for EPC related to minimum four of the following: i. Supply of Solar Modules (Compulsory for EPC Works) ii. Erection of modules iii. Civil works including Module mounting structures/floaters, trench, foundation of Inverters/Transformers/LT/HT Panels, Control Room. iv. Supply & Erection of Inverters (Power Conditioning UEOIs) and Inverter Transformers v. Cables and Cabling Works vi. Installation of plant end switchyard along with associated protection devices

4.4. Financial Qualification Requirement

Clause no.	Qualification Requirement	Support document
4.4.1. 4.4.2. 4.4.3. 4.4.4. 4.4.5.	Cumulative Turnover of the **Bidder for last three (3) financial years shall be at least 30 Cr.** The bidder should have **achieved a single work order of at least INR 5 Cr value.** The Net Worth of the Bidder during the last Financial Year shall be positive, wherein the Net Worth shall be calculated as follows: Net Worth = (Equity + Reserves) – (Revaluation reserves+ intangible assets + miscellaneous expenses to the extent not written off + carried forward losses). The Bidder shall provide a copy each of audited annual report to ascertain their turnover & net-worth. The Bidder shall submit audited annual report of FYs 2021-22, 2022-23, 2023-24 (if not audited then certification from Chartered Accountant shall be required). In case a Bidder is a subsidiary company {a subsidiary company, as defined in clause (87) of section 2 of the Companies Act, 2013 (18 of 2013)} & does not satisfy the annual turnover criteria, stipulated above on its own, its Holding Company would be required to meet the stipulated turnover requirements as above, provided that the Net Worth of such Holding Company as on the last day of the preceding financial year is at least equal to or more than the paid-up share capital of the subsidiary Company. In such an event, the Bidder would be required to furnish along with its Techno- Commercial Bid, a Letter of Undertaking from the Holding Company, supported by the Holding Company's Board Resolution, as per the format enclosed in the bid documents& pledging unconditional and irrevocable financial support for the execution of the Contract by the Bidder in case of award. Over and above bidder shall submit unconditional Bank Guarantee equivalent but not less than 5% of EPC price from holding company which shall be furnished within ten (10) days after Notification of Award.	The Bidder shall submit a turnover certificate issued by a chartered accountant, as per Bid Form 5 of Section 7 (Annexure). It is important to note that the annual turnover for each financial year shall be the income/ earning/ revenue from the solar business only; and other income (if any) shall not be considered for evaluation.

5. General Conditions of Contract (GCC)

Section 5 (GCC) contains all general terms and conditions to be applied to the Work Order along with other associated documents mentioned therein. Section 5 (GCC) shall be read in conjunction with Section 6 (SCC) and other documents listed therein, should be a complete document expressing all terms and conditions of the Work Order.

5.1. General

5.1.1. **Work Order**

5.1.1.1. All documents forming part of the Work Order including any Amendment to the Work Order as per GCC Clause 5.1.2, and all parts thereof, are intended to be correlative, complementary, and mutually explanatory.

5.1.1.2. The Work Order constitutes all the terms and conditions for the Successful Bidder with respect to the Commissioning, and Acceptance of the Project along with its CMC Period. The CMC shall be executed between OREDA and the Successful Bidder.

5.1.1.3. The Work Order including any Amendment supersedes all communications, negotiations, and agreements (whether written or oral) made prior to the date of issuance of Work Order in case of any confusion with the Bidding Document at any point in time.

5.1.2. **Amendment**

5.1.2.1. No Amendment to the Work Order shall be made effective unless it is in writing, is dated, expressly refers to the Work Order, and is signed duly and issued by OREDA based on any amended terms mutually agreed between OREDA and the Successful Bidder or as it is required in the interest of the Project.

5.1.3. **Independent Successful Bidder**

5.1.3.1. The Successful Bidder shall be completely independent in performing all its obligations under the Work Order. The Work Order does not create any agency, partnership, joint venture, or other joint relationship with OREDA. Subject to the provisions of the Work Order, the Successful Bidder shall be solely responsible for the manner in which all the obligations will be performed. All employees and representatives engaged by the Successful Bidder in connection with the performance of the Work Order shall be under the complete control of the Successful Bidder only and shall not be deemed to be employees of OREDA at any point in time, and nothing contained in the Work Order or in any subcontract awarded by the Successful Bidder to anyone shall be construed to create any contractual relationship between OREDA and any such employees, representatives, engaged by the Successful Bidder.

5.1.4. **Non-waiver**

5.1.4.1. Any waiver of Successful Bidder's rights, powers, or remedies under the Work Order must be in writing, must be dated and signed duly and issued by OREDA in granting such waiver, and must specify the right and the extent to which it is being waived.

5.1.5. **Severability**

5.1.5.1. If any provision or condition of the Work Order is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Work Order.

5.1.6. **Communications**

5.1.6.1. Wherever these conditions provide for issuing approvals, certificates, consents, determinations, notices, requests, and discharges, these communications shall be:

a) in writing along with a copy being sent to the other Party and delivered against its receipt; and
b) delivered, sent, or transmitted to the address of either Party, as stated in Work Order.

5.1.7. **Law**

5.1.7.1. The Work Order shall be governed by and interpreted in accordance with the laws of India.

5.1.8. **Language**

5.1.8.1. The ruling language of the Work Order shall be in English only.

5.1.9. **Integrity Violation**

5.1.9.1. The Successful Bidder shall observe the highest standard of ethics during the performance of the Work Order.

5.1.9.2. Applicable as per ITB Clause 1.1.2.2

5.2. Payment

5.2.1. **Total Price**

5.2.1.1. The Total Price shall be as specified in the Work Order.

5.2.1.2. Unless an escalation clause is provided in GCC Clause 5.2.2, the Total Price shall be a firm lump sum amount, non-escalating, and not subject to any alteration, except in the event of a Change Order for the Project issued by OREDA.

5.2.1.3. Subject to SOW Clause 3.2.1, the Successful Bidder shall be deemed to have satisfied itself as to the correctness and sufficiency of the Total Price, which shall, except as otherwise provided for in the Work Order, cover all its obligations under the Work Order.

5.2.2. **Terms of Payment**

5.2.2.1. The terms of payment outlining the procedures to be followed are mentioned in Section 6 (SCC).

5.2.2.2. No payment made by OREDA herein shall be deemed to constitute acceptance by OREDA of the Project or any part(s) thereof, until the issuance of Acceptance Certificate by OREDA in writing.

5.2.2.3. The payment against the undisputed invoice shall be made by OREDA based on the internal processes.

5.2.2.4. The currency in which payments are made to the Successful Bidder under this Work Order shall be in Indian Rupees only.

5.2.3. **Taxes**

5.2.3.1. The Tax on the Total Price shall be paid as per the prevailing rules in India at the time of invoicing.

5.2.3.2. The Tax Deduction at Source (TDS) shall be deducted as per the prevailing rules in India at the time of the payment.

5.2.4. **Performance Security**

5.2.4.1. The Successful Bidder shall submit the Performance Security as per ITB Clause**Error! Reference s ource not found.**.

5.2.5. **Incoterms**

5.2.5.1. Unless inconsistent with any provision of the Work Order, the meaning of any trade term and the rights and obligations of Parties thereunder shall be as prescribed by Incoterms.

5.3. Intellectual Property

5.3.1. **License/Use of Technical Information**

5.3.1.1. For the Commissioning until Acceptance of the Project and during the CMC Period, the Successful Bidder hereby grants a non-exclusive and non-transferable license (without the right to sub-license) to OREDA under the patents, utility models or other industrial property rights owned by the Successful Bidder or by a third party from whom the Successful Bidder has received the right to grant licenses thereunder, and shall also grant to OREDA a non-exclusive and non-transferable right (without the right to sub-license) to use the know-how and other technical information disclosed to OREDA under the Work Order. Nothing contained herein shall be construed as transferring ownership of any patent, utility model, trademark, design, copyright, know-how, or other intellectual property rights from the Successful Bidder or any third party to OREDA.

5.3.1.2. The copyright in all drawings, documents and other materials containing data and information furnished to OREDA by the Successful Bidder herein shall remain vested in the Successful Bidder or, if they are furnished to OREDA directly or through the Successful Bidder by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.

5.3.2. **Confidential Information**

5.3.2.1. The Parties shall keep confidential and shall not, without the written consent of the other Party, divulge to any third party any documents, data or other information furnished directly or indirectly by the other Party hereto, whether such information has been furnished prior to, during or following termination of the Work Order. Notwithstanding the above, a Party may furnish to its third parties such documents, data and other information it receives from the other Party to the extent required for the third parties to perform all the obligations under the Work Order, in which event the Party shall obtain from such third parties an undertaking of confidentiality similar to that imposed on the Party under this GCC Clause 5.3.2 and submit a copy of the same to the other Party with an immediate effect.

5.3.2.2. A Party shall not use such documents, data, and other information received from the other Party for any purpose other than for this Project and services as are required for the performance of the Work Order.

5.3.2.3. The obligation of a Party under GCC Clauses 5.3.2.1 and 5.3.2.2 above, however, shall not apply to that information which

a) now or hereafter enters the public domain through no fault of that Party;

can be proven to have been possessed by that Party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other Party hereto; and

otherwise lawfully becomes available to that Party from a third party that has no obligation of confidentiality.

5.3.2.4. The above provisions of this GCC Clause 5.3.2 shall not in any way modify any undertaking of confidentiality given by either of the Parties hereto prior to the date of the Work Order in respect of the Project or any part thereof.

5.3.2.5. The provisions of this GCC Clause 5.3.2 shall survive termination, for whatever reason, of the Work Order.

5.4. Execution of the Project

5.4.1. **Representatives**

5.4.1.1. Authorized Representative of OREDA

a) The name of the Authorized Representative of OREDA shall be generally mentioned in the Work Order. If the Authorized Representative of OREDA is not named in the Work Order, then within seven (7) Days of the Effective Date, OREDA shall appoint and notify the Successful Bidder in selecting an Authorized Representative of OREDA. OREDA may from time to time appoint some other person as the Authorized Representative of OREDA as deemed necessary in place of the person previously so appointed and shall give notice of the name of such other person as Authorized Representative of OREDA to the Successful Bidder as required. Such an appointment shall only take effect upon the date of issuance of such notice by OREDA. The Authorized Representative of OREDA shall represent and act for OREDA at all times during the performance of the Work Order. All notices, instructions, orders, certificates, approvals and all other communications under the Work Order shall be given by the Authorized Representative of OREDA, except as herein otherwise provided.

b) All notices, instructions, information, and other communications given by the Successful Bidder to OREDA under the Work Order shall be given to the Authorized Representative of OREDA, except as herein otherwise provided.

5.4.1.2. Project Manager, Construction Manager, and CMC Manager

a) The name of the Project Manager representing the Successful Bidder shall be generally mentioned in the Work Order. If the Successful Bidder's representative as Project Manager is not named in the Work Order, then within seven (7) Days of the Effective Date, the Successful Bidder shall appoint the Project Manager and shall request OREDA in writing to approve the Project Manager so appointed. If OREDA makes no objection to the appointment within seven (7) Days, the Project Manager shall be deemed to have been approved. If OREDA objects to the appointment within seven (7) Days, then the Successful Bidder shall appoint a replacement within seven (7) Days of such objection, and the foregoing provisions of this GCC Clause 5.4.1.2a) shall apply thereto.

b) The Project Manager shall represent and act for the Successful Bidder at all times during the performance of the Work Order and shall give to the Authorized Representative of OREDA all the Successful Bidder's notices, instructions, information, and all other communications under the Work Order.

c) All notices, instructions, information, and all other communications given by OREDA or the Authorized Representative of OREDA to the Successful Bidder under the Work Order shall be given to the Project Manager or, in its absence, its deputy, except as herein otherwise provided.
d) The Successful Bidder shall not revoke the appointment of the Project Manager without OREDA's prior written consent. If OREDA consents thereto, the Successful Bidder shall appoint some other person as the Project Manager, pursuant to the procedure set out in GCC Clause 5.4.1.2a).
e) The Project Manager may, subject to the written approval of OREDA, at any time delegate to any person any of the powers, functions and authorities vested in him or her. Any such delegation may be revoked at any time; however, any such delegation or revocation shall be subject to a prior notice signed by the Project Manager and shall specify the powers, functions and authorities thereby delegated or revoked. No such delegation or revocation shall take effect unless and until a copy thereof has been delivered to the Authorized Representative of OREDA.
f) Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with this GCC Clause 5.4.1.2e) shall be deemed to be an act or exercise by the Project Manager.
g) From the commencement of works of the Project at the site until installation, Commissioning and Acceptance, the Project Manager shall additionally appoint a suitable person as the Construction Manager. The Construction Manager shall supervise all work done at the site by the Successful Bidder and shall be present at the site as required during the performance of the Work Order in accordance with the terms of the Work Order. Whenever the Construction Manager is absent from the site, the Project Manager shall appoint a suitable person to act as the Construction Manager's deputy with prior notice of seven (7) Days before such a replacement and shall inform OREDA in writing prior to such changes.
h) From the commencement of the CMC Period until its expiry, the Project Manager shall appoint a suitable person as the CMC Manager. The CMC Manager shall supervise all work done at the site by the Successful Bidder and shall be present at the site as required during the performance of the Work Order in accordance with the terms of the Work Order. Whenever the CMC Manager is absent from the site, the Project Manager shall appoint a suitable person to act as the CMC Manager's deputy with prior notice of seven (7) Days before such a replacement and shall inform OREDA in writing prior to such changes.
i) OREDA may by notice to the Successful Bidder object to any representative or person employed by the Successful Bidder in the execution of the Work Order who, in the reasonable opinion of OREDA, may behave inappropriately, may be incompetent or negligent, or may commit a serious breach of the site regulations. OREDA shall provide writing of the same, whereupon the Successful Bidder shall remove such person from the Project with an immediate effect.
j) If any representative or person employed by the Successful Bidder is removed in accordance with GCC Clause 5.4.1.2i), the Successful Bidder shall, where required, promptly appoint a replacement; failure to which will lead to a material breach in the Work Order.

5.4.2. **Work program**

5.4.2.1. Successful Bidder's Organization

Within thirty (30) Days from the Effective Date, the Successful Bidder shall submit to OREDA an organization chart showing the proposed team to be established by the Successful Bidder for carrying out work on the Project within the Project Timelines for achieving Commissioning and Acceptance as mentioned in SOW Clause 3.4.The organization chart shall include the identities of the key personnel and the short curricula vitae of such key personnel to be employed. The Successful Bidder shall promptly inform the Authorized Representative of OREDA in writing of any revision or alteration of such an organization chart, as applicable.

5.4.2.2. Detailed Workplan

Within thirty (30) Days from the Effective Date, the Successful Bidder shall submit to the Authorized Representative of OREDA a Detailed Workplan, made in a form acceptable to the Authorized Representative of OREDA and showing the sequence in which it proposes to achieve the Commissioning and Acceptance in line with the Project Timelines.

The Successful Bidder shall update the actual achievement against the Detailed Workplan as and when appropriate or when required by the Authorized Representative of OREDA, but without modification in the Project Timelines and any extension granted in accordance with GCC Clause 5.7.2 and shall submit all such revisions to the Authorized Representative of OREDA.

5.4.2.3. Progress of Detailed Workplan

If at any time the Successful Bidder's actual progress falls behind the Detailed Workplan, or it becomes apparent that it will so fall behind, the Successful Bidder shall promptly prepare and submit to the Authorized Representative of OREDA a revised Detailed Workplan without changing any timelines with reference to the Project Timelines, taking into account the prevailing circumstances, and shall notify the Authorized Representative of OREDA of the steps being taken to expedite progress so as to achieve the Commissioning and Acceptance of the Project within the Project Timelines, any extension thereof entitled under GCC Clause 5.7.2, or any extended period as may otherwise be notified by OREDA.

5.5. Guarantees and Liabilities

5.5.1. **Delay Liquidated Damages**

5.5.1.1. The Successful Bidder guarantees that it shall achieve the Commissioning of the Project as per the Project Timelines or any extension thereof entitled under GCC Clause 5.7.2.

5.5.1.2. In case of failure on the part of the Successful Bidder to achieve the Commissioning timelines pursuant to GCC Clause 5.5.1.1, the Successful Bidder shall pay to OREDA a Delay Liquidated Damage for a sum equivalent to half percent (0.5%) of the Total Price for each week of the delay from the target date of Commissioning, to be calculated on pro-rata basis for each Day of delay, subject to a maximum of three percent (3%) of the Total Price.

5.5.1.3. Once the maximum limit of three (3%) is reached, OREDA may consider terminating the Work Order without prejudice to the other remedies of the Work Order. However, the OREDA may at own discretion allow reasonable time extension upon the written application of the Successful Bidder. If the delay is considered intentional or due to the negligence of the Successful Bidder, no extension can be allowed with the imposition of Delay Liquidated Damages. If the delay is considered to be genuine, then a suitable time extension can be allowed with/ without the imposition of the delay Liquidated Damages, to be evaluated on a case-to-case basis.

5.5.1.4. The payment of liquidated damages shall not in any way relieve the Successful Bidder from any of its obligations to complete the Project or from any other obligations and liabilities of the Successful Bidder under the Work Order.

5.5.1.5. The Delay Liquidated Damages shall be inclusive of all applicable taxes as applicable under the laws of India and such applicable taxes shall be borne by the Successful Bidder only.

5.5.1.6. The Successful Bidder acknowledges that the Delay Liquidated Damages payable by the Successful Bidder under this Work Order are a genuine pre-estimate of the losses suffered by OREDA and the compensation as contemplated is reasonable and not by way of any penalty.

5.5.2. **Warranty**

5.5.2.1. The details of the provisions related to the Warranty of the Equipment under the Project are mentioned in Section 6 (SCC).

5.5.3. **Defect Liability**

5.5.3.1. The Successful Bidder warrants that the Projector any part thereof shall be free from defects in the design, engineering, materials and workmanship of the Project supplied and of the work executed.

5.5.3.2. The Defect Liability Period shall be Ten (10) Years from the date of Commissioning of the Project.

5.5.3.3. If during the Defect Liability Period any defect should be found in the design, engineering, materials and workmanship of the Project supplied or of the work executed by the Successful Bidder, the Successful Bidder shall promptly, in consultation and agreement with OREDA regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good such defect as well as any damage to the Project caused by such defect.

5.5.3.4. OREDA shall give the Successful Bidder a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. OREDA shall afford all reasonable opportunities for the Successful Bidder to inspect any such defect.

5.5.3.5. The Successful Bidder may, with the consent of OREDA, remove from the site any Projector any part of the Project that are defective if the nature of the defect, and/or any damage to the Project caused by the defect, is such that repairs cannot be expeditiously carried out at the site.

5.5.3.6. If the repair, replacement or making good is of such a character that it may affect the efficiency of the Projector any part thereof, OREDA may give to the Successful Bidder a notice requiring that tests of the defective part of the Project shall be made by the Successful Bidder immediately upon completion of such remedial work, whereupon the Successful Bidder shall carry out such tests. If such part fails the tests, the Successful Bidder shall carry out further repair, replacement or making good, as the case may be, until that part of the Project passes such tests. The tests shall be agreed upon by OREDA and the Successful Bidder.

5.5.3.7. If the Successful Bidder fails to commence the work necessary to remedy such defect or any damage to the Project caused by such defect within a reasonable time (which shall in no event be considered to be less than seven (7) Days), OREDA may, following notice to the Successful Bidder, proceed to do such work through a third party, and the reasonable costs incurred by OREDA in connection therewith shall be paid to OREDA by the Successful Bidder or may be deducted by OREDA from any monies due to the Successful Bidder or claimed under the Performance Security.

5.5.3.8. The vendor shall maintain insurance throughout the entire CMC period and submit a CMC Performance Report to OREDA, ensuring a minimum CUF of 16%.

5.5.3.9. If CUF falls below 16%, On generation shortfall the bidder needs to submit a DD to OREDA of equivalent amount as clause 3.2.3.

5.5.3.10. If the Projector any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Projector such part, as the case may be, shall be extended by a period equal to the period during which the Projector such part cannot be used by OREDA because of any of the aforesaid reasons.

5.5.3.11. Except as provided in GCC Clauses 5.5.2 and GCC Clause 5.6.3, the Successful Bidder shall be under no liability whatsoever and howsoever arising, and whether under the Work Order or at law, in respect of defects in the Projector any part thereof, the design or engineering or work executed that appear after Acceptance of the Projector any part thereof, except where such defects are the result of the gross negligence, fraud, criminal or willful action of the Successful Bidder.

5.5.4. **Patent IndemEOIy**

5.5.4.1. The Successful Bidder shall, subject to OREDA's compliance with GCC Clause 5.5.4.2, indemnify and hold harmless OREDA and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which OREDA may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Work Order by reason of Commissioning and Acceptance of the Project.

Such indemEOIy shall not cover any use of the Projector any part thereof other than for the purpose indicated by or to be reasonably inferred from the Work Order, any infringement resulting from the use of the Projector any part thereof, or any products produced thereby in association or combination with any other equipment, plant or materials not supplied by the Successful Bidder, pursuant to the Work Order.

5.5.4.2. If any proceedings are brought or any claim is made against OREDA arising out of the matters referred to in GCC Clause 5.5.4.1, OREDA shall promptly give the Successful Bidder a notice thereof, and the Successful Bidder may at its own expense and in OREDA's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Successful Bidder fails to notify OREDA within seven (7) Days after receipt of such notice that it intends to conduct any such proceedings or claim, then OREDA shall be free to conduct the same on its own behalf. Unless the Successful Bidder has so failed to notify OREDA within the seven (7) Day period, OREDA shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

OREDA shall, at the Successful Bidder's request, afford all available assistance to the Successful Bidder in conducting such proceedings or claim, and shall be reimbursed by the Successful Bidder for all reasonable expenses incurred in so doing or may be deducted by OREDA from any monies due to the Successful Bidder or claimed under the Performance Security.

5.5.5. **Limitation of Liability**

5.5.5.1. Except in cases of criminal negligence or willful misconduct,

a) the Successful Bidder shall not be liable to OREDA, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Successful Bidder to pay the Delay Liquidated Damages to OREDA; and

b) the maximum liability of the Successful Bidder to OREDA, whether under the Work Order, in tort or otherwise, shall not exceed ten percent (10%) of the Total Price.

5.6. Risk Distribution

5.6.1. **Transfer of Ownership**

5.6.1.1. The ownership of the Project shall pass on to OREDA on fulfillment of the following:

a) Issuance of a certificate by the Successful Bidder stating that the Successful Bidder is free and clear from any and all claims, liens, security interest, encumbrances, unpaid vendors'/ suppliers' lien or otherwise, arising out of or in connection to the performance of the Work Order as per Annexure Clause 20.1; and

b) Issuance of Acceptance Certificate by OREDA.

5.6.2. **Risk**

5.6.2.1. Notwithstanding anything to the contrary in this Contract, the care, custody and the risk in relation to the entire Project shall pass on to OREDA on fulfillment of the following:

a) Issuance of Acceptance Certificate by OREDA; and

b) Issuance of release and waiver of lien-free certificate by the Successful Bidder.

5.6.3. **Loss of or Damage to Property; Accident or Injury to Workers; Indemnification**

5.6.3.1. The Successful Bidder shall indemnify and hold harmless OREDA and its employees, officers and advisors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss of or damage to any property other than the Project, arising in connection with the implementation of the Project and by reason of the negligence of the Successful Bidder.

5.6.3.2. If any proceedings are brought or any claim is made against OREDA that might subject the Successful Bidder to liability under GCC Clause 5.6.3.1, OREDA shall promptly give the Successful Bidder a notice thereof and the Successful Bidder may at its own expense and in OREDA's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

5.6.3.3. If the Successful Bidder fails to notify OREDA within seven (7) Days after receipt of such notice that it intends to conduct any such proceedings or claim, then OREDA shall be free to conduct the same on its own behalf. Unless the Successful Bidder has so failed to notify OREDA within the seven (7) Day period, OREDA shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

5.6.3.4. OREDA shall, at the Successful Bidder's request, afford all available assistance to the Successful Bidder in conducting such proceedings or claim, and shall be reimbursed by the Successful Bidder for all reasonable expenses incurred in so doing or may be deducted by OREDA from any monies due to the Successful Bidder or claimed under the Performance Security.

5.6.4. **Insurance**

5.6.4.1. The successful bidder shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect until the issuance of the Acceptance Certificate, all necessary insurances. The Bid price is to be inclusive of all insurances taken.

5.6.4.2. The Successful Bidder shall be responsible to maintain the spares all the time until the expiry of the CMC Period. In no case, OREDA shall provide any spares until the expiry of CMC Period of the Plant and the Successful Bidder shall be responsible solely for the replacement of the spares for the reasons attributable to the Successful Bidder.

5.6.5. **Change in Laws and Regulations**

5.6.5.1. If, after the last date of online Bid submission, 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 Successful Bidder and/or the time for achieving the Commissioning and Acceptance along with the Work Order price shall be correspondingly increased or decreased, and/or the Time for achieving Commissioning and Acceptance shall be reasonably adjusted to the extent that the Successful Bidder has thereby been affected in the performance of any of its obligations under the Work Order. 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.

5.6.6. **Force Majeure**

5.6.6.1. "Force Majeure" shall mean any event beyond the reasonable control of OREDA or of the Successful Bidder, as the case may be, and which is unavoidable notwithstanding the reasonable care of the Party affected, and shall include, without limitation, the following:

a)war, hostilities or warlike operations whether a state of war be declared or not, invasion, an act of foreign enemy and civil war;

b) rebellion, revolution, insurrection, mutiny, usurpation of a civil or military government, conspiracy, riot, civil commotion and terrorist acts;

c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler or any other act or failure to act of any local state or national government authority;

d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, pandemics, lockdowns, quarantine and plague;

e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves or other natural or physical disasters; and

f) shortage of labor, materials or utilities where caused by circumstances that are themselves Force Majeure.

5.6.6.2. If either party is prevented, hindered or delayed from or in performing any of its obligations under the Work Order by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within seven (7) Days after the occurrence of such event.

5.6.6.3. The Party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Work Order for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended in accordance with GCC Clause 5.7.2.

5.6.6.4. The Party or Parties affected by the event of Force Majeure shall use reasonable efforts to mitigate the effect thereof upon its or their performance of the Work Order and to fulfill its or their obligations under the Work Order, but without prejudice to either party's right to terminate the Work Order under GCC Clause 5.6.6.6.

5.6.6.5. No delay or nonperformance by either party hereto caused by the occurrence of any event of Force Majeure shall

a)constitute a default or breach of the Work Order, or

b) if and to the extent that such delay or nonperformance is caused by the occurrence of an event of Force Majeure.

5.6.6.6. If the performance of the Work Order is substantially prevented, hindered or delayed for a single period of more than sixty (60) Days or an aggregate period of more than one hundred and twenty (120) Days on account of one or more events of Force Majeure during the currency of the Work Order, the Parties will attempt to develop a mutually satisfactory solution, failing which either party may terminate the Work Order by giving notice to the other, but without prejudice to either party's right to terminate the Work Order.

5.6.6.7. In the event of termination pursuant to GCC Clause 5.6.6.6, the rights and obligations of OREDA and the Successful Bidder shall be as specified in GCC Clause 5.7.4.

5.7. Change in Work Order Elements

5.7.1. **Change Order**

5.7.1.1. A Change Order shall be issued only by OREDA. Any change made necessary because of a default by the Successful Bidder in the performance of its obligations shall not be considered a Change Order.

5.7.1.2. Change Orders may be facilitated by OREDA at any time by the issuance of a Change Order notice to the Successful Bidder. The Successful Bidder shall not make any alteration and/ or modification of the Project unless the OREDA instructs or approves a Change Order in writing.

5.7.1.3. If the Owner issues a Change Order notice, the increase could in the range of (one hundred percent) 100% of the total bidding quantum and there shall be no change in the prices as quoted by the Bidder in its Price Bid. There shall be no change in Project Timelines.

5.7.2. **Extension of achieving Commissioning and Acceptance**

5.7.2.1. The Project Timelines as specified in the SOW Clause 3.4 shall be extended if the Successful Bidder is delayed or impeded in the performance of any of its obligations under the Work Order by reason of any of the following:

a)any occurrence of Force Majeure as provided in GCC Clause 5.6.6,

b) 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 Successful Bidder, subject to the final decision of OREDA.

5.7.3. **Suspension**

5.7.3.1. OREDA may request, by notice to the Successful Bidder, to order the Successful Bidder to suspend performance of any or all of its obligations under the Work Order. Such notice shall specify the obligation of which performance is to be suspended, the effective date of the suspension and the reasons therefor. The Successful Bidder shall thereupon suspend performance of such obligation, except those obligations necessary for the care or preservation of the Project, until ordered in writing to resume such performance by OREDA.

5.7.3.2. If the Successful Bidder's performance of its obligations is suspended or the rate of progress is reduced pursuant to GCC Clause 5.7.3, then the Project Timeline shall be extended in accordance with GCC Clause 5.7.2.1.

5.7.3.3. During the period of suspension, the Successful Bidder shall not remove from the site any Project, any part of the Projector any Successful Bidder's tools and tackles, without the prior written consent of OREDA.

5.7.4. **Termination**

5.7.4.1. Termination for OREDA's Convenience

c) OREDA may at any time terminate the Work Order for any reason by giving the Successful Bidder a notice of termination that refers to this GCC Clause 5.7.4.1.

d) Upon receipt of the notice of termination as per the GCC Clause 5.7.4.1c), the Successful Bidder shall either immediately or upon the date specified in the notice of termination

i. cease all further work, except for such work as OREDA may specify in the notice of termination for the sole purpose of protecting that part of the Project already executed, or any work required to leave the site in a clean and safe condition,

ii. terminate all subcontracts, except those to be assigned to OREDA pursuant to GCC Clause 5.7.4.1i.B,

iii. remove all Successful Bidder's tools and tackles from the site, repatriate the Successful Bidder's and its personnel from the site, remove from the site any wreckage, rubbish and debris of any kind, and leave the whole of the site in a clean and safe condition, and

iv. subject to the payment specified in GCC Clause 5.7.4.1e),

A. deliver to OREDA the parts of the Project executed by the Successful Bidder up to the date of termination, and

B. deliver to OREDA all non-proprietary drawings, specifications and other documents prepared by the Successful Bidder as on the date of termination in connection with the Project.

e) In the event of termination of the Work Order under GCC Clause 5.7.4.1c), OREDA shall pay to the Successful Bidder the following amounts:

i. the Work Order Price, properly attributable to the parts of the Project executed by the Successful Bidder as of the date of termination

5.7.4.2. Termination for Successful Bidder's Default

a) OREDA, without prejudice to any other rights or remedies it may possess, may terminate the Work Order forthwith in the following circumstances by giving a notice of termination and its reasons therefor to the Successful Bidder, referring to this GCC Clause 5.7.4.2:

i. if the Successful Bidder becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Successful Bidder is a corporation, a resolution is passed or order is made for its winding up, other than a voluntary liquidation for the purposes of amalgamation or reconstruction, a receiver is appointed over any part of its undertaking or assets, or if the Successful Bidder takes or suffers any other analogous action in consequence of debt

ii. if the Successful Bidder assigns or transfers the Work Order or any right or interest therein in violation of the provision of GCC Clause 5.7.5.

iii. if the Successful Bidder, in the judgment of OREDA has engaged in Integrity Violation practices, as defined in GCC Clause 5.1.9.

b) If the Successful Bidder

i. has abandoned or repudiated the Work Order

ii. has without valid reason failed to commence work on the Project promptly or has suspended the progress of Work Order performance for a prolonged period (30 days) even after receiving a written instruction from OREDA to proceed

iii. persistently fails to execute the Work Order in accordance with the Work Order or persistently neglects to carry out its obligations under the Work Order without just cause

iv. refuses or is unable to provide sufficient materials, services or labour to execute and complete the Project in the manner specified in the Project Timelines as per SOW Clause 3.4 at rates of progress that give reasonable assurance to OREDA that the Successful Bidder can attain Commissioning and Acceptance of the Project, then OREDA may, without prejudice to any other rights it may possess under the Work Order, give notice to the Successful Bidder stating the nature of the default and requiring the Successful Bidder to remedy the same. If the Successful Bidder fails to remedy or to take steps to remedy the same within fourteen (14) Days of its receipt of such notice, then OREDA may terminate the Work Order forthwith by giving a notice of termination to the Successful Bidder that refers to this GCC Clause 5.7.4.2.

c) Upon receipt of the notice of termination under GCC Clause 5.7.4.2, the Successful Bidder shall, either immediately or upon such date as is specified in the notice of termination,

i. cease all further work, except for such work as OREDA may specify in the notice of termination for the sole purpose of protecting that part of the Project already executed, or any work required to leave the site in a clean and safe condition,

ii. terminate all subcontracts, except those to be assigned to OREDA pursuant to GCC Clause 5.7.4.1B,

iii. deliver to OREDA the parts of the Project executed by the Successful Bidder up to the date of termination complete in all respect, and

iv. deliver to OREDA all drawings, specifications and other documents prepared by the Successful Bidder as on the date of termination in connection with the Project.

d) OREDA may enter upon the site, expel the Successful Bidder, and complete the Project itself or by employing any third party. OREDA may, to the exclusion of any right of the Successful Bidder over the same, take over and use with the payment of a fair rental rate to the Successful Bidder, with all the maintenance costs to the account of OREDA and with an indemnification by OREDA for all liability including damage or injury to persons arising out of OREDA's use of such Equipment, any Successful Bidder's equipment owned by the Successful Bidder and on the site in connection with the Project for such reasonable period as OREDA considers expedient to achieve the Commissioning and Acceptance.

e) Upon completion of the Project or at such earlier date as OREDA thinks appropriate, OREDA shall give notice to the Successful Bidder that such Successful Bidder's equipment will be returned to the Successful Bidder at or near the site and shall return such Successful Bidder's equipment to the Successful Bidder in accordance with such notice. The Successful Bidder shall thereafter without delay and at its cost remove all Successful Bidder's tools and tackles from the site, repatriate the Successful Bidder's personnel from the site, remove from the site any wreckage, rubbish and debris of any kind, and leave the whole of the site in a clean and safe condition.

f) Subject to GCC Clause 5.7.4.2g), the Successful Bidder shall be entitled to be paid the Work Order price attributable to the Project executed as of the date of termination, the value of any unused or partially used Project on the site, and the costs, if any, incurred in protecting the Project and in leaving the site in a clean and safe condition pursuant to GCC Clause 5.7.4.2c)i. Any sums due to OREDA from the Successful Bidder accruing prior to the date of termination shall be deducted from the amount to be paid to the Successful Bidder under this Work Order.

g) If OREDA completes the Project, the cost of completing the Project by OREDA shall be determined.

i. If the sum that the Successful Bidder is entitled to be paid, pursuant to GCC Clause 5.7.4.2f), plus the reasonable costs incurred by OREDA in completing the Project, exceeds the Total Price mentioned in the Work Order, the Successful Bidder shall be liable for such excess.
ii. If such excess is greater than the sums due to the Successful Bidder under GCC Clause 5.7.4.2f), the Successful Bidder shall pay the balance to OREDA.

h) OREDA and the Successful Bidder shall agree, in writing, on the computation described above and the manner in which any sums shall be paid.

5.7.4.3. In this GCC Clause 5.7.4, the expression "Project executed" shall include all work executed, Installation Services provided, and all Project acquired, or subject to a legally binding obligation to purchase, by the Successful Bidder and used or intended to be used for the purpose of the Project, up to and including the date of termination.

5.7.4.4. In this GCC Clause 5.7.4, in calculating any monies due from OREDA to the Successful Bidder, the account shall be taken of any sum previously paid by OREDA to the Successful Bidder under the Work Order.

5.7.5. **Assignment**

5.7.5.1. No Party shall, without the prior consent of the other Party, assign to any Person any benefit of or obligation under this Work Order in whole or in part. Such an assignment, if approved by the other Party, shall not relieve the assigning Party from any obligations, duty, or responsibility under this Work Order.

5.7.5.2. The Successful Bidder consents to the creation by OREDA of security over or assignment of its rights and obligations under this Work Order including the Performance Security provided hereunder by the Successful Bidder in favour of OREDA.

5.8. Disputes and Arbitration

5.8.1. **Mutual Settlement**

5.8.1.1. If any dispute or difference shall arise between OREDA and the Successful Bidder out of, relating to or in connection with the Work Order (including its existence, breach, termination or validity) or the performance of the Comprehensive Maintenance under the Work Order, it shall, in the first instance be referred to the Chief Executive Officer, OREDA and the Successful Bidder's senior management. The Chief Executive Officer, OREDA shall make every effort to amicably resolve the dispute or differences arising between the Parties and provide its written decision within a maximum time period of fifteen (15) Days of the dispute being referred to it by either Party.

5.8.1.2. If the Chief Executive Officer, OREDA has given its written decision to the Parties and no claim to arbitration has been communicated to it by either Party within two (2) Days from receipt of such notice, the said decision shall become final and binding on the Parties.

5.8.1.3. In the event that the Chief Executive Officer, OREDA fails to provide its decision within the above said period after being requested as aforesaid, or in the event that either OREDA or the Successful Bidder is dissatisfied with any such decision, either Party may, within fifteen (15) Days after the date on which such decision is required to be provided in accordance with GCC Clause 5.8.1.1, whether the decision is provided by the Chief Executive Officer, OREDA during such period or not, refer the matter to the Energy Secretary to the Government of Odisha for a resolution.

5.8.1.4. The Energy Secretary to the Government of Odisha shall make every effort to amicably resolve the dispute or differences arising between the Parties and provide its written decision within a maximum time period of seven (7) Days of the dispute being referred to it by either Party.

5.8.1.5. In the event that the Energy Secretary to the Government of Odisha fails to provide its decision within the above said period after being requested as aforesaid, or in the event that either OREDA or the Successful Bidder is dissatisfied with any such decision, either Party may, within fifteen (15) Days after the date on which such decision is required to be provided in accordance with GCC Clause 5.8.1.4, whether the decision is provided by the concerned Secretary of the admin department to the Government of Odisha during such period or not, refer the matter in dispute to arbitration as hereinafter provided in GCC Clause 5.8.2.

5.8.1.6. The Successful Bidder shall continue to perform its obligations under this Contract during this mutual settlement.

5.8.2. **Arbitration**

5.8.2.1. If disputes or differences between the Parties are not resolved under Clause 5.8.1, the same shall be referred for arbitration under the Indian Arbitration and Conciliation Act, 1996.

5.8.2.2. The arbitral tribunal shall consist of a sole arbitrator, who shall be appointed by the Parties mutually, in accordance with the Arbitration and Conciliation Act, 1996.

5.8.2.3. The Successful Bidder shall continue to perform its obligations under this Contract during the arbitration proceedings.

5.8.2.4. The arbitration proceedings shall be in English and shall take place in Bhubaneswar, Odisha. The courts in Bhubaneswar, Odisha shall have jurisdiction on any matter connected with or arising under this Contract. The law governing the arbitration and the process shall be Indian law only.

5.8.2.5. The arbitration shall be the sole and exclusive remedy between the Parties regarding the dispute referred to arbitration and any claims, counterclaims, issues or accountings presented to the tribunal in connection with such dispute.

5.8.2.6. The award rendered in any arbitration commenced hereunder shall be final, conclusive, and binding on the Parties.

5.8.2.7. The Parties hereby undertake to implement the award with an immediate effect.

6. Special Conditions of Contract (SCC)

Section 6 (SCC) shall supplement the Clauses mentioned in Section 5 (GCC). Whenever there are a conflict or interpretation issues, the provisions herein shall prevail over those in Section 6 (SCC). The Clause number of Section 6 (SCC) is the corresponding Clause number of Section 5 (GCC).

6.1. Specific provisions of GCC

The successful bidder shall generate and submit separate e-invoices along with applicable taxes for the following subjects or parts;

a) Supply of material (including all equipment or components) for development of Solar Power Plant and Power Evacuation

b) Installation & commissioning of the Solar Power Plant

c) Operation and Maintenance of the Solar Power Plant (for each completion year up to 10th CMC Year)

<table>
<tr><th>SCC Clause reference</th><th>GCC Clause reference</th><th colspan="3">Detailed Clause</th></tr>
<tr><td rowspan="4">6.1.1.</td><td rowspan="4">GCC Clause 5.2.2.1</td><td>Milestone</td><td>Payment term</td><td>Support documents</td></tr>
<tr><td>On Supply of Material (equipment or components for the development of Solar Power Plant and power evacuation)</td><td>Seventy percent (70%) of the bill invoice towards supply of material + 100 % applicable Tax at the time of invoicing, as specified in the Work Order.</td><td>The payment shall be made upon due verification by Concerned OREDA Officer on the following documents:
• Delivery Challan with Tax Invoice
• Warranty certificates
• GPS based photograph of Materials Supplied along with Check list duly signed by Concerned OREDA officer</td></tr>
<tr><td>On successful installation and commissioning of solar power plant</td><td>Balance Thirty percent (30%) of the bill invoice towards supply of material
+
Hundred Percent (100 %) of the bill invoice towards Installation & commissioning of the Solar Power Plant along with 100% applicable taxes</td><td>• Joint Commissioning Certificate (JCC) issued by concerned OREDA Officer
• Power Plant Commissioning Report (Shall be Provided by OREDA along with the Work Order)
• Submission of executed version of CMC as per the sample format provided in Annexure Clause 7.1.6
• Compliance to CRC process using the ReSolve Mobile App
• Login credentials of Inverter for generation data monitoring.
• Insurance Copy of asset.</td></tr>
<tr><td>On Submission of Yearly Performance Report of the solar Power plant</td><td>Hundred Percent (100 %) of the bill invoice towards Operation & Maintenance (each completion Year) of the Solar</td><td>• Performance Certificate issued by concerned OREDA Officer
• Performance Report (CRC)</td></tr>
</table>

<table>
<tr><th>SCC Clause reference</th><th>GCC Clause reference</th><th>Detailed Clause</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td>Power Plant along with 100% applicable taxes each year up to the 10th CMC year</td><td>• Generation/Performance report (Shall be Provided by OREDA along with the Work Order)</td></tr>
<tr><td>On completion of CMC for the 10st year from commissioning of the Project (one BG)</td><td>Bank Guarantee (BG): Ten percent (10%) of the Total Price at the time BG submission, as specified in the Works Order, to be returned</td><td>• CMC Completion Certificate of the Project issued by concerned OREDA Officer (Shall be Provided by OREDA along with the Work Order)
• The report should include 16% CUF achievement.
• On generation shortfall the bidder needs to submit a DD to OREDA of equivalent amount as clause 3.2.3.
• A decrease in CUF may impact future allotment of work and participation in OREDA tenders, which will be at the sole discretion of OREDA.</td></tr>
</table>
</td></tr>
<tr><td>6.1.2.</td><td>GCC Clause 5.5.2.1</td><td>Warranty:

The Warranty in respect of the Equipment, as applicable shall be as follows:

• Solar photovoltaic modules: Performance Warranty with guaranteed ninety percent (90%) production at the end of 10th year of operation and 80% (eighty percent) at the end of the 25th year of operation from the date of Commissioning of the Project. Product Warranty for a period of ten (10) years from the date of Commissioning of the Project.
• Module mounting structures: Product Warranty period of five (5) years from the date of Commissioning of the Project.
• Power Conditioning UEOI/ Inverter: Product Warranty period of five (5) years from the date of Commissioning of the Project
• Balance of system: Product Warranty period of five (5) years from the date of Commissioning of the Project.
As a testimony, the Successful Bidder must submit the Warranty certificate and service agreement with the OEM/ suppliers prior to achieving Commissioning of the Project. Any defect noticed during the Warranty period should be rectified/ replaced by the Successful Bidder either through OEM/ suppliers or by itself, free of cost, upon due intimation by OREDA.
In case any OEM/ supplier provides a Warranty period more than five (5) years from the date of Commissioning of the Project, then the Successful Bidder shall provide the same to OREDA even if the Warranty period exceeds the CMC Period.</td></tr>
</table>

7. Annexure

7.1. Bid Forms – Technical Bid

7.1.1. **Bid Form 1 (Bid Processing Fee)**

Bid Processing Fee

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert .] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, attaching the copy of the Bid Processing Fee paid to the E-procurement Website "www.tenderwizard.com/OREDA".

The Unique Transaction Reference (UTR) no. is [insert the UTR no.], dated [DD MMM YYYY].

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name] Seal: [insert seal of the Bidder]

7.1.2. **Bid Form 2 (Cost of Bid)**

Cost of Bid

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, attaching the copy of the Cost of Bid submitted in the form of Demand Draft.

The Demand Draft no. is [insert], dated [DD MMM YYYY].

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.1.3. **Bid Form 3 (Bid Security)**

Bid Security

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, attaching the copy of the Bid Security submitted in the form of [Demand Draft/ Fixed Deposit Receipt/ Bank Guarantee].

The Demand Draft no. is [insert], dated [DD MMM YYYY] (in case of a demand draft), or

The Fixed Deposit Receipt no. is [insert], dated [DD MMM YYYY]. (in case of an FDR)

The Bank Guarantee no. is [insert], dated [DD MMM YYYY]. (in case of a Bank Guarantee)

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.1.4. **Bid Form 4 (Power of Attorney)**

Power of Attorney

(To be submitted on a non-judicial stamp paper of appropriate value as per The Indian Stamp Act,1899 relevant to the place of execution. The stamp paper shall be purchased in the name of the Bidder only.)

Signature and stamp of the notary of the place of execution [insert place] dated [DD MMM YYYY]

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
Odisha Renewable Energy Development Agency (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

Know all men by these presents, We, [name of the executant(s)], do hereby constitute, appoint and authorize [name of the Authorized Signatory] as the Authorized Signatory presently residing at [residential address of Authorized Signatory] and having PAN [insert PAN no. of Authorized Signatory] who is presently employed with us and holding the designation of [designation of the Authorized Signatory] as our true and lawful representative, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid for the Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning with power evacuation of solar PV technology-based grid interactive power plants, with reference to the EOI no. [insert EOI no.] dated [DD MMM YYYY] issued by Odisha Renewable Energy Development Agency ("OREDA').

The Authorized Signatory shall represent us and shall be responsible for the signing of the Bid, submission of the Bid and executing all other documents related to this Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which OREDA may require us to submit. The Authorized Signatory is further authorized to make representations to OREDA and provide information/ responses to OREDA, representing us in all matters before OREDA, and generally dealing with OREDA in all matters in connection with our Bid and during the performance of the Work Order.

We hereby agree to ratify all acts, deeds and things are done by our said Authorized Signatory pursuant to this Power of Attorney and that all acts, deeds and things are done by our aforesaid Authorized Signatory shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the Bidding Document.

Signature of the executant
Name:
Designation:
Address:
Company:

Accepted by

Signature of the Authorized Signatory
Name:
Designation:

Address:
Company:
Common seal of [name of the Bidder] is affixed in [my/our] presence pursuant to the provisions mentioned in the clause under “Seal” of the Article of Association.

Board resolution dated [DD MMM YYYY] is attached below.

WITNESS

Signature:	Signature:
Name:	Name:
Address:	Address:

Notes:

1. The mode of execution of the power of attorney shall be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same shall be under the common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by a Board Resolution.
1. The person authorized under this Power of Attorney shall be a person holding the responsible post and designation in the company.
2. The Board Resolution forms a part of the Power of Attorney.

Board Resolution

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]

EOI no.: [insert EOI no.]

CERTIFIED TRUE COPY OF THE RESOLUTION PASSED IN THE MEETING OF THE BOARD OF DIRECTORS OF M/S. [insert name of the Bidder] HAVING ITS REGISTERED OFFICE AT [insert office address of the Bidder] HELD ON [DD MMM YYYY] AT [HHMM]HRS.

Resolved that we, [insert name of the Bidder], do agree to participate in the EOI invited by OREDA vide EOI no.
[insert EOI no.] dated [DD MMM YYYY] for the selection as a Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning with power evacuation of solar PV technology-based grid interactive power plants.
RESOLVED FURTHER THAT, [insert name of the Bidder] agrees to unconditionally accept all terms and conditions mentioned in the aforementioned Bidding Document.

RESOLVED FURTHER THAT, Ms./ Mr. [Name of the Authorized Signatory] [is/ are] presently residing at [residential address of Authorized Signatory] and having PAN [insert PAN no. of Authorized Signatory] who is presently employed with us and holding the designation of [designation of the Authorized Signatory] is the Authorized Signatory of [insert name of the Bidder] be and hereby authorized to sign, execute and submit such applications, undertakings, agreements and other requisite documents writings and deeds as may be deemed necessary or expedient to implement the above Project.

AND RESOLVED FURTHER THAT, the common seal of the company is affixed, wherever necessary,

in accordance with the applicable procedure laid down by the applicable law and the charter documents.

For [insert name of the Bidder]

Chairman/ Director/ Company Secretary
(Signatory of the Board Resolution)

Name of the Authorized Signatory
Specimen signature of Authorized Signatory

Note: The above signature(s) to be attested by the person signing the resolution

7.1.5. **Bid Form 5 (Covering Letter of Technical Bid)**

Covering Letter of Technical Bid

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha. Email: ceoreda@oredaorissa.com

Sub: Submission of Technical Bid for Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning with power evacuation of solar PV technology-based grid interactive power plants.

Dear [Sir/ Madam],

Having examined the Bidding Document carefully, We, the undersigned, offer to submit herewith the Technical Bid as per the subject line and EOI no. mentioned above.

We are submitting our Bid and we have applied for the following Project:

We hereby undertake the following:

We have read all the provision of the Bidding Document and confirm that notwithstanding anything stated elsewhere in our Technical Bid to the contrary, the provisions of the Bidding Document are acceptable to us and we further confirm that we have not taken any deviation to the provision of the EOI anywhere in our Bid. Acceptance of the above attribute shall be considered as our confirmation that any deviation, variation or additional condition, etc. or any mention, contrary to the provisions of Bidding Document found anywhere in our Technical Bid implicit or explicit shall stand unconditionally withdrawn, without any cost implication whatsoever to OREDA.

8. We further declare that any additional conditions, variations, deviations, if any, in our Bid shall not be given effect to. We further understand that any deficiency or illegibility in our Technical Bid shall result in rejection of our Technical Bid.
9. We hereby declare that all the information and statements made in this proposal are complete, true and correct and also accept that any misinterpretation contained in it may lead to our disqualification and rejection of our Technical Bid. In case of any false documents submitted and found any time in the future, we shall be liable to be proceeded as per Applicable Law.
10. We confirm that we have submitted the Technical Bid as per the instructions given in the Bidding Document.
11. We hereby declare and confirm that only we are submitting our Bid and that our parent, affiliate, the ultimate parent or any group companies with which we have direct or indirect relationships are not separately submitting their Bid.
12. We hereby declare that our application has been submitted in good faith and the information contained is true and correct to the best of our knowledge and belief.
13. We confirm that the Technical Bid submitted are subject to the verification solely by appropriate authorities of OREDA as per all the terms of the Bidding Document and agree that the decision taken by OREDA shall be final and binding on us.

14. We declare that our Technical Bid is fully compliant to the qualification requirement mentioned under Section 4 (QR) and we have not misrepresented any information provided in our Bid.
15. We confirm that any genuine changes made by OREDA in the interest of the Project with respect to the Technical Specifications, Designs and Drawings during the course of performance of the Work Order shall be fully acceptable to us without any cost implication whatsoever to OREDA.
16. We confirm that we will comply with all the Applicable Laws and Prudent Utility Practices all the time during the performance of the Work Order.
17. We confirm that we have submitted the Technical Bid as per the forms given in Bid Form (Technical Bid) and/ or the instructions given in the EOI or E-procurement Website; failure to which our Technical Bid shall be considered as non-responsive and shall be liable for rejection.
18. We agree that We have not submitted any conditional or alternative Technical Bid and in case of any deviation, then our Technical Bid shall be considered as non-responsive and shall be liable for rejection.
19. We confirm that we do not have any conflict of interest in accordance with the provisions of the EOI.
20. We confirm that in case we are directly or indirectly through an agent engaged in Corrupt Practice, Fraudulent Practice, Coercive Practice, Collusive Practice, Obstructive Practice or Integrity Violation, then our Technical Bid shall be considered as non-responsive and shall be liable for rejection.
21. We confirm that OREDA reserves all the right to accept or reject any Technical Bid without assigning any reasons thereof and shall not be held liable for any such action and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.
22. We confirm that in case our Bid is accepted, we undertake to provide Contract Performance Securities as specified in the EOI, else our Bid Security shall be forfeited.
23. We agree that this Technical Bid shall remain valid for a period of One Hundred and Eighty (180) Days from the original last date of online Bid submission and such further period as may be mutually agreed upon.
24. The Bidding Document has been discussed in the Board meeting and a Board Resolution (BR) no. [insert BR no.] dated [DD MMM YYYY] has been concurred for submission of our Bid and is enclosed as a part of Bid Form 4 (Power of Attorney).
25. We undertake that OREDA shall, without prejudice to any other right or remedy, be at liberty to foEOIit the Bid Security deposited by us in case of any default as per the Bidding Document.
26. In case we fail to achieve the milestones of Commissioning and Acceptance of the Project as per the Project Timelines, OREDA shall, without prejudice to any other right or remedy, be at liberty to foEOIit the Performance Security.
27. We confirm that we shall establish a central office at Bhubaneswar, Odisha and also establish local offices at the concerned district so as to deliver uninterrupted and sustainable Comprehensive Maintenance during the CMC Period.
28. We understand that you are not bound to accept any Technical Bid you may receive.

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name] Seal: [insert seal of the Bidder]

7.1.6 Bid Form 6 Technical Qualification

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, hereby, submit our experience as Qualification Requirement in the last Three (3) years from the due date of submission of the Technical Bid.

As per Technical Qualification Requirement, our experiences are as follows:

Technical Qualification	**Details** -
Completed capacity(kW) of EPC Project for Design, supply, installation and commissioning of solar power plants within the last 3 years.	

The details pertaining to the reference assignment are given below:

Sr. No.	**Item Description**	**Reference project [insert]****
1.	Title of the assignment with a brief of scope	
2.	Actual contract value	[insert] Lakh INR
3.	Name of the client with the full address including the contact no. and email id of the client	Name of the client: Address: Contact no.: Email id:
4.	Details of the letter of awards/ work orders/ contract	Work order no.: Date of work order: [DD MMM YYYY]
5.	I have attached the JCC/Completion Certificate issued by the concerned government authority as per the Prudent Utility Practices followed in Odisha.	[Yes/ No]

** In case of multiple reference projects, please keep on adding separate columns.

The scanned copies of the letter of awards/ work orders/ contract along with the associated Completion Certificates are enclosed below:

[Please attach the proof of documents]

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

(To be submitted on the letter head of the Bidder)

7.1.7 Bid Form 7 (Financial Qualification)

Financial Qualification

(To be submitted on the letterhead of the certified chartered accountant)

To

The Chief Executive Officer
OREDA Limited
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

I, [insert name of the chartered accountant], confirm that the Bidder, [insert name of the Bidder], has financial details as mentioned below, as per our detailed evaluation of the Bidder's latest certified true copy of the audited annual accounts and their work orders related to the solar business and/or other than solar business.

Average annual turnover:

Particulars	**UEOI**	**FY21-22**	**FY22-23**	**FY23-24**
Annual turnover from solar business only#	Lakh INR	[insert]	[insert]	[insert]
Average annual turnover from solar business only#	Lakh INR	[insert]		
Annual turnover from other than solar business only#*	Lakh INR	[insert]	[insert]	[insert]
Average annual turnover from other than solar business only#*	Lakh INR	[insert]		
Annual turnover from business only#*	Lakh INR	[insert]	[insert]	[insert]
Average annual turnover from business only#*	Lakh INR	[insert]		

other income is not considered
*Strick-off if not applicable

[For partnership firm and sole proprietorship firm, as per the methodology certified by the chartered accountant based on the Applicable Law in India.]

I hereby declare that all the information and statements made in this certificate are complete, true and correct and also accept that any misinterpretation contained in it may lead to cancellation of my CA membership, and I shall be liable to be proceeded as per the Applicable Law.

Date: [DD MMM YYYY]

Place: [insert place]

[sign here]
Signature
Name of Chartered Accountant (CA): [insert name]
Designation: [insert designation]
Name of the firm of the CA: [insert Bidder's legal entity name]
CA membership no.: [insert CA membership no.]
Registration no. of the CA's firm:
Seal: [insert seal of the Bidder]

7.1.8 Bid Form 8 (Test Certificates)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, declare that the "**Test Certificates**" for the Equipment are issued from the valid MNRE/ BIS authorized NABL/ ILAC accredited Test Labs, pursuant to the requirements as mentioned in QR Clause 4.2.1.

Sl. No.	Major Component	Test Certificates Required	Test description
1	Crystalline Silicon Terrestrial PV Modules	IEC 61215/ or equivalent BIS standard (IS 14286)	Design qualification
		IEC 61730 -1,2	Safety Qualification Part 1: Requirements for Construction Part 2:- Requirements for Testing
		IEC 61701	Salt Mist Corrosion Test
		IEC 62716	Ammonia (NH3) Corrosion Testing, (As per site condition like dairies, toilets)
		IEC 61853-Part 1 & 2 /IS 16170: Part 1	Performance testing and energy rating:- Irradiance and temperature performance measurements and power rating.
		IEC 61683	Efficiency Test
		IEC 62804:	Potential Induced Degradation test
		IEC 62782	Dynamic Mechanical Load Test
		IEC 61726:2022	shielding effectiveness of cable assemblies, cables, connectors, and passive microwave components Test
		IEC 60068-1:2013	Sand & Dust Test
2	Inverter*	IEC 60068-2-1,2,14,30/ IEC 62093	Environmental Test
		IEC 61683	Energy Efficiency
		IEC62109-1,2	Safety test
		IEC 62116	Anti islanding
		IEC 61727	Utility Interface
		IEC 61000	EMC

Note:

1. Strick of above testing requirement if Bidder is not applying for particular Projects
2. The proof of all documents showcasing the possession of such copies of the Test Certificates by the Bidder shall be submitted as per the instructions given under the Letter of Intent and not at the time of bidding.

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.1.9 Bid Form 9 (Self-certificate)

Self-certificate

(To be submitted on a non-judicial stamp paper of appropriate value as per The Indian Stamp Act,1899 relevant to the place of execution and notarized by the appropriate authority. The stamp paper shall be purchased in the name of the Bidder only.)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, confirm and certify that we have not been debarred/ blacklisted/ defaulted by any Government, agency, Public Sector Undertaking (PSU), institution/ autonomous organizations in the past. We have not acted in concert or in collusion with any other Bidder or other person(s) and also not done any act, deed or thing which is or could be regarded as anti-competitive.

I/we hereby declare the following in the context of the aforementioned tender that:

In case of any false documents submitted and found in the future, we shall be liable to be proceeded against as per the Applicable Law.

In case of any such events, we have provided the case details and their current status below. [strike-off this line, in case it is not applicable].

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.1.10 Bid Form 10 (Undertaking for Indigenousness)

Undertaking for Indigenousness

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, [insert the Bidder name], hereby certify and confirm that the solar photovoltaic modules to be supplied under this Project shall be indigenous and not fully imported, as per the relevant guidelines of the Ministry of New and Renewable Energy (MNRE), Government of India.

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.1.11 Bid Form 11 (No Deviation Certificate)

No Deviation Certificate

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, [insert the Bidder name], hereby certify and confirm that we have read the clauses and provisions of the EOI, Addendums, Corrigendum, etc. issued thereafter and the stipulation of all clauses and provisions are acceptable to us, and we have not taken any deviation whatsoever to any of the clauses and provisions.

*In case the Bidder has taken any deviation, then the same shall be mentioned here.

Clause No.	Deviations considered, if any

[*strike-off, if not applicable]

We further confirm that we are aware that our Bid would be liable for rejection in case any material misrepresentation is made or discovered with regard to the requirements of this EOI at any stage of the bidding process or thereafter during the performance of the Work Order.

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.1.12 Registration details

Registration details

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha. Email: ceoreda@oredaorissa.com

We, the undersigned, attaching the Certificate of Incorporation, Memorandum of Association (MOA) and Article of Association (AOA) [applicable in case of companies]. The **AOA** (if applicable) shall mention the company's operations and defines the company's purpose from the SOW point of view or

We, the undersigned, attaching the Partnership Deed [applicable in case of partnership firm]. or

We, the undersigned, attaching the proof of having the bank account or any other document as issued by the Government [applicable in case of sole proprietorship firm].

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name] Seal: [insert seal of the Bidder]

7.1.13 PAN

PAN

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, attaching the copy of the PAN card.

The PAN is [insert PAN].

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name] Seal: [insert seal of the Bidder]

7.1.14 GST Certificate

GST Certificate

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha. Email: ceoreda@oredaorissa.com

We, the undersigned, attaching the copy of the GST Certificate.

The GST no. is [insert GST no.] and the place of GST registration is for the state of [insert state name].

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name] Seal: [insert seal of the Bidder]

7.1.15 Bid Form 15 (Income Tax Return)

Income Tax Return

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, attaching the copy of the Income Tax Return for the last five (3) assessment years for FY2022-23,FY 21-22, FY20-21,.

Place: [insert place]

[sign here]
Signature
Name of Authorized
Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.1.16 Bid Form 16 (Quality Assurance)

Quality Assurance

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, declare that we have a copy of the ISO certificate for ISO 9001 and will submit the copy of the ISO 14001 certificate in the name of the Original Equipment Manufacturer (OEM), supported by a letter of authorization from the OEM, as per QR Clause 4.2.2.

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

Note: The documentary evidence shall be submitted as a part of the response to the Letter of Intent and prior to issuance of the Work Order, and not at the time of bidding.

7.1.17 Bid Form 17 (Summary of the Bidder)

Summary of the Bidder

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

We, the undersigned, attaching the summary of [insert name of the Bidder] in excel format provide in the e-portal site.

7.1.18 Bid Form 18 (Land Consent Form)

1. Land Self Consent by Farmer/Land Owner

SELF-CONSENT AFFIDAVIT

(On Non-Judicial Stamp Paper as per the Applicable State Laws)

DECLARATION BY THE LANDOWNER FOR LEASING LAND TO THE NODAL AGENCY FOR RENEWABLE ENERGY PROJECT DEVELOPMENT

I, [Full Name of the Farmer / Landowner],
Son/Daughter/Wife of _____,
Resident of _____, District _____, State _____, Caste _____
do hereby solemnly declare and affirm as follows:

1. LAND DETAILS

- **Land Location:** _____
- **Village :** _____
- **Panchayat :** _____
- **Block:** _____
- **Tahsil:** _____
- **Land Survey/Plot No.:** _____
- **Khata No:** _____
- **Any incumbency: (Yes / No)**
- **Land is free from any litigation: (Yes / No)**
- **Total Land Area for Lease:** _____
- **Type of Land:** [Agricultural / Barren / Pasture / Other]
- **Proposed Use:** Development of a Solar Power Plant under the Kusum-A Scheme

2. LEASE TERMS AND CONDITIONS

i. **Lease Duration:**
   - I agree to lease my land to the Nodal Agency **[OREDA or Name of the Agency]** for a period of **___ years (typically 28-30 years)** for the development of a renewable energy project under PM KUSUM A.
   - I understand that the lease may be extended upon mutual agreement.

ii. **Compensation and Payment Schedule:**
   - I shall receive a mutually agreed lease rent as a compensation.
   - Payment shall be made **[monthly/annually]** through **[Bank Transfer/Cheque]**, as per the agreed terms.
   - Adjustments for inflation or changes in market conditions shall be discussed during the lease rent agreement.

iii. **Renewal and Termination:**
   - The lease may be **renewed upon mutual agreement** between both parties.
   - If the lease is not renewed, the land shall be handed back in its original condition.

iv. **Post-Lease Infrastructure Handover:**

- I understand that at the end of the lease period, the infrastructure (solar panels, buildings, etc.) will be **removed by OREDA.**

I hereby declare that:

- I have **voluntarily agreed** to lease my land for the renewable energy project under the PM KUSUM A scheme.
- I hereby express my **intent to proceed** with the leasing agreement if the terms and conditions mutually agree.

Signature of the Farmer/Landowner:

Farmer's Full Name:
Farmer's Mobile No:
Farmer's email id (if any):

Signature:

Date:

2. Declaration By EPC

TO BE FILLED BY THE EPC BIDDER

(On the Letter Head of the Bidder)

Question/Statement	Space for EPC Contractor's Input
Land Details	
Land Location with Address (Village, Block, Tahsil):	
Land Coordinates:	
Land Survey/Plot No.:	
Khata No:	
Any incumbency (Yes / No):	
Existing vegetation on land (Tree/shrub etc.)	
Condition of Land (Highly undulated/Plain/Slope etc.)	
Total Land Area for Lease: (In acres)	
Type of Land (Agricultural / Barren / Pasture / Other):	
Land is free from any litigation (Yes / No):	
Substation Details	
Possibility of LILO interconnection (If Yes, then share proximity and details):	
Sub-station details (Transformers capacity, Injection capacity):	
Availability of bay:	
Distance from my land to the nearest electrical substation (approx. km):	
No of ROW clearances required (Elaborate each one)	
Additional Details	
Lease Duration (In years/month)	
Condition of access roads to the land (Paved / Gravel / Dirt Road):	
New approach roads are required (Yes/No)	
What additional infrastructure development required?	
Is there any dispute in the land ownership? (Yes/No)	

7.1.19 Bid Form 19 (Covering Letter of Price Bid) (The Price bid Excel sheet is uploaded in the e-tendering portal)

Covering Letter of Price Bid

(To be uploaded on the letterhead of the Bidder in the e-tendering portal)

Date: [DD MMM YYYY]
RFE no.: [insert RfE no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

Sub: Submission of Price Bid for the empanelment for Design, Engineering, Supply, Installation, Testing, Commissioning including Comprehensive Maintenance for five (5) years of Rooftop Solar PV On-grid system of cumulative capacity up to 2 MW in various capacities, across Odisha on a rate contract basis

Dear [Sir/ Madam],

Having examined the Bidding Document carefully, We, the undersigned, offer to submit herewith the Price Bid as per the subject line and RfE no. mentioned above.

We agree that this Price Bid shall remain valid for a period of Three hundred and sixty-five (365) Days from the original last date of online Bid submission and further for Empanelment Period of One Year from the date of issue of Empanelment Order. **The validity of bid price may be extended for further period as may be mutually agreed upon.**

We have read all the provision of the Bidding Document and confirm that notwithstanding anything stated elsewhere in our Price Bid to the contrary, the provisions of the Bidding Document are acceptable to us and we further confirm that we have not taken any deviation to the provision of the RfE anywhere in our Bid. Acceptance of the above attribute shall be considered as our confirmation that any deviation, variation or additional condition, etc. or any mention, contrary to the provisions of Bidding Document found anywhere in our Price Bid implicit or explicit shall stand unconditionally withdrawn, without any cost implication whatsoever to OREDA.

We further declare that any additional conditions, variations, deviations, if any, in our Bid shall not be given effect to. We further understand that any deficiency or illegibility in our Price Bid shall result in rejection of our Price Bid.

We hereby declare that all the information and statements made in this proposal are complete, true and correct and also accept that any misinterpretation contained in it may lead to our disqualification and rejection of our Price Bid.

We hereby declare that our application has been submitted in good faith and the information contained is true and correct to the best of our knowledge and belief.

We agree with the following:

3. We confirm that the Price Bid submitted are subject to the verification solely by appropriate authorities of OREDA as per all the terms of the Bidding Document and agree that the decision taken by OREDA shall be final and binding on us.
4. We declare that our Price Bid is fully compliant as per the terms of the Bidding Document.
5. We confirm that we have submitted the Price Bid in Indian Rupees only and the Price Bid will be considered up to two places of decimal only.
6. We confirm that any genuine changes made by OREDA in the interest of the Project with respect to the Technical Specifications, Designs and Drawings during the course of performance of the Work Order shall be fully acceptable to us without any cost implication whatsoever to OREDA.
7. We confirm that we will comply with all the Applicable Laws and Prudent Utility Practices all the time during the performance of the Work Order.

8. We confirm that we have submitted the Price Bid as per the forms given in Bid Form (Price Bid) and/ or the instructions given in the RfE or E-procurement Website; failure to which our Price Bid shall be considered as non-responsive and shall be liable for rejection.
9. We agree that We have not submitted any conditional or alternative Price Bid and in case of any deviation, then our Price Bid shall be considered as non-responsive and shall be liable for rejection.
10. We confirm that we have not mentioned the Price Bid anywhere other than the Price Bid on the E-procurement Website for further evaluation. If we submit the Price Bid on the E-procurement Website that is not in line with the instructions mentioned therein, then the Price Bid shall be considered as non-responsive and shall be liable for rejection.
11. We confirm that we do not have any conflict of interest in accordance with the provisions of the RfE.
12. We confirm that in case we are directly or indirectly through an agent engaged in Corrupt Practice, Fraudulent Practice, Coercive Practice, Collusive Practice, Obstructive Practice or Integrity Violation, then our Price Bid shall be considered as non-responsive and shall be liable for rejection.
13. We understand that you are not bound to accept any Price Bid you may receive.
14. We confirm that OREDA reserves all the right to accept or reject any Price Bid without assigning any reasons thereof and shall not be held liable for any such action and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.
15. We confirm that in case our Bid is accepted, we undertake to provide Contract Performance Securities as specified in the RfE, else our Bid Security shall be forfeited.
16. The rates quoted by us are firm, final and are meant for execution of the allotted supply/ installation within the time frame stipulated in the tender/supply/ installation order.
17. We shall be responsible for the payment of the respective taxes to the appropriate authorities and should I/we fail to do so, I/we hereby authorize OREDA to recover the taxes due from us and deposit the same with the appropriate authorities on their demand.

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.2 Letter of Intent Forms

7.2.6 Letter of Intent

Letter of Intent
(To be submitted on the letterhead of OREDA)

Letter no.: [insert Letter of Intent no.] dated [DD MMM YYYY]

From

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

To

[Bidder name]
[Address]

Sub: Letter of Intent to the successful bidders for Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning with power evacuation of solar PV technology-based grid interactive power plants.
Reference:
1. EOI no. [insert EOI no.] dated [DD MMM YYYY]

With reference to the above, you have been selected as the Successful Bidder and you are requested to submit the following critical documents within a maximum period of fifteen (15) Days from the date of issue of this Letter of Intent, without any fail, else your Bid shall be liable for rejection and the Bid Security submitted to us shall be forfeited.

Sl. No	Critical documents
1.	Acceptance to the Letter of Intent by signing the copy of the Letter of Intent along with an official seal, date, and submission to OREDA
2.	Land Lease Agreement (LLA) to be signed along with the sketch map of the land issued by the tahsil office. (OREDA will share the format along with LOI)
3.	Submission of Minimum Guaranteed Monthly power generation from the Solar Power Plant under normal operating conditions (Format will be provided by OREDA) as per the quoted price bid MU generation by the bidder
4.	Submission of Performance Security as per ITB Clause 1.6.3
5.	Submission of a Detailed Workplan in line with the Project Timelines mentioned in the SOW Clause 3.4.1 for the implementation of Project.
6.	Single line diagram of the Project.
7.	Design document of the module mounting structure and other mounting structure, of the Project along with a STAD pro analysis report as a part of the mandatory submission, if applicable.
8.	Bill of materials along with spares and all relevant equipment test certificates
9.	Proof of Local office (registered office address in Odisha)

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory of OREDA: [insert name]
Designation: [insert designation]
OREDA Limited
Seal: [insert seal of the Bidder]

7.2.7 Work Order Form 1 (Work Order for Project)

Work Order for Project
(To be submitted on the letterhead of OREDA)

Letter of Award no.: [insert Letter of Award no.] dated [DD MMM YYYY]

From

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

To

[Bidder name]
[Address]

Sub: Letter of Award for Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning with power evacuation of solar PV technology-based grid interactive power plants.

Reference:

1. EOI no. [insert EOI no.] dated [DD MMM YYYY]
1. EOI no. [insert EOI no.] dated [DD MMM YYYY]
2. LOI no. [insert LOI no.] dated [DD MMM YYYY]
3. Work Order no. [insert Wok Order no.] dated [DD MMM YYYY]

With reference to the above, you have been selected as the Successful Bidder for Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning with power evacuation of solar PV technology-based grid interactive power plants.

Note:

1. Above rate shall include Cost of CMC for 10 Years, cost of design, engineering, supply, installation, testing, commissioning with power evacuation and acceptance of solar project with insurance.
2. Tax (GST) rates shall be as per the actuals at the time of invoicing as per the prevailing tax rules in India.

You are requested to submit the signed documents within a maximum period of fifteen (15) Days from the date of issue of this Letter of Award, without any fail, else your Bid shall be liable for rejection and the Bid Security submitted to us shall be forfeited.

Sl. No	Critical documents
1.	Acceptance to the LOA by signing the copy of the LOI along with an official seal, date, and submission to OREDA
2.	Land Lease Agreement(LLA) to be signed along with the sketch map of the land issued by the tahsil office. (OREDA will share the format along with LOI)
3.	Submission of Performance Security as per ITB Clause **Error! Reference source not found.**
4.	Submission of a Detailed Workplan in line with the Project Timelines mentioned in the SOW Clause 3.4.1 for the implementation of Project.
5.	Submission of a site survey report with the finalization of the exact location of the Project and the plan for the finalization of loads for the purpose of implementation of the Project.
6.	Single line diagram of the Project.

Sl. No	Critical documents
7.	Design document of the module mounting structure and other mounting structure, of the Project along with a STAD pro analysis report as a part of the mandatory submission, if applicable.
8.	Bill of materials along with spares and all relevant equipment test certificates
9.	Proof of Local office (registered office address in Odisha)

Date: [DD MMM YYYY]
Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.2.8 LOI Form 2 (Performance Security)

Performance Security (in the form of a Bank Guarantee)

(To be submitted on a non-judicial stamp paper of appropriate value as per The Indian Stamp Act,1899 relevant to the place of execution. The stamp paper shall be purchased in the name of the issuing bank only.)

Bank Guarantee (BG) no.: [insert BG no.]

Date: [DD MMM YYYY]

To

The Chief Executive Officer
OREDA Limited (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

WHEREAS M/s. [insert name of the Successful Bidder] having its registered office at [insert address] (hereinafter called "the Successful Bidder") has been selected as the Successful Bidder for the selection as an vendor for Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM KUSUM A project, including design, engineering, supply, construction, erection, testing, and commissioning with power evacuation of solar PV technology-based grid interactive power plants with reference to

1) Expression of Interest (EOI) no. [insert EOI no.] dated [DD MMM YYYY],
2) Letter of Intent (LOI) no. [insert LOI no.] dated [DD MMM YYYY],
3) Work Order no. [insert Work Order no.] dated [DD MMM YYYY]
4) Letter of Award (LOA) no. [insert LOA no.] dated [DD MMM YYYY].

AND WHEREAS it has been stipulated by OREDA in the said Bidding Document that the Successful Bidder shall furnish OREDA with a Bank Guarantee from a nationalized or scheduled commercial bank for the sum specified therein, as Performance Security for compliance with its obligations in accordance with the Bidding Document, the Letter of Intent and the Work Order to be issued by OREDA.

AND WHEREAS we have agreed to give the Successful Bidder such a Performance Security in the form of this Bank Guarantee. NOW THEREFORE we hereby affirm that we are the guarantors and responsible to OREDA on behalf of the Successful Bidder for an amount up to a total of INR [Amount of the Bank Guarantee in words]([Indian Rupees in figures]) only and we undertake to pay OREDA upon OREDA's first written demand declaring the Successful Bidder to be in default under the various provisions of the Bidding Document and/ or the Work Order to be issued by OREDA and without cavil or argument, any sum or sums within the limits of the amount of Bank Guarantee, as aforesaid, without OREDA's need to prove or to show grounds or reasons for the demand or the sum specified therein. We hereby waive the necessity of your demanding of the said demand from the Successful Bidder before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Bidding Document and/ or the Work Order to be issued by OREDA to be performed thereunder or any of the contract documents which may be made between you and the Successful Bidder shall in any way release us from any liability under this Bank Guarantee and we hereby waive notice of any such change, addition or modification.

This Bank Guarantee shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the issuing bank.

This Bank Guarantee shall be a primary obligation of the issuing bank and accordingly OREDA shall not be obliged before enforcing this Bank Guarantee to take any action in any court or arbitral proceedings against the Successful Bidder, to make any claim against or any demand on the Successful Bidder or to give any notice to the Successful Bidder or to enforce any security held by OREDA or to exercise, levy or enforce any distress, diligence or other processes against the Successful Bidder.

This Bank Guarantee shall be interpreted in accordance with the laws of India and the courts at Bhubaneswar, Odisha shall have exclusive jurisdiction.

This Bank Guarantee shall be effective only when the Bank Guarantee is issued to the account holder "OREDA Limited" in the bank and branch "Axis Bank Ltd., Satyanagar, Bhubaneswar" having the account no. 924020075365443 IFSC code UTIB0000024.

Notwithstanding anything contained herein above our liability under this guarantee is restricted to INR [insert] (Indian Rupees [in words]) only and it shall remain with an expiry date up to [DD MMM YYYY, [insert] months from the original last date of submission of Bid] with a claim date up to [DD MMM YYYY, 12 months from the date of expiry] and shall be extended from time to time for such period, as may be desired by M/s. [insert the Successful Bidder name] whose behalf this guarantee has been given.

Our branch at [Name and address of the branch] is liable to pay the guaranteed amount depending on the filing of the claim and any part thereof under this Bank Guarantee only and only if you serve upon us at our [Name and address of the branch] branch a written claim or demand and received by us at our [Name and address of the branch] branch, otherwise the bank shall be discharged of all liabilities under this guarantee thereafter.

In witness whereof the Bank, through its authorized officer, has set its hand and stamp on [DD MMM YYYY] at [insert location of signing].

(Signature of the authorized officer of the Bank)
Name and designation of the officer
Seal, name and address of the Bank and address of the Branch
Power of attorney no.:
WITNESSES

Signature:	Signature:
Name:	Name:
Address:	Address:

Note:

1. This Bank Guarantee format is prepared in line with the Annexure-II of Finance Department Office Memorandum 4939 dated 13 Feb 2012, Govt of Odisha [Ref Para 22(i1].
2. Please ensure that each page of the Bank Guarantee is duly signed by the authorized signatory of the issuing bank and stamp of the issuing bank is affixed thereon.
3. Please ensure whether the last page is signed with full particulars including two witnesses under the seal of Bank as required in the prescribed format.
4. Please ensure that the date, purpose of purchase of stamp paper and name of the purchaser are indicated on the back of the stamp paper under the signature of the stamp vendor. The date of purchase of stamp paper shall be not later than the date of execution of the Bank Guarantee.
5. In case of any overwriting, cutting, etc. on the Bank Guarantee have been properly authenticated under signature and seal of the authorized office of the issuing bank.

7.2.9 LOI Form 3 (Sample format for CMC)

Sample format for Comprehensive Maintenance Contract (CMC)

CMC ref no: [insert]
Date: [DD MMM YYYY]
Sub: CMC for Expression of Interest (EOI) invited for EPC Contractors: Collaborate with Landowners/Farmers to Lease Land and Execute the PM Kusum A Project, Including Design, Engineering, Supply, Construction, Erection, Testing, Commissioning, power evacuation & operation, maintenance for 10 years of Solar PV Technology-Based Grid Interactive Power Plants.

Ref:

1. EOI no. [insert] dated [DD MMM YYYY]
2. EOI no. [insert] dated [DD MMM YYYY]
3. Letter of Intent (LOI) no. [insert LOI no.] dated [DD MMM YYYY],
4. Work Order no. [insert Work Order no.] dated [DD MMM YYYY]
5. Letter of Award (LOA) no. [insert LOA no.] dated [DD MMM YYYY].

The Comprehensive Maintenance Contract (CMC) is signed jointly between the two (2) Parties on this [insert] day of [insert] month in the year [insert] at Bhubaneswar, Odisha and shall come into force from the date of its signing.

CMC for maintenance of Project as per the details provided in the EOI and installed by M/s [insert the name of the Successful Bidder] for a CMC Period of ten (10) years from the date of Commissioning of the Project.

This CMC is executed between OREDA Limited (OREDA) having registered office at S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha, herein after called as the First Party and M/s [insert the name of the Successful Bidder] having registered office at [insert address of the Successful Bidder] herein after called as Second Party, for the maintenance for a period of ten (10) years from the date of Commissioning of the Project, as per the details of the Project provided in Annexure Clause 20.2.

The Second Party will maintain the Project as per the terms and conditions mentioned hereunder:

1. It has been envisaged in the Work Order under Article [insert] that the Project shall be warranted against any manufacturing defect and bad workmanship during the CMC Period of Ten (10) years from the date of Commissioning of the Project. As these Projects have been Commissioned after issuance of a Commissioning Certificate. Hence, the Second Party is fully responsible for their trouble-free maintenance and the Second Party is liable to rectify/ remove any defect noticed within the aforesaid CMC Period, free of cost.
2. The Second Party will impart training to at least two (2) designated persons from the organization to be able to provide first aid repair service for the SPV systems.
3. The Performance Security has been submitted only in the form of the Bank Guarantee and the Bank Guarantees were issued in favour of Chief Executive Officer, OREDA Limited payable at Bhubaneswar, Odisha for an amount, expiry date and claim date as mentioned below:

   The Performance Security has been submitted for an aggregate amount equivalent to ten percent (10%) of the initial Capex in one (1) parts, as given below:

4. The CMC includes repair/ replacement of all spares, consumable and all the Equipment of the solar power system during the CMC Period or warranty period.
5. The Second Party shall establish a central office at Bhubaneswar, Odisha, and establish local offices at the concerned district so as to deliver uninterrupted and sustainable Comprehensive Maintenance during the CMC Period duly headed by a Service Engineer.
6. The Second Party shall undertake corrective maintenance upon receiving of complaints by consumers at CRC-OREDA or direct contact. After attending to the defect, the Second Party shall upload the required documents at ReSolve mobile application for successful closure of the complaints. The Second Party shall ensure rectification of defects and restore functionality within seven (7) Days of lodging of the complaints. For any deviation, the second party shall intimate in written to both the beneficiary and OREDA Limited.

7. The Second Party shall undertake scheduled maintenance work as per the prescribed format attached in Annexure Clause 7.5.7 and 7.6.7 and upload the required details and documents in the ReSolve mobile application strictly according to the given schedule. The Second Party shall also abide by any intimation of new format or documentation platform by the First Party.
8. The Second Party shall apprise the First Party about the requirements and supply of spares during warranty as well as CMC Period.
9. Annual report from CRC-OREDA shall be considered as a token of verification of maintenance done and release of an annual payment towards CMC as specified in the work order upon completion of each year of the CMC Period along with the performance report/certificate issued by concerned OREDA Field officials.
10. It will be the liberty of the First Party to crosscheck the systems maintained by the Second Party. Random verification of the maintenance may be carried out by the First Party wherever necessary. The Second Party must ensure that, the solar power project (as applicable) should be in operational condition before handing over the RE asset to the concerned beneficiary/OREDA Limited after expiry period of the CMC Period or Warranty Period.
11. The Second Party may continue to maintain the gadgets after the expiry of the CMC Period up to ten (10) years from the date of Commissioning of the Project, provided the Department/ First Party desires. During the Ten Years of CMC Period, the period (no of days) for which the power plant remain defunct shall be automatically added with the CMC period (in addition to the First Ten Years from date of commissioning of the solar power plant)
12. For the adjudication of any dispute between the two (2) Parties arising on the execution of this CMC, the matter shall first be brought to the notice of Chief Executive Officer, OREDA Limited.
13. In case there will be no amicable settlement of the issues, the matter can be referred to the court of law having jurisdiction at Bhubaneswar, Bhubaneswar only.

For and on behalf of OREDA Limited (First Party),

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory of OREDA: [insert name]
Designation: [insert designation]
OREDA Limited
Seal: [insert seal of the Bidder]

For and on behalf of M/s …… (Second Party)

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.3 Pre-bid Form

Pre-bid queries

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]

EOI no.: [insert EOI no.] dated [DD MMM YYYY]

To

The Chief Executive Officer
Odisha Renewable Energy Development Agency (OREDA)
Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.
Email: ceoreda@oredaorissa.com

Sub: Submission of pre-bid queries against the EOI for Expression of Interest (EOI) invited for EPC contractors to collaborate with landowners/farmers to lease land and execute the PM Kusum A project, including design, engineering, supply, construction, erection, testing, and commissioning with power evacuation of solar PV technology-based grid interactive power plants.

We are pleased to submit the following pre-bid queries:

Sl. No.	Clause no.	Page no.	Clause	Clarification sought	Rationale
1					
2					
3					
4					
5					

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

7.4 Appendix to SOW – On Grid Solar PV based applications

7.4.6 Appendix Form 1 (Technical Specifications)

7.4.6.1 Project Overview

EPC Contractors: Collaborate with Landowners/Farmers to Lease Land and Execute the PM Kusum A Project, Including Design, Engineering, Supply, Construction, Erection, Testing, Commissioning, power evacuation & operation, maintenance for 10 years of Solar PV Technology-Based Grid Interactive Power Plants.

7.4.6.2 Solar Plant Technology

OREDA has opted to develop the project based on Crystalline solar PV modules. Contractor can decide upon the choice of module mounting arrangement with fixed/seasonal tilt along with String/Central Inverters. However, the contractor has to ensure the minimum annual CUF of 16%.

7.4.6.3 Power Evacuation

Power evacuation shall be nearest 33/11kV transmission line.

7.4.6.4 Generation Guarantee

The annual solar generation has to be quoted by the Bidder in MU in the relevant section of the Bid Document. The Bidder shall guarantee the Quoted Annual Energy Generation at metering point during the O&M period. Bidder shall adopt PV module mounting arrangement with fixed/seasonal system to achieve the coated generation.

7.4.6.5 Other Details

S. No.	Item	Details
1.	Water requirement during construction	To be arranged by Bidder
2.	Power requirement during construction	To be arranged by Bidder
3.	Chief Electrical Inspector Clearance	To be arranged by Bidder
4.	Connectivity with OPTCL/DISCOM substation	To be arranged by OREDA
5.	Internal Road	To be arranged by OREDA

7.4.6.6 Design Consideration and Scope of Supply & Services

7.4.6.6.1 Intent of Specifications

The scope of the proposal for the Design, Engineering, Supply, Construction, Erection, Testing, Commissioning with power evacuation, power evacuation including five (05) years of Operation and Maintenance (O&M) works of the Solar PV plant on turnkey basis. Along with completely covering the following activities and services in respect of all the equipment &

works specified and covered under the specifications and read in conjunction with “Scope of Supply & services” elaborated elsewhere.

All equipment, materials and services whether explicitly stated or otherwise and that are necessary for the satisfactory operation of the Solar PV system as per prevailing technical standards and requirements and its integration with the existing ac systems as described in the specification shall be deemed to be included in the scope of work of the Contractor and shall not be limited to the following:

- Basic Engineering of the plant and systems.
- Detailed design of all the equipment and equipment system(s) including civil works.
- All associated power and control cabling, electrical system required and its design criteria etc.
- Lighting, CCTV, SCADA, Fire alarm system, firefighting system etc. as per requirement.
- Complete earthing system including lightning protection system.
- Complete module cleaning system and its associated facilities.
- All civil jobs including access roads, storm water channels, cable routes, foundation, structural, earthing, control room/security buildings etc.
- All electrical equipment & switchgear required for the project including installation of all electrical cables, panels, other equipment, tool & tackles, equipment/gadgets required for proper installation, commissioning of solar PV system.
- Providing, Review and approval of engineering drawings, data, process Calculations, test procedures, structural design calculations, Equipment layout, Drawings/Data sheets of bought out items, civil structural/architectural Drawings, Performance & Guarantee Test procedure etc.
- Providing Operation & Maintenance/ instruction manuals, as built drawings and other information.
- Providing training of Employer’s personnel
- Manufacturing quality plans and Field quality plans.
- Verified Bill of Quantity.
- Statutory clearances, if any.
- Fortnightly and monthly progress report.
- Safety adherence at site.
- IER adherence while erection of electrical works.
- Closure report after site completion.
- Complete manufacturing including conducting all type, routine and acceptance tests; Civil, Structural and Architectural works to the extent applicable, including construction facilities and construction power distribution.
- Packing and transportation from the manufacturer’s works to the site including

- customs clearance & port clearance, port charges, (if any).
- Receipt, storage, preservation and conservation of equipment at the site; Fabrication, pre-assembly, (if any), erection, testing, pre-commissioning and commissioning and putting into satisfactory operation all the equipment including successful completion of initial operation
- Reliability and Functional guarantee tests after successful completion of trial operation;
- Supply of spares
- Satisfactory completion of the contract.
- Special tools and tackles if any required for maintenance of the plant.
- Operation and maintenance of the solar plant

1.1 The work to be carried out as per the above scope shall be all in accordance with the requirements, conditions, appendices etc. given in Technical Specifications (Section- 7.5.1) together with those stated in other Sections/Sub-sections of Bid Documents which shall be considered as a part of this volumes completely as if bound herewith. It is not the intent to specify herein all aspects of design and construction nevertheless, the equipment's and civil works shall conform all aspects to high standard of engineering, design and workmanship and shall be capable of performing continuous commercial operations in a manner acceptable to the Employer, who will interpret the meaning of the specification and drawings and shall have a right to reject or accept any work or material which in his assessment is not complete to meet the requirements of this specification and/or applicable Indian / International standards mentioned elsewhere in this specification. The Bidder shall be responsible for providing all materials, equipment and services, specified or otherwise (unless specifically excluded) which are required to fulfill the intent of ensuring operability and the reliability of the complete system covered under this specification.

1.2 Bidders are requested to carefully examine and understand the specifications and seek clarifications, if required, to ensure that they have understood the specifications. Such clarifications should be sought within the time period as stipulated in section ITB. Bidder's offer should not carry any sections like clarifications, interpretations and/or assumptions. However, if the bidder feels that, in his opinion, certain features brought out in his offer are superior to what has been specified, these may be highlighted separately.

1.3 The Bidder shall be responsible for providing all material, equipment and services, specified or otherwise which are required to fulfill the intent of specification and ensuring operability, maintainability and the reliability of the complete work covered under this specification.

1.4 Failure of any equipment to meet the specified requirements of tests carried out at works or at site shall be sufficient cause for rejection of the equipment. Rejection of any equipment will not be held as a valid reason for delay in completion of the works as per schedule. Contractor shall be responsible for removing all deficiencies and supplying the equipment that meet the requirement.

1.5 Before submitting his bid, the bidder should inspect and examine the sites and its surroundings and should satisfy himself as to the nature of the ground and subsoil, the quantities and nature of work, materials necessary for completion of the work and their availability, means of access to sites and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances

which may influence or affect his offer. No consequent extra claims on any misunderstanding or otherwise shall be allowed.

1. Basic Engineering Design Parameter of Solar PV Plant

2.1 Plant Capacity: 2 MW (DC).

2.2 **Inverter Capacity**: The continuous combined rating of all PCUs/Inverters shall not be less than Plant capacity at until power factor at ambient temperature of 50 deg C and 0.95 p.f. at 40 deg C.

2.3 33/11 kV Switchgear

- 33/11kV Bus bar rating shall be as per single line diagram approved by OREDA.
- 33/11kV switchgears system fault current rating shall be as single line diagram. Dynamic withstand current rating shall be 2.5 times of system fault current.
- Spare 33/11kV breaker panels with VCB, relay and all other accessories shall be provided. VCB with protection relay shall be used at all switchgear panels including 33/11kV Aux transformer feeder (if provided).
- DC supply shall be used for control and protection supply of switchgear. In case UPS AC supply are considered for auxiliary control and protection supply for switchgear, then suitable rated AC/DC converter/ power pack shall be used to meet the DC control supply requirement of switchgear panels.
- HT switchgear shall be indoor or outdoor type.
- The 33/11kV switchgear (both indoor and outdoor type) shall conform to the standards of the Internal Arc classification as per IEC 62271-200

2.4 Outdoor containerized solution/compact substation with inverter, inverter transformer & HT switchgear as inverter station are acceptable. However, technical specification of inverter, HT switchgear and inverter transformer as per relevant chapter of technical specification shall be applicable.

2.5 Metering: ABT Meter has to be provided

2.6 Licenses for Remote (web) Monitoring of SCADA: 2 Nos concurrent viewing.

The detailed scope of work in accordance with this specification is elaborated below. The scope of the contractor shall be deemed to include all such items which although are not specifically mentioned in the bid documents and/or in contractor's proposal but are needed to make the system complete in all respects for its safe, reliable, efficient and trouble-free operation and the same shall be furnished and erected unless otherwise specifically excluded as per Section Terminal Points & Exclusions.

2. DETAILED ENGINEERING OF THE ELECTRICAL SIDE OF THE SOLAR PV

3.1 Detailed design of Grid Interactive Solar PV Plant and its associated civil, electrical & mechanical auxiliary systems includes preparation of foundation drawings, single line diagrams, installation drawings, electrical layouts, design calculations etc. Design memorandum and other relevant drawings and documents required for engineering of all facilities within the scope to be provided under this contract, are covered under Contractor's scope of work.

3.2 SUPPLIES & ASSOCIATED WORKS

DC SIDE	
	Solar PV Modules
	Modules Mounting Structure (MMS) along with Foundation
	DC Cables including MC4 connectors and DWC pipes

	String Combiner Box
	Power Conditioning uEOI
AC SIDE	
	LT Switchgear
	HT Switchgear
	Inverter Transformer& Auxiliary Transformer
	LT Cables
	HT Cables
	SCADA & Time Synchronization Equipment
	Instrumentation and Communication cable
	Earthing System
	Lightning Protection System
	Plant Illumination System
	Auxiliary Power Supply System
	Battery and Battery Charger/UPS

	Tie-Transformer
	11/22 kV Switchyard Bays
	Conductors
	Grid interfacing so as to meet statutory requirements and comply with CERC code.
GENERAL SYSTEMS	
	Weather Monitoring Station
	Fire Detection and protection system
	Module Cleaning system

3.3 CIVIL WORKS

The broad scope of work under this package shall include Civil Structural and architectural works related to but not limited to the following areas, System, Structures/ Substructures, Buildings and Facilities:

Procurement of construction power and water supply
Construction of Central Monitoring and Control Station (CMCS) with switchgear room, one number.
Construction of Inverter room/Pre - Engineered Building (PEB) as per bidder's proposal.
Design and construction of Internal Roads as per Bidder's proposal
Foundation: Requisite foundation and structures wherever required

Design and construction of Drainage system as per General layout and Topography
Rooms: Construction of Central Monitoring and Control Station (CMCS), Inverter room, Main pooling switchgear, security room, Gate complex
Design and construction of a module cleaning system. Water supply arrangement for cleaning.
Cable Routing: Requisite cable routing through cable trenches/ trestle and/ or cable tray, Wherever required.
Construction of Store Room, One number.
Design and construction of Sewerage System for any facility/ Room /building
Switchyard Civil works
Civil Foundations for all electrical items and 33/11kV systems
Additional civil works
Fencing/Boundary: Fencing/boundary to be constructed for Inverter station, Power Transformer, WMS

3.4 TELEMETRY

Telemetry Requirement: The arrangement to transmit data required by the Load Dispatch Centre (LDC) from solar Plant to OPTCLDISCOM as per extant regulations and procedures for grid management up to 33/11 kV control room/CMCS room near Plant Boundary shall be in contractor's scope. Necessary software and Hardware, including laying of Communication/Fiber Optic cable up to Switchyard control room required for communication of plant data from Solar plant SCADA to Load Dispatch Center (LDC) is included in the contractor's scope. Communication link and communication controller/Gateway used for data communication to LDC shall be redundant (one for normal operation and other as hot standby). Bidders are advised to update themselves with State LDC requirement for compliance related to Automatic Meter Reading (AMR), telemetry data, channel and procedures for engineering of telemetry solution accordingly.

3.5 SCADA HMIS /Server Equipment

S. No.	Description	Quantity
1	Engineering cum Operator work station workstation (EWS+OWS) (Desktop & MoEOIor)	01 Set
2	Operator work station (OWS) (Desktop & MoEOIor)	01 Set
3	Portable (laptop based) EWS	01 No
4	Historian (Desktop)	01 No
5	50 Inch LED display	01 No
6	Time Synchronization equipment	01 No
7	Control Desk	1 Set
8	Chairs for Control Desk	04 Nos

9	Laser Printer	01 No

3.6 TESTING

During detailed engineering, the contractor shall submit for OREDA approval the reports of all the type tests as listed in this specification. Unless specified, the type test should have conducted within last ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.

However, if the contractor is not able to submit report of the type test(s) conducted within applicable period or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client /owner's representative and submit the reports for approval.

All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.

3.7 PAINTING

The bidder's scope of work includes painting of all equipment's and structures as per the OREDA standard colour coding scheme. The painting shall include required application of finish paint indicated elsewhere in the Technical Specification. The quality and finish of paints shall be as per standards of BIS or approved equivalent.

3.8 TRAINING OF EMPLOYERS PERSONNEL

The bidder shall provide training (free of cost) to the personnel of OREDA for 15 man-days at his works and at site for erection, testing, commissioning and O&M. Expenses towards travel, lodging, and boarding and other expenses for the personnel shall be borne by OREDA.

3.9 PERFORMANCE GUARANTEE (PG) TEST

The performance guarantee tests shall be carried out as specified elsewhere in the Technical Specification. All special equipment, tools and tackles instruments, measuring devices required for the successful conductance of PG test shall be provided by the bidder, free of cost. All costs associated with the PG tests shall be included in bid price.

Minimum guaranteed generation at metering point by shall be as per separate clause of this chapter. Bidder shall adopt module mounting arrangement with fixed/seasonal tilt as outlined in the specification to achieve the quoted generation.

3.10 OPERATION AND MAINTENANCE (O&M)

Comprehensive O&M of the entire facilities located in the solar plant for a period of **five (05)** years from the date of successful completion of trial run is in the scope ofthe bidder.

3. CODES AND STANDARDS

All works shall be carried out as per the standards/codes (IEC, IS etc) referred in the specification. All standards, specifications and codes of practice referred to shall be the latest editions including all applicable official amendments and revisions as on date of opening of bid. In case of conflict between this specification and those codes/standards referred the former shall prevail.

Equipment's complying with other internationally accepted standards such as BS, UL, DIN, VDE etc. will also be considered, if they ensure performance and constructional features equivalent or superior to standards listed in the specification. In such case the Bidder shall clearly indicate the standards adopted, furnish a copy in the English of the latest revisions in force as on date of opening of bid and shall clearly bring out salient features for comparison

4. APPROVALS

The scope of the bidder includes complete design and engineering, technical coordination (including participation and arranging technical coordination meetings), finalization of drawings / documents, submission of engineering drawing / documents and processing of their approvals by the Employer as per relevant clauses of bid document and other relevant clauses given elsewhere in the Technical Specifications. Further, the scope shall also include submission, in proper shape & format, of all types of manuals, handbooks & documents in requisite numbers to OREDA at different phases of the project as per the requirement of Employer. The contractor shall have to arrange technical coordination meetings and ensure participation.

5. TERMINAL POINT

The terminal point under the scope of this assignment shall be termination to 11/33 kV Line Take-off Gantry. Bidder shall furnish all relevant data required by OREDA at interface points within schedule as agreed prior to award of contract.

6. SPARES

The Bidder shall include in his scope of supply all the mandatory spares as per regulation as described elsewhere in the specifications.

7. DC SYSTEMS

8.1 Solar Photovoltaic (SPV) Modules

The Solar PV module comprises of PV cell(s) connected in any combination to achieve the required module power output. PV cells directly produces DC power on receipt of solar irradiation.

8.1.1 CRYSTALLINE SILICON MODULES (C-Si)

The PV cells in a crystalline silicon module shall be protected by encapsulation between front glass and back sheet/back glass. The glass shall be made of high transmissivity and front surface shall give high encapsulation gain. The technical details of Solar PV Modules shall be as given below:

Sl. No.	Description	Details
1	Type of SPV Module	Crystalline Silicon
2	Peak Power rating of Module	Shall not be less than 400Wp
3	Module Efficiency	Minimum 20 % at Standard Test Conditions
4	Fill Factor	0.7(Minimum)

8.1.2 CODES AND STANDARDS

The applicable codes and standards are as mentioned below:

Codes	Description
IEC 61215 -2016	Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval
IEC 61730 – 1 -2016	Photovoltaic (PV) module safety qualification – Part 1: Requirements for construction
IEC 61730 – 2 -2016	Photovoltaic (PV) module safety qualification – Part 2: Requirements for Testing
IEC 61701 – Edition 2.0 2011-12	Salt mist corrosion testing of photovoltaic (PV) modules
IEC 62804 – 1: 2015	Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation - Part 1: Crystalline silicon

8.1.3 TECHNICAL REQUIREMENTS

a) The temperature co-efficient of Power for the module should be better than - 0.45% per deg C. Each and every SPV module shall conform to standards mentioned in 1.2 above and no negative power tolerance shall be accepted. Additionally, the Module wattage band/bin offered shall not be less than 5Wp. Each inverter shall use only one type (Make and Nominal rating) of module.

b) Module shall be made up of crystalline silicon cells. The module should be PID resistant. The front glass used to make the crystalline silicon modules shall be toughened low iron glass with minimum thickness of 3.2 mm (2.5mm for glass- to-glass module) for 72 cell module. The glass used shall have transmittance of above 90% and with bending less than 0.3% to meet the specifications.

c) The module shall not be subjected to any point load during transportation, handling and erection and complete care has to be taken to avoid any undue loading on either side of the module.

d) The interconnected cells shall be laminated in vacuum to withstand adverse environmental conditions. The EVA used for the modules should be of UV resistant in nature with gel content of more than 70%. The back sheet used in the crystalline silicon-based modules shall be of 3 layered structures. The thickness of back sheet should be of minimum 300 microns with water vapor transmission rate less than 2.0g/m2/day (38°C at 90% RH). The Back sheet can be fluoropolymer based or of any other well proven technology details of which shall be submitted and reviewed during detailed engineering and shall be subject to Employer's approval. The back sheet shall have globally benchmarked durability properties on Moisture barrier, Tensile Strength (Machine Direction & Transverse Direction), Elongation retention and UV stability and shall be able to withstand system voltage. In case of glass-to-glass module, the back glass shall have a minimum thickness of 2.5mm.

e) The module frame shall be made of corrosion resistant materials, preferably having aluminum anodized finish. The anodizing thickness shall be 15 microns or better. In case the offered module is frameless, suitable retaining clips/clamps used for installing the modules shall not damage the glass surface in contact with the retaining clamp.

f) Module(s) shall be provided with minimum three (03) bypass diode.

g) Junction box(es) of the module should be of high-quality IP 65 or better rated fitted at the back side which should be weather proof and designed to be used with standard wiring or conduit connection. Each Junction Box shall contain Bypass Diode.

h) It is to be ensured that the Modules installed on an MMS Table, in two rows, should be connected to each other so as to minimize the shading effect. The same is to be achieved by connecting the modules in the upper row of two consecutive tables in series. Similarly, the modules in the lower row are to be connected in series and to be kept separate from the modules in the upper row.

i) SPV module shall perform satisfactorily with ambient temperatures between - 10°C & +60°C and shall withstand gust up to 150 Km/h on the surface of the panel.

j) Solar PV modules used in solar power plants/ systems must be warranted for the product Workmanship (process and materials) for a period of minimum 10 years. Further, they shall also be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years from the completion of the trial run.

k) The bidder shall provide the sample solar PV module electrical characteristics including current-voltage (I-V) performance curves and temperature coefficients of power, voltage and current.

l) The minimum design clearance (at the highest tilt angle) between the lower edge of the modules and the developed ground level shall be 400 mm. A tolerance of +/-50mm shall be allowed as per site conditions.

m) Each PV module deployed must use a Radio Frequency identification (RFID) tag for traceability. RFID shall either be placed behind name plate sticker or behind bar code label pasted on the back glass of PV module and must be able to withstand harsh environmental conditions during the module lifetime. One number RFID reader has to be supplied by the bidder which has to be compatible to read the data from the RFID Tag & download the data to Computer. All associated Software & Cables are to be provided along with the RFID reader. The following information must be mentioned in the RFID used on each module.

    1. Name of the manufacturer – PV Module
    2. Month & year of the manufacture of the module
    3. Country of origin
    4. I-V curve for the module
    5. Wattage, Im, Vm and FF for the module
    6. Unique Serial No. and Model No. of the module
    7. Date and year of obtaining IEC PV module qualification certificate
    8. Name of the test lab issuing IEC certificate
    9. Other relevant information on traceability of solar cells and modules as per ISO 9001

n) All the modules in the PV plant should be arranged (azimuth angle), in a way so as to minimize the mismatch losses.

o) Each module should have two suitably sized stranded UV resistant cables and terminated with DC plug-in connector directly. The positive (+) terminal has a male connector while the negative (-) terminal has a female connector. The connectors used for interconnecting the modules and connectors used for connecting the strings and/or to the String Combiner Box, i.e. field connectors shall be of same make for better compatibility (refer Connectors chapter elsewhere for detailed Specification of Field Connectors). In case, 1500 V modules are used, the connecting cable shall be as per the relevant standard.

p) The bidder has to submit, along with the data sheet of the module, a detailed Bill of Material (BoM) elaborating on the properties, such as, thickness, material composition etc. of the major components of the module which shall be same as per the type tested and approved Constructional Data Form (CDF).

8.1.4 NAME PLATE

All individual modules shall be provided with a Name Plate label at the back of module which shall provide the information given below for identification. They shall be clearly visible and shall not be hidden by equipment wiring. Type of labels and fixing of labels shall be such that they are not likely to peel off/ fall off during the life of the panel.

1. Manufacturer's Name
2. Model Number, Serial Number
3. Overall Dimensions (W x L x D)
4. Weight (kg)
5. Maximum Power (PMAX), Voltage (VMP), Current (IMP)
6. Short Circuit Current (ISC), Open Circuit Voltage (VOC)
7. Main System Voltage
8. Relevant standards, Certification lab. Name
9. Warnings, if any

8.1.5 TYPE TEST

SPV modules must be tested and certified by any of the accredited certifying agencies according to above mentioned International Standards at clause 8.1.2 above and the type test reports shall be submitted for approval.

Note:

The Module Manufacturer, along with the Module datasheet, shall also provide the Details about the PV Cells used for the offered PV Modules. The information shall contain Cell Source, Type, and Electrical Parameters including efficiency, Size, Number of Bus bars and any other relevant information. (For Crystalline Silicon Modules)

In case the successful bidder supplies PV Modules of different make and/or model or from different agencies, the fixing holes in the frame/ location of retaining clips, their location, diameter, center-to-center distance between them and all other attributes related to mounting should be same, if applicable.

Bidder shall submit third-party verified PAN files for one module in each wattage bin offered and self-certified Electro- Luminescence (EL) and Flash test reports of all the PV Modules being offered to OREDA.

8.1.6 MODULE MOUNTING STRUCTURE (MMS)

The PV modules shall be mounted on metallic structures called Module Mounting Structures (MMS) having adequate strength and appropriate design, which can withstand the load of the modules and design wind pressure:

8.1.6.1 Codes and Standards.

The applicable codes and standards are as mentioned below:

1	IS 875: Part 1 & 2	Code of practice for the design loads for buildings and structures-
2	IS 875: Part 3	Code of practice for the design loads for buildings and structures-Wind Loads
3	IS 800: 2007	Code of practice for use of structural steel in general building construction
4	IS-4759	Hot-dip zinc coatings on structural steel and other allied products
5	IS 1868	Anodic Coatings on Aluminum and its Alloys

8.1.6.2 Technical Requirement

a) Modules shall be mounted on non-corrosive support structures. The Bidder can provide any of the following types of mounting arrangement:
   - **Fixed Tilt**
   - **Seasonal Tilt**- Mounting arrangement shall have provision to adjust it at two or three angular positions. The angular difference between two consecutive tilt positions shall not be less than 5 degrees.
   - The Bidder can also provide, the combination of the two arrangements. However, all modules corresponding to any inverter shall have the similar type of arrangements

b) Mounting structures shall be designed to withstand the extreme weather conditions in the area. The site design wind speed factors k1, k2, k3 and k4 shall conform to IS 875 (Part-3): 2015 for the design of MMS

c) The structural material, corrosion protection and design, shall be as per Design Criteria for Module Mounting Structures (MMS) described elsewhere in this specification.

d) The proposed foundation system for MMS shall be as per the geotechnical investigation report.

e) The design philosophy and the calculations for the MMS and the foundation system shall be submitted for prior approval of OREDA before the commencement of construction.

f) Further details related to structures and foundations have been mentioned in the chapter on civil works of this specifications.

g) In case, String Combiner Box (SCB) are to be mounted on the Module Mounting structures, bidder to take into consideration the load of SCB during the design of MMS. Further suitable supporting members for mounting the SCB on the MMS shall also be within the scope of the bidder.

h) Suitable provision of a mechanized arrangement for seasonal tilting of the Module Mounting Structure shall also be provided. The same may be provided using the jacks placed below the MMS at few locations and used for lifting the MMS. The Bidder may also propose alternate mechanized arrangement subject to OREDA approval.

i) All bolts of module mounting structure and its foundation shall be immediately tightened upon erection to ensure that no damage happens to the MMS and

panels due to heavy winds arising during the erection period.

8.1.6.3 DC Cables

The DC Cables in a solar PV plant are used in the following areas

a) Interconnecting SPV modules
b) From SPV Modules up to SCB/SMU
c) From SCB/SMU up to the Inverter

8.1.6.4 DC CABLES (Interconnecting SPV MODULES and from SPV Modules to SCB/SMU)

a) Cables used for inter-connecting SPV modules as well as Modules to SMU's shall conform to the requirements of **EN 50618:2014** applicable for DC cable for photovoltaic system.

b) This shall be applicable for both 1000V and 1500V modules.

c) These cables shall also meet the fire resistance requirement as per the above standard and shall be electron beam cured.

d) All cables except module cable used for (+) ve and (–) ve shall have distinct color identification.

e) In addition to manufacturer's identification on cables as per EN50618, following marking shall also be provided over outer sheath

i. Cable size and voltage grade
ii. Word 'FRNC' at every 5 meters
iii. Sequential marking of length of the cable in meters at everyone meter

f) The Printing shall be progressive, automatic, in line and marking shall be legible and indelible.

g) Type test, routine, acceptance tests requirements for these cables shall be as per EN50618:2014. All test charges shall be deemed to be included in the cable price. Sampling for acceptance tests will be as per IS 7098.

h) A maximum of 8 Cables (4 Circuits) shall be laid in one HDPE Pipe for DC Cable from Module to SMB. The fill factor of the pipe should not be more than 40%. However, in case of necessity to lay more than 8 cables (4 circuits) in one pipe, the same shall be allowed during detailed engineering and as per the derating factors recommended by the cable manufacturer. Fill factor criterion is still to be maintained. Bidder to ensure that there is no gap and proper packing at the junction of two pipes, in which DC cable is laid, using proper method and accessories, like bell mouth.

8.1.6.5 DC CABLES (STRING COMBINER BOX TO INVERTER)

Cables used between SCB/SMU's and Inverters shall be of min. 1.5 kV (DC) grade. In case bidder offers 1500V DC system 3.3 kV (E) grade cables shall be provided. These Power cables shall have compacted Aluminum/copper conductor, XLPE insulated, PVC inner-sheathed (as applicable), Armoured / Unarmoured, FRLS PVC outer sheathed conforming to IS: 7098 (Part-I). These cables shall confirm to the

requirements of the standards & codes specified at clause 1.0 of Chapter- LT Cables or any other relevant standard elsewhere in the specification.

All the requirement specified for LT POWER CABLES under clause 2.0, 4.0 & 6.0 of Chapter- LT Cables shall also be applicable to these cables.

8.1.6.5.1 DC Cable sizing criteria

The Maximum Overall Voltage Drop from Module to Inverter Transformer shall be limited to 3% of rated voltage.

8.1.6.6 String Combiner Box

String Combiner Box (SCB) is used in multi-string photovoltaic systems to combine the individual strings electrically and connect them to the Inverters. It shall have protection devices to protect the PV modules from current/voltage surges. Number of inputs to each SCB shall be decided during detail engineering based on the approved Single Line Diagram (SLD) submitted by contractor.

Vendor to note that DC system of both 1000 V- and 1500-Volt rating is accepted based on solar string/array design offered by contractor. Accordingly, component/assembly shall comply with 1000/1500 V rating as applicable.

Voltage rating of the selected component shall be 1000V or 1500V (Min.) as per system requirement during detail engineering.

SCB offered for 1500V application should have been already type tested and if type test reports are not available, for meeting the project schedule, Bidder/Sub-vendor shall take suitable steps quite in advance to ensure successful conduction of tests within two months from date of LOA.

8.1.6.6.1 Codes & Standards

SL NO.	CODES	DESCRIPTION
1.	UL 94 V	Fire Resistant/ flammability for Enclosure
2.	UL 746C	UV Resistant for Enclosure
3.	IEC 62262/EN 50102	Mechanical Impact Resistance for Enclosure
4.	IS 2147/IEC 60529	Degrees of protection provided by enclosures (IP Code)
5.	IEC 61643-12	Surge Protection
6.	IEC 62208	Enclosure for low voltageSwitchgear and control gear assemblies

Vendor shall submit the suitable Test Certificate/Report from accredited lab(s) indicating compliance of mentioned codes and standard if asked for the offered component or assembly.

8.1.6.6.2 General Requirement

SCB shall be equipped (but not limited to) with the following:

a) DC Disconnector /Breaker to disconnect the PV strings from the Inverter for maintenance purpose as per specification mentioned in this chapter.
b) All component in the SCB shall be suitable for operation within temperature range of 0-70 Deg C.
c) Fuse in each SCB input (both positive and negative) shall be provided to prevent the reverse short circuit current flow. However, in case of negative string fuse is not required as per recommendation of inverter manufacturer, string cable shall preferably be terminated with field connector with SCB.
d) Surge Protection Devices (SPD) for protection against surge currents and voltages as per specification given in separate clause. Other associated items like cable glands, lugs, Vents and items required for the protection and completeness of the system shall be provided
e) The common collection bus bars should be made up of zinc/tin coated copper and shall be suitably sized to limit temperature rise within safe operating limits.
f) Vendor shall ensure adequate clearance with suitable insulated separator between positive bus and negative bus if it is in same enclosure. Positive and Negative section shall be orientated horizontally (Landscape orientation) on the either side of separator. Separate compartment for negative section and positive section for termination of positive and negative string input shall be preferred.

8.1.6.6.3 DC SURGE PROTECTION DEVICES (SPD) for PV Solar Application.

DC output SPD shall consist of three Metal Oxide Varistors (MOV) type surge arrestors which shall be connected from positive and negative bus to earth. The discharge capability of the SPD shall be at least 12.5kA at 8/20 micro second wave as per IEC 61643-12 and shall be rated for MCOV 1000/1500 Volt DC. During fault and failure of MOV, the SPD shall safely disconnect the healthy system. SPD shall have thermal disconnector to interrupt the surge current arising from internal and external faults. In order to avoid the fire hazard due to possible DC arcing in the SPD due to operation of thermal disconnector, the SPD shall be able to extinguish the arc. SPD shall have local visual indication and potential free contact for remote indication

8.1.6.6.4 String Fuses

In order to provide protection to all cables and modules, string fuses shall be provided with strings. String fuses shall be of PV category and dedicated to solar applications and conform to IEC 60269-6 or UL-2579 standards and fuse base shall comply to IEC 60269-

1. String fuses should be so designed that it should protect the modules from reverse current overload. Fuses or Isolation Link shall be mounted in pull out type fuse holders. Fuse holders shall be suitable for DIN rail mounting. PCB mounted fuses are not acceptable. Fuse rating for single and combined input (limited to two) shall be 15 A and 30 A respectively suitable for 1000/1500 Volt for crystalline module. For Thin film modules, fuse rating shall be decided during detail engineering. In case of negative grounded system, string fuse as well as inverter input fuses on negative side shall be based on Inverter manufacturer's recommendation.

8.1.6.6.5 SCB Enclosure

SCB Enclosure shall satisfy the following requirement.

The enclosure shall be made of fire-retardant material with self- extinguishing property and free from Halogen, UV Protected. Material of the enclosure shall be made of GRP/FRP/Polycarbonate.

i. Degree of protection for enclosure shall be at least IP 65. All the part shall be corrosion resistant and enclosure surface shall be free from crazing, blistering, wrinkling, color blots/striations. There should not be any mending or repair of surface. Complete assembly shall be erected below suitable canopy/ rain cover or Modules at site.

ii. The mechanical impact resistance of enclosure shall be IK 07 or better.

iii. The size of the enclosure and general arrangement of the component shall be designed in such a way that the temperature rise of at any point of enclosure shall not rise more than 12 deg C above the ambient temp of 55 deg C. The components mounted inside the SCB shall have higher temperature withstand capability and shall continuously operate under such conditions.

iv. Complete assembled SCB shall be subject to heat run type test to be witnessed by owner after manufacturing. In case it is found that the temperature rise is beyond the acceptable limits, bidder shall redesign the assembly and perform the test free of cost to verify that temp. rise is within acceptable limit.

v. In each SCB 5% spare terminals along with cable glands and fuse rounded off to next higher integer shall be provided to connect the PV strings.

vi. All terminals' blocks shall be rated for min 1000V/1500 V and rated

vii. continuously to carry maximum expected current.

viii. In case, SCB is proposed to be mounted on the MMS structure, the additional load of the SCB shall be considered for the design of structure. If the SCB is proposed to be mounted on separate structure and is not protected from top, suitable canopy shall be provided on top of SCB extending minimum 50mm from all four sides. Design and dimensions of SCB structure must be such that minimum 600 mm of ground clearance is ensured at site for repair and maintenance. Drawing of such structure with mounting arrangement of SCB shall be submitted to OREDA for approval during detail engineering. All the erection hardware and mounting accessories shall be galvanized steel.

ix. All internal wiring shall be carried out with stranded copper wires with voltage rating mentioned elsewhere in the specification. All internal

wiring shall be securely supported, neatly arranged readily accessible and connected to component terminals and terminal blocks. Wire terminations shall be made with solder less crimping type of tinned copper lugs which firmly grip the conductor and insulation. Insulated sleeves shall be provided at all the wire terminations. Engraved core identification plastic ferrules marked to correspond with the wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on wires shall not fall off when the wire is disconnected from terminal blocks.

x. If metallic hinge is being used with enclosure cover, it shall be made of SS 304 and shall be rust proof. Enclosure shall be provided with captive screws so that it's screws don't fall off when cover is opened. Screws shall be made of corrosion free material. Suitable non- conducting protection cover shall be provided for any metallic hinge/screw/fastener to avoid contact with live part of the assembly.

xi. Mounting plate inside the SCB for mounting/fixing of devices shall be made of FRP/GRP or equivalent non-conducting material.

xii. Offered enclosure shall have adequate space to fix one String Monitoring card, One Modbus SPD and One DC-DC converter for internal power supply with suitable terminal block for retrofitting of enclosure to convert the offered combiner box as String Monitoring Box in future by OREDA. Vendor shall submit a sample Internal GA drawing with aforementioned components for future use of OREDA in addition to the drawing/document(s) for inspection and dispatch of offered assembly for OREDA approval.

8.1.6.6.6 DC on Load Isolator

Solar PV on-load Isolator shall be suitable for minimum 1000Vdc or 1500 Vdc operational voltage, with minimum 250Vdc per pole breaking. 2. Any multipolar device achieving this configuration with Shorting links will not be acceptable.

Air Insulation distance shall be higher than 25 mm and the creepage distance shall be higher than 50 mm. The PV Isolators shall be type tested to carry the nominal current till Min. ambient temperature of 60 Deg C without any de-ration inside the String Junction box. Switching part shall necessarily contain reinforced break chamber, with an integrated magnetic arc-extinguishing system for the PV arc. Isolator terminals need to be Silver plated. The Solar PV Isolators need to have a positive break indication and will have to comply with IEC 60947-3 and PV-2 for critical current.

8.1.6.6.7 Type Test

Vendor shall submit the following Type Test/Product Certification from any National / International accredited lab for approval:

i. Temperature rise test on complete assembled Box as per acceptable limit mentioned in relevant clause.
ii. Type test for enclosure as per code and standard mentioned in relevant

clause.

iii. Thermal ageing at 70 Deg C for 96 hours as per IEC 60068-2

iv. ii. HV Test

8.1.6.6.8 DC PLUG-IN CONNECTORS FOR FIELD Cabling

8.1.6.6.8.1 Field connectors are electrical connectors/coupler used for connecting solar panels and also strings of panels to String combiners box. Cable connector to be used for connecting SPV modules and String monitoring boxes shall be in accordance with IEC 62852: 2014. Connector shall be of plug and socket design to be plugged together by hand but can be separated again using a tool only. Bidder shall ensure that field connectors to be mated shall always be of same make and model or shall be tested Inter-compatible as per clause no.6.3.11 of IEC 62852: 2014 for offered make(s).

Mating of connectors of different makes/model shall not be acceptable if not tested for inter-compatibility by any accredited lab.

8.1.6.6.8.2 Technical Requirements

Rated Current	30 A (4 MM^2 , 6 MM^2) - 40 A(10 MM^2)
Rated Voltage	Min1000/1500 Volts as per system requirement
Connector Design	Snap-In locking Type
Protection Degree	IP68 (Mated)
Ambient Temperature	(-) 40^0 C to (+) 85^0 C
Protection/Safety Class	Class II
Contact material	Cu
Contact surface material	Silver/Tin
Contact resistance for plug connector	≤ 0.5 milli-ohms
Stripping length	10mm
In flammability class acc.to	UL 94-V0
Insulating Material	PPE / PPO/Polyamide
Pollution Degree	3
Certification	UL/TUV/CSA/EAC or Equivalent

8.1.6.6.8.3 Type Test for DC Plug in Connectors

a) Protection Degree (IP)
b) Operating Temperature
c) Inflammability
d) Pollution Degree
e) Voltage Withstand (Rated Voltage/Test Voltage)
f) Product Certification

8.1.6.6.9 Power conditioning UEOI

The Power Conditioning UEOI (PCU) is Solar Inverter designed to convert solar PV DC power to 3-phase AC power and fed into utility grid. The PCU

shall consist of solid-state electronic switch along with all associated control & protection, filtering, measuring instruments and data logging devices. The PCU shall have suitable maximum power point tracker (MPPT) for operating the input PV Array at its maximum power point. The PCU output shall always follow the grid voltage & frequency by sensing the grid voltage and phase and the PCU shall always remain synchronized with the grid. The PCU shall use only self-commutated device which shall be adequately rated.

8.1.6.6.9.1 Codes And Standards

The PCU shall conform to all applicable IEC standard. Where an applicable IEC standard is not available, IS/ any applicable international standard shall be referred to as best practice.

IEC-61683	Energy efficiency requirements
IEC 61000	Emission/ ImmuEOIy requirement
IEEE 519	Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.
IEC 60068	Environmental Testing
IEC 62116	Testing procedure—Islanding prevention measures forpower conditioners used in grid-connected photovoltaic (PV) power generation systems
IEC 62109-1 & 2	Safety of power converters for use in photovoltaic power systems
EN 50530	Overall efficiency of grid connected photovoltaic inverters
BDEW 2008	Technical Guidelines for Generating plant connected to Medium voltage network
IEEE 1547	Standard for interconnecting distributed resources with electrical power systems.
IEC 60529	Ingress protection test
Grid Connectivity	Relevant CEA Regulations (including LVRT/HVRT compliance) and Grid Code as amended and revised from time to time.

8.1.6.6.9.2 General Requirements

a) The minimum euro efficiency of the PCU as per IEC 61683 shall be 97%. The bidder shall specify the conversion efficiency at following load conditions i.e., 25%, 50%, 75% and 100% during detail engineering, which shall be confirmed by type test reports.

b) The PCU shall remain connected to the grid as per Central Electricity Authority Technical (standards for connectivity to the grid) regulation 2007 with all latest amendments and its components shall be designed accordingly.

c) In case auxiliary supply of PCU is met internally, then it should have

sufficient power backup to meet the LVRT requirement. Bidder needs to submit the detail auxiliary supply arrangement for PCU during detail engineering stage.

d) The PCU shall be capable of operating in the frequency range of 47.5 Hz to 52 Hz and shall be able to deliver rated output in the frequency range of 49.5 Hz to 50.5 Hz.

e) The monitoring/measurement of DC inputs (central inverter) and AC output shall be done using transducers/instruments having sensor accuracy of 0.5 class or better.

f) Internal Surge Protection Device (SPD) shall be provided in the PCU on DC and AC side. It shall consist of Metal Oxide Varister (MOV) type arrestors. The discharge capability of the SPD shall be at least 12.5kA at 8/20 micro second wave as per IEC 61643-12.

g) The PCU shall be capable of supplying reactive power as per grid requirement (manual intervention through SCADA) during solar generation hours. However, reactive power support, below 0.95 power factor, might be at the behest of active power.

h) The PCU shall have protection against any sustained fault in the feeder line and against lightning discharge in the feeder line.

i) The Bidder shall ensure by carrying out all necessary studies that the PCU will not excite any resonant conditions in the system that may result in the islanded operation of PV plant and loss of generation. In case there is excitation of any resonant condition in the system during PV plant operation that may result in the islanding/tripping of the PV plant and affect the power transfer, it shall be the responsibility of the Bidder to rectify the design and carryout required modification in the equipment of his supply.

j) The PCU must be self-managing and stable in operation.

k) In case of grid failure, the PCU shall be re-synchronized with grid after revival of power supply. Bidder to furnish the time taken by PCU to be re-synchronized after restoration of grid supply during detailed engineering.

l) The PCU shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of PCU component failure or from parameters beyond the PCU's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the PCU front panel to cause the PCU to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the PCU, including commutation failure, shall be cleared by the PCU protective devices.

m) PCU shall have active power limit control, reactive power and power factor control feature. Plant operator shall be able to provide (manual intervention) Active power, reactive power and power factor control/limit set point through SCADA HMI and local control display uEOI (or Laptop computer). PCU shall be provided with remote start and stop facility

from SCADA HMI. All required hardware and software required for this purpose shall be provided by Bidder.

n) PCU shall have necessary limiters in build in the controller so as to ensure safe operation of the PCU within the designed operational parameters.

o) PCU shall have thermal overloading protection to prevent failure of switching devices (i.e. IGBT) and other components of Inverter. PCU controller shall automatically regulate/limit the power output in order to reduce the PCU cabinet and switching devices temperature. Bidder to submit the PCU power vs ambient temperature curve during details engineering stage. PCU shall be able to provide inverter inside cabinet and IGBT's (switching device) temperature (in soft analog value) to SCADA system for remote monitoring, storing and report generation purpose.

p) PCU shall have the following feature,

   a. AC & DC overcurrent protection.
   b. Synchronization loss protection.
   c. Over temperature protection.
   d. DC & AC under and over voltage protection.
   e. Under & over frequency protection.
   f. Cooling system failure protection
   g. PV array ground fault monitoring & detection
   h. PV array insulation monitoring
   i. LVRT protection
   j. Anti-islanding protection
   k. Grid monitoring

q) One number of laptop PC shall be supplied for PCU configuration and troubleshooting purpose. Laptop shall be supplied with complete set of hardware & software accessories. Laptop detailed configuration must ensure suitability for the required applications. Supplied Laptop shall be protected with the latest anti- virus software and shall be provided 3 Years onsite warranty including its battery. At least two sets of communication cable for Laptop to PCU communication shall be provided.

r) PCU shall be provided with Mobile user interface facility for monitoring of inverter by plant O&M personal for better O&M and highest yield from the PV plant. In case PCU does not have this facility, then Bidder can provide the same facility through plant SCADA system.

s) PCU shall have AC and DC side monitoring capability and reporting to SCADA system (measured analog and digital value measured within PCU). Any special software if required for these purposes shall be provided for local and remote monitoring and report generation

t) DC Overloading: - Maximum PCU DC overload loading shall be limited to its design PV Array Power to PCU nominal AC power ratio. Bidder

needs to submit all the relevant technical document/test report from PCU manufacturer (OEM) during details engineering stage in support of declared PCU design DC overloading capacity.

u) EARTHING OF INVERTERS: -The PCU shall be earthed as per manufacturer recommendation. During detail engineering the Bidder needs to submit the detailed earthing arrangement of PCU and system earth pit requirement during detail engineering stage. The detail specification for panel earthing for safety has been mentioned elsewhere in this specification

v) OPERATING MODES OF PCU

a. **Low Power Mode: -** The PCU shall be able to wake-up automatically when PV array open circuit voltage value is equal/more than preset value in the PCU program. Once its start generation the PCU shall automatically enter maximum power mode.

b. Maximum Power Point Tracking (MPPT): - In order to maximized the energy collection from solar PV array, the PCU shall have inbuilt maximum power point tracker (MPPT) controller and same shall be able operate the PV array at its maximum power point by adjusting output voltage of PV array system according to atmospheric condition. PCU MPPT controller shall ensure that it operate the PV array system at its global maximum power point and it shall not trap into PV array local maximum power point during cloudy atmospheric condition. The PCU shall operate within its MPPT operating input DC voltage range (window) and same shall be large enough so that MPPT shall be able to satisfactorily operate the PV modules exposed to the maximum ambient temperature of 50 deg C or any other condition. In case the solar PV array operating maximum power point voltage fall below (or above) the PCU MPPT operating voltage range, then the PCU controller shall automatically adjust the PCU input voltage so that PCU shall not enter into sleep mode. If the PV array output power fall below the PCU minimum preset power value then PCU shall automatically switched to sleep mode. In case, PV Modules connected to Inverter are in Flickering shading zone of Wind turbines, Suitable MPPT algorithm shall be adopted for those inverters to optimize Energy Yield.

c. Sleep Mode: - PCU shall automatically go into sleep mode when the output voltage of PV array and/or output power of the inverter falls below a specified limit. During sleep mode the inverter shall disconnect from grid. Inverter shall continuously moEOIor the output of the PV array and automatically start when the DC voltage rises above a pre-defined level. During evening and night (non solar generation hours) the PCU shall be in sleep mode in order to minimize the internal power loss. Maximum loss in sleep mode shall be less than 0.05% of PCU rated power.

d. Standby Mode: - In standby mode the PCU DC & AC contactor are open, inverter is powered on condition and waiting for start command.

w) PCU shall meet the following technical parameter

1.	Nominal output voltage frequency	50Hz
2.	Continuous operating frequencyrange	47.5 Hz to 52 Hz
3.	Continuous operating AC voltagerange	± 10% rated AC voltage
4.	Operating power factor range	Operating power factor (adjustable) shall be 0.9 Lead to 0.9 Lag.
5.	Maximum input DC voltage	1000V or 1500V as per application requirement.
6.	Current THD value	< 4% at nominal load
7.	Operating ambient temperature	0 to 50 ° C
8.	Humidity	95 % non-condensing
9.	Maximum Noise level (at 1 meter distance)	75 dBA for indoor type PCU
10.	DC Injection	<0.5 % at rated current
11.	Flicker	As per IEC61000

8.1.6.6.9.3 Central Inverter

8.1.6.6.9.3.1 PCU must have provision to be isolated from grid through Air Circuit Breakers/MCCB's. The ACBs/MCCBs as required can be provided as a part of PCS/its Modules or separately based on standard design and configuration of PCS manufacturer.

8.1.6.6.9.3.2 PCU shall have suitable rated DC isolator/contactor/MCCB for isolation of PV array from inverter. Suitable rated fuse shall be provided (at inverter end) in incoming DC cable from each string combiner box (SCB). Fuse requirement (at inverter end) in the negative side of incoming DC cable shall be as per inverter manufactures recommendation. In case fuse are not recommended by the inverter manufacturers, then suitable rated link in place of fuse shall be provided in the negative side of incoming DC cables from each string combiner box (SCB). One set spare terminal with fuse/link (as applicable) and holder shall be provided for the future use.

8.1.6.6.9.3.3 String Monitoring facility

PCU shall be provided with current monitoring transducer at incoming DC cables from each string combiner box (SCB) for PV array zone monitoring purpose. The current transducers used for this purpose shall have accuracy of 0.5 class or better. The PCU shall be able to provide the measured DC current value and calculated DC power and energy value of incoming SCB DC cable to SCADA system for remote monitoring, storing and report generation. In case PCU does not have the facility/capability for power and energy calculation within its controller, then Bidder can provide the same facility in SCADA system.

8.1.6.6.9.3.4 The PCU should be designed for parallel operation through galvanic isolation. Solid state electronic devices shall be

protected to ensure smooth functioning as well as ensure long life of the inverter. Parallel operated PCU system are also accepted subjected to recommendation of PCU manufacturer. In such case, PCU design shall also ensure that no abnormal interaction shall take place among the PCU uEOI during any grid operating condition which may result in outages.

8.1.6.6.9.3.5 Local Display uEOI for viewing important parameters, configuration and troubleshooting purpose shall be provided. Display shall include all important parameter such as DC input voltage, DC input current, AC output voltage, AC output current, AC output power, frequency etc. Inverter shall also be provided with required software along with accessories (2 sets) for interface with Laptop PC for viewing, configuration, troubleshooting purpose.

8.1.6.6.9.3.6 PCU shall have suitable communication card (Modbus/Ethernet) for networking and SCADA integration. Communication port shall be preferably TCP/IP protocol. PCU shall include all important measured & internal calculated analog values and alarm & trip signals for remote monitoring, storing and report generation purpose in SCADA system. Details list of above such parameters shall be provided along with their Modbus address during detail engineering stage

8.1.6.6.9.3.7 In case of modular design of PCU is offered, the Contractor shall ensure that no abnormal interaction shall take place among the various PCU modules during any grid operating condition which may result in outages. The PCU controller offered by the Contactor shall be such as to ensure stability, reliability and a good dynamic performance. The Bidder shall indicate the control scheme adopted for modular PCU and its merits and the test which will check its performance.

8.1.6.6.9.3.8 Bidder may offer liquid cooling system subject to OREDA approval. In case Liquid cooled inverters are offered, Bidder to ensure that coolant is used in closed cycle. Complete inverter along with cooling system shall be of proven design.

8.1.6.6.9.3.9 The Inverter shall have suitable arrangement for negative grounding of solar PV array system and the ground current shall be limited to safe limit. Ground current shall be measured continuously and alarm shall be generated in case ground current reaches to predefined set value. Inverter shall trip in case ground current more than safe operating limit.

8.1.6.6.9.3.10 Inverter shall have emergency stop push button for tripping of inverter with complete DC & AC electric isolation.

8.1.6.6.9.3.11 INDOOR CENTRAL INVERTER

a) The PCU enclosure protection class shall be IP 20 or better protection.
b) COOLING AND VENTILATION: - To prevent the maximum permissible temperature in the inverter room from being exceeded because of internal heat emission of inverters and other auxiliaries in the inverter room, the inverter room in the PV plant shall be adequately ventilated. Ventilation shall be designed such that the temperature rise of the inverter rooms doesn't exceed 3 deg above ambient (during 50°C). Filter

banks at the air inlet of the inverter room shall be provided to prevent dust ingress. The air velocity through the filter shall be taken at max 1.5 m/sec and the filter shall be chosen accordingly to pass the required intake air through the filter to remove heat from the inverter room. Bidder shall furnish peak power consumption of cooling system (cooling fans, pumps etc.) of the PCU along with the data sheet.

Ventilation shall be designed in such a way that the temperature rise of the inverter rooms doesn't exceed the maximum designed temperature of Inverters and other auxiliary equipment's placed inside the inverter room. Accordingly, the air velocity through the filter shall be suitably chosen to remove the heat from the inverter room. All exhaust and fresh air fans shall be provided with thermostat control

8.1.6.6.9.3.12 OUTDOOR CENTRAL INVERTER

a. Outdoor PCU (including containerized solution) with metallic enclosure are acceptable. The enclosure must be suitable to withstand the harsh environmental conditions for complete life of plant.

b. The PCU enclosure protection class shall be IP 54 or better protection.

c. Bidder to submit temperature endurance test report of complete assembly during detail engineering stage.

d. For Outdoor PCU (without containerized solution) the complete assembly should be placed inside a shed made of structural steel section preferably tubular/hollow section and colour coated metal sheets for roof with BMT 0.5 mm and at least 60cm projection in all side. For containerized solution separate shed is not required, however, the container shall have projection of atleast 60cm wherever an opening in the inverter door exposes the inverter component to outside environment. Structural steel and paints for shed shall be as per ISO 12944-5.

Alternatively, Bidder can also provide integrated protection to the inverter enclosure through suitable other arrangement (s) subjected to OREDA Approval

8.1.6.6.9.4 String Inverter

a) The string inverter enclosure protection class shall be IP 65 or better protection.

b) The string inverter should be placed inside a canopy shed with at least 15 cm in all direction, if installed in open. Alternatively, the Bidder can also install the inverter on the column post of the module mounting structure, below the modules. In such case, the canopy is not required and the column and foundation shall be designed accordingly.

c) String inverter shall have suitable communication port (RS485/TCP-IP/PLC) for SCADA integration. All necessary hardware, software and accessories used for communication with SCADA (including Data logger if supplied) at both the ends shall be provided by the

bidder.

d) String inverter shall have individual string monitoring capability and reporting to SCADA system. Any special software if required for these purposes shall be provided for local and remote monitoring and report generation.

e) Anti-PID device along with all hardware and communication cable/device shall be provided in case negative grounding of PV string provision is not available in string inverter. Data logger used in Anti-PID device shall be integrated with SCADA system.

f) DC fuse requirement for PV string at string inverter end shall be as per string manufacturer/system requirement and same shall be finalized during detail engineering stage.

g) Provision for AC and DC electrical isolation device (such as MCB/MCCB/Isolator) inside string shall be as per string inverter manufacturer practice.

h) Local Display uEOI for viewing important parameters, configuration and troubleshooting purpose shall be provided as per string inverter manufacture practice. In case standard design of string inverter does not include display, then string inverter shall be provided with required software along with accessories (5 sets) for interface with inverter or facility for mobile viewing and configuration with laptop.

i) LT Junction box, switchboard and switchgear requirement for string inverter system as per chapter C-1 (LT Switchgear).

8.1.6.6.9.5 Type Testing

i. Applicable both for Central and String Inverter

ii. During detailed engineering, the Bidder shall submit all the type test reports including temperature rise test and surge withstand test carried out within last ten years from the date of techno-commercial bid opening for Owner's approval. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.

iii. However, if the Bidder is not able to submit report of the type test(s) conducted within last ten years from the date of techno-commercial bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the Bidder shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client/owner’s representative and submit the reports for approval.

8. AC Systems

1. LT SWITCHGEAR

The design, materials, and method of LT switchgear shall conform to the applicable IEC standards. All equipment shall be installed and all work shall be carried out in accordance with relevant IEC standards. Where an applicable IEC standard is not available, IS/ any applicable international standard shall be referred to as best practice. All standards, specifications and

codes of practice shall be the latest editions including all applicable official amendments and revisions.

As a minimum requirement, the following standards shall be complied with:

IS	Details
IEC60947/IS13947	Low-voltage switchgear and control gear
IS 2705	Current Transformers
IS 3043	Code of practice for earthing.
IS 3072	Code of practice for installation and maintenance of Switchgear
IS 3156	Voltage Transformers
IS 3202	Code of practice for climate proofing of electrical equipment.
IS 3231	Electrical relays for power system protection.
IS13703/IEC 60269	HRC Cartridge fuses
IS10118 (4 parts)	Code of practice for selection, installation and maintenance of switchgear and control gear.
IEC 60255	Electrical Relays

1.1 TECHNICAL PARAMETERS

A. POWER SUPPLY (AC SYSTEM)		
(i)	Voltage	415V ± 10%, 3 Phase, 4 wire, Neutral Solidly Earthed
(ii)	Frequency	50 Hz +/- 5%
(iii)	Minimum system fault level	As per system fault current (for 1 sec)
(iv)	Short time rating for bus bars, ckt. breakers, current transformers and swgr. Assembly.	As per system fault current (for 1 sec)
(v)	Maximum ambient air Temperature	50 deg. C
B.BUS BARS		
(vi)	Continuous current rating at 50ºC ambient:	As Per Requirement
(vii)	Temperature Rise allowed above ambient	40^0C for plain joints, 55^0Cfor Silver plated joints
C. MCCB		

(i)	Rated voltage	415V
(ii)	Rated Insulation Level	690V
(iii)	Rated ultimate and service SC breaking capacity (As per system requirement)	As per system fault current (for 1sec)
(iv)	Rated making capacity	2.1 times of System fault current
(v)	Utilization category	A
C. DIGITAL MFM		
(i)	Accuracy class	0.5
(ii)	MFM shall be provided at LT incomer feeder. MFM shall have suitable communication port for integration with SCADA system	
D. CURRENT TRANSFORMERS		
(i)	Type	Cast Resin Bar Primary
(ii)	Voltage class and frequency	650V, 50HZ
(iii)	CT Secondary Current	1 A
(iv)	Class of insulation	E or better
(v)	Accuracy class & burden	
(vi)	a) For Protection	5P20, 5VA
(vii)	b) For Metering	Class 1.0, 5VA (min)
(viii)	Instrument Security Factor for metering CT	5
E. VOLTAGE TRANSFORMERS		
(i)	Type	Cast Resin
(ii)	Voltage Ratio	415 / 110V for line PT 415/√3 / 110/√3V for Bus PT
(iii)	Method of Construction	Vee Vee
(iv)	Accuracy Class	0.5
(v)	Rated Voltage factor	1.1 continuous, 1.5 for30 sec.
(vi)	Class of insulation	E or better
(vii)	One-minute power frequency withstand voltage	2.5 KV
F. HRC FUSES		
(i)	Voltage Class	650 Volts
(ii)	Rupturing capacity	80kA (RMS) for AC circuits
G. CONTACTORS		
(i)	Type	Air break electro magnetic

(ii)	Utilising Category	AC3 of IS/IEC 60947 for non- reversible AC4 of IS/IEC 60947 for reversible drives
H. SWGR. CUBICLE CONSTRUCTIONAL REQUIREMENTS		
(i)	Colour finish Exterior	RAL 9002 (Main body) RAL 5012 (Extreme end covers) The paint thickness shall not be less than 50 microns
(ii)	Cable entry	
	Power Cables	Bottom
	Control Cables	Bottom

The quantities/Nos. of the Feeders/MCCB shall be so as to meet the system requirements. 5% spare with minimum 01 No. to be provided on each board/switchgear having more than 5 MCCB. However, no spare Air circuit breaker panels are required.

1.2 DETAILS OF INDOOR DISTRIBUTION BOARDS

Applicable for Auxiliary Power Supply system and String Inverter distribution board of rating up to & including 400A.

1.2.1 Switchboards shall be of metal enclosed, indoor, floor-mounted, free- standing type.

1.2.2 All switchboard frames and load bearing members shall be fabricated using suitable mild steel structural sections or pressed and shaped cold- rolled sheet steel of thickness 2.0 mm. Frames shall be enclosed in cold- rolled sheet steel of thickness 1.6 mm. Doors and covers shall also be of cold rolled sheet steel of thickness 1.6 mm. Stiffeners shall be provided wherever necessary. The gland plate thickness shall be 3.0 mm for hot / cold-rolled sheet steel and 4.0 mm for non-magnetic material.

1.2.3 All panel edges and cover / door edges shall be reinforced against distortion by rolling, bending or by the addition of welded reinforcement members. The top covers of the panels should be designed such that they do not permanently bulge/ bend by the weight of maintenance personnel working on it.

1.2.4 The switchboards shall be of bolted design. The complete structures shall be rigid, self-supporting, and free from flaws, twists and bends. All cutouts shall be true in shape and devoid of sharp edges.

1.2.5 All switchboards shall be of dust-proof and vermin-proof construction and shall be provided with a degree of protection of IP: 5X as per IS/IEC 60947. All cutouts shall be provided with EPDM / Neoprene gaskets.

1.2.6 All switchboards shall be of uniform height not exceeding 2450 mm.

1.2.7 Switchboards shall be supplied with base frames made of structural steel sections, along with all necessary mounting hardware required for welding down the base frame to the foundation / steel insert plates.

1.2.8 All equipment and components shall be neatly arranged and shall be easily accessible for operation and maintenance. Replacement /Maintenance of individual equipment/

component shall be possible without switching off or isolating the other equipment's/components.

1.2.9 Each switchboard shall be provided with undrilled, removable type gland plate. For all single core cables, gland plate shall be of non-magnetic material. The gland plate shall be provided with gasket to ensure enclosure protection.

1.2.10 The minimum clearance in air between phases and between phases and earth for the entire busbars shall be 25mm. For all other components, the clearance between "two live parts", "a live part and an earthed part", shall be at least ten (10) mm throughout. Wherever it is not possible to maintain these clearances, insulation shall be provided by sleeving or barriers. However, for busbars, the clearances specified above should be maintained even when the busbars are sleeved or insulated. All connections from the busbars up to switch / fuses / MCCB shall be fully insulated and securely bolted to minimize the risk of phase to phase and phase to earth short circuits.

1.2.11 All busbars and jumper connections shall be of high conductivity aluminum alloy/ copper of adequate size. All switchboards shall be provided with three phase and neutral busbars. Entire busbar system shall be insulated with PVC sleeves. Busbar sleeves shall be compliant to UL224 (Extruded insulating tubing), CE/UL certified, having fire retardant properties and working temperature of 105°C.

1.2.12 The cross-section of the busbars shall be uniform throughout the length of switchboard section and shall be adequately supported and braced to withstand the stresses due to the specified short circuit currents. Neutral busbar short circuit strength shall be same as main busbars.

1.2.13 All busbars shall be adequately supported by non-hygroscopic, non- combustible, track-resistant and high strength sheet molded compound or equivalent type polyester fiber glass molded insulator. Separate supports shall be provided for each phase and neutral busbar. If a common support is provided, anti-tracking barriers shall be provided between the supports. Insulator and barriers of inflammable material such as Hylam shall not be accepted. The busbar insulators shall be supported on the main structure.

1.2.14 All busbar joints shall be provided with high tensile steel bolts, Belleville / spring washers and nuts, so as to ensure good contacts at the joints. Non- silver-plated busbar joints shall be thoroughly cleaned at the jointed locations and suitable contact grease shall be applied just before making a joint. All bolts shall be tightened by torque spanner to the recommended value. The overlap of the busbars at each joint surface shall be such that the length of overlap shall be equal to or greater than the width of the busbar. All copper to aluminum joints shall be provided with suitable bimetallic washers.

1.2.15 All busbars shall be color-coded as per IS: 375.

1.2.16 Wherever the busbars are painted with black Matt paint, the same should be suitable for temperature encountered in the switchboard under normal operating conditions.

1.2.17 The Bidder shall furnish calculations establishing the adequacy of bus bar sizes for specified current ratings.

1.2.18 Panel space heaters shall be provided and the supply for this shall be tapped from incomer, before the isolating switch/circuit breaker. Incoming circuit to space-heater shall have an isolating switch, HRC fuse and neutral link of suitable rating. Panel illumination and plug-socket shall also be tapped from the space heater supply.

1.2.19 A galvanized steel / Copper / Aluminum earth bus shall be provided at the bottom of each panel and shall extend throughout the length of each switchboard. It shall be welded / bolted to the framework of each panel and breaker earthing contact bar. Vertical earth bus shall be provided in each vertical section which shall in turn be bolted / welded to main horizontal earth bus.

1.2.20 The earth bus shall have sufficient cross section to carry the momentary short circuit and short time fault current to earth without exceeding the allowable temperature rise.

1.2.21 All non-current carrying metal work of the switchboard shall be effectively bonded to the earth bus. Electrical conductivity of the whole switchgear enclosure framework and truck shall be maintained even after painting.

1.2.22 All metallic cases of relays, instruments and other panel-mounted equipment shall be connected to earth by independent stranded copper wires of size not less than 2.5 sq. mm. All the equipment mounted on the door shall be earthed through flexible wire/braids. Insulation color code of earthing wires shall be green. Earthing wires shall be connected to terminals with suitable clamp connectors, soldering is not acceptable.

1.2.23 Looping of earth connections, which would result in loss of earth connections to other devices, when a device is removed, is not acceptable. However, looping of earth connections between equipment to provide alternative paths to earth bus is acceptable.

1.2.24 VT and CT secondary neutral point earthing shall be at one place only, i.e. on the terminal block. Such earthing shall be made through links so that earthing of one secondary circuit shall be removed without disturbing the earthing of other circuit.

1.2.25 All hinged doors having potential carrying equipment mounted on it shall be earthed by flexible wire/ braid. For doors not having potential carrying equipment mounted on it, earth continuity through scraping hinges/ hinge pins of proven design may also acceptable. The Contractor shall establish earth continuity at site also.

1.2.26 All switchboards shall be supplied completely wired internally up to the terminals, ready to receive external cables.

1.2.27 All auxiliary wiring shall be carried out with 650V grade, single core stranded copper conductor, color coded, PVC insulated wires. Conductor size shall be 1.5 mm2 (min.) for control circuit wiring and 2.5 mm2 (min) for CT and space heater circuits.

1.2.28 Extra flexible wires shall be used for wiring to devices mounted on moving parts such as hinged doors. The wire bunches from the panel inside to the doors shall be properly sleeved or taped.

1.2.29 All wiring shall be properly supported, neatly arranged, readily accessible and securely connected to equipment terminals and terminal blocks.

1.2.30 All internal wiring terminations shall be made with solderless crimping type tinned copper lugs which shall firmly grip the conductor or an equally secure method. Similar lugs shall also be provided at both ends of component-to- component wiring. Insulating sleeves shall be provided over the exposed parts of lugs to the extent possible. Screw-less (spring loaded) / cage clamp type terminal shall also be provided with lugs.

1.2.31 Printed single tube ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. The wire identification marking shall be in accordance with IS: 375. Red Ferrules should be provided on trip circuit wiring.

1.2.32 Cable termination arrangement for power cables shall be suitable for heavy duty, 1.1 kV grade, stranded aluminum conductor, PVC/ XLPE insulated, armoured / unarmoured and PVC sheathed cables. All necessary cable terminating accessories such as supporting clamps and brackets, hardware etc., shall be provided by the contractor, to suit the final cable sizes.

1.2.33 All power cable terminals shall be of stud type and the power cable lugs shall be of tinned copper solderless crimping ring type conforming to IS: 8309. All lugs shall be insulated/ sleeved.

1.2.34 All Switchgears, MCCs, Distribution Boards, Fuse boards, all feeders, local push- button stations etc. shall be provided with prominent, engraved identification plates.

1.2.35 All name plates shall be of non-rusting metal or 3-ply Lamicoid, with white engraved lettering on black background. Inscription & lettering sizes shall be subject to Employer's approval.

1.2.36 Caution name plate "Caution Live Terminals" shall be provided at all points where the terminals are likely to remain live and isolation is possible only at remote end.

1.2.37 The gaskets, wherever specified, shall be of good quality EPDM / neoprene with good ageing, compression and oil resistance characteristics suitable for panel applications.

1.2.38 The bidder shall, ensure that the equipment offered will carry the required load current at site ambient conditions specified and perform the operating duties without exceeding the permissible temperature as per Indian standards / specification. Continuous current rating at 50 deg C ambient in no case shall be less than 90% of the normal rating specified.

1.2.39 ON/OFF status and protection trip status of incomers and bus coupler (if available) be provided for SCADA system.

1.2.40 Suitable changeover and interlocking arrangement shall be provided for incomers and bus coupler.

1.2.41 It shall be the responsibility of the Bidder to fully coordinate the overload and short circuit breakers/fuses with the upstream and downstream circuit breakers / fuses, to provide satisfactory discrimination. Further the various equipment supplied shall meet the requirements of type ii class of co-ordination as per IS: 8544.

1.2.42 All sheet steel work shall be pretreated, in tanks, in accordance with IS: 6005. Degreasing shall be done by alkaline cleaning. Rust and scales shall be removed by pickling with acid. After pickling, the parts shall be washed in running water. Then these shall be rinsed in slightly alkaline hot water and dried. The phosphate coating shall be "class-c" as specified in IS: 6005. The phosphate surfaces shall be rinsed and passivated. After passivation, electrostatic powder coating shall be used. Powder should meet requirements of is 13871 (powder costing specification). Finishing paint shade for complete panels excluding end covers shall be RAL9002 & RAL5012 for extreme end covers of all boards, unless required otherwise by the employer. The paint thickness shall not be less than 50 microns.

1.3 MCCB

1.3.1 MCCB shall be fixed type module, air break type, having trip free mechanism with quick make and quick break type contacts. MCCB shall have current limiting feature. MCCB of identical ratings shall be physically and electrically interchangeable. MCCB shall be provided with 1 NO and 1NC auxiliary contacts.

1.3.2 MCCB shall be provided with Microprocessor based inbuilt front adjustable releases (overload & short circuit) and shall have adjustable earth fault protection uEOI also. The protection settings shall have suitable range to achieve the required time & current settings. LED indications shall also be provided for faults, MCCB status (on/off etc).

1.3.3 MCCB terminals shall be shrouded and designed to receive cable lugs for cable sizes relevant to circuit rating. Extended cable terminal arrangement for higher size cable may also be offered. ON and OFF position of the operating handle of MCCB shall be displayed and the rotary operating handle shall be mounted on the door of the compartment housing MCCB. The compartment door shall be interlocked mechanically with the MCCB, such that the door cannot be opened unless the MCCB is in OFF position. Means shall be provided for defeating this interlock at any time. MCCB shall be provided with padlocking facility to enable the operating mechanism to be padlocked. The MCCBs being offered shall have common/interchangeable accessories for all ratings like aux.

switch, shunt trip, alarm switch etc. The MCCBs shall have the current discrimination up to full short circuit capacity and shall be selected as per manufacturer's discrimination table.

1.4 FUSES

1.4.1 All fuses shall be of HRC cartridge fuse link type. Screw type fuses shall not be accepted. Fuses for AC circuits shall be rated for 80kA rms (prospective) breaking capacity at 415V AC and for DC circuits, 20kA rms breaking capacity at 240V DC.

1.4.2 Fuse shall have visible operation indicators. Insulating barriers shall be provided between individual power fuses.

1.4.3 Fuse shall be mounted on insulated fuse carriers, which are mounted on fuse bases. Wherever it is not possible to mount fuses on carriers, fuses shall be directly mounted on plug-in type of bases. In such cases one set of insulated fuses pulling handles shall be supplied with each switchboard.

1.4.4 The Neutral links shall be mounted on fuse carriers which shall be mounted on fuse bases

1.5 INDOOR LT SWITCHGEAR FOR STRING INVERTER

In addition to the above clauses (relevant), the following shall also be applicable for switchgear ratings more than 400A.

1.5.1 All switchboards shall be divided into distinct vertical sections (panels), each comprising of the following compartments,

a) **BUSBAR COMPARTMENT: -** A completely enclosed bus bar compartment shall be provided for the horizontal and vertical busbars. Bolted covers shall be provided for access to horizontal and vertical busbars and all joints for repair and maintenance, which shall be feasible without disturbing any feeder compartment. Auxiliary and power busbars shall be in separate compartments.

b) **SWITCHGEAR / FEEDER COMPARTMENT: -** All equipment associated with a feeder of rating above 400A shall be housed in a separate compartment of the vertical section. ACB shall be provided for feeders of rating 1000A and above. The design of the vertical section for such an arrangement shall ensure ease of termination of power cables of size & quantity as per system requirement. The compartment shall be sheet steel enclosed on all sides with the withdrawable uEOIs in position or removed. Insulating sheet at rear of the compartment is also acceptable. The front of the compartment shall be provided with the hinged single leaf door with captive screws for positive closure.

c) **CABLE COMPARTMENT/CABLE ALLEY: -** A full-height vertical cable alley of minimum 250mm width shall be provided for power and control cables. Cable alley shall have no exposed live parts and shall have no communication with busbar compartment. Cable terminations located in cable alley of capacity more than 400 A shall be designed to meet the Form IV-b (as per IEC 61439) for safety purpose. Wherever cable alleys are not provided for distribution boards, segregated cable boxes for individual feeders shall be provided at the rear for direct termination of cables. For circuit breaker external cable connections, a separately enclosed cable compartment shall also be acceptable. The contractor shall furnish suitable plugs to cover the cable openings in the partition between feeder compartment and cable alley. Cable alley door shall be hinged.

d) **CONTROL COMPARTMENT: -** A separate compartment shall be provided for relays

and other control devices associated with a circuit breaker.

1.5.2 All switchboards shall be of dust-proof and vermin-proof construction and shall be provided with a degree of protection of IP: 5X as per IS/IEC 60947. However, the busbar chambers having a degree of protection of IP: 42 are also acceptable where continuous busbar rating is 1600A and above. Provision shall be made in all compartments for providing IP: 5X degree of protection, when circuit - breaker or module trolley has been removed. All cutouts shall be provided with EPDM / Neoprene gaskets.

1.5.3 Provision of louvers on switchboards would not be preferred. However, louvers backed with metal screen are acceptable on the busbar chambers where continuous busbar rating is 1600 A and above.

1.5.4 Sheet steel barriers shall be provided between two adjacent vertical panels running to the full height of the switchboard, except for the horizontal busbar compartment. EPDM / Neoprene gasket shall be provided between the panel sections to avoid ingress of dust into panels.

1.5.5 The minimum clearance in air between phases and between phases and earth for the entire busbars. and bus-link connections at circuit-breaker shall be 25mm. All busbars and jumper connections shall be of high conductivity aluminum alloy / copper of adequate size.

1.5.6 After isolation of power and control circuit connections it shall be possible to safely carryout maintenance in a compartment with the busbar and adjacent circuit live. Necessary shrouding arrangement shall be provided for this purpose. Wherever two breaker compartments are provided in the same vertical section insulating barriers and shrouds shall be provided in the rear cable compartment to avoid accidental touch with the live parts of one circuit when working on the other circuit.

1.5.7 All switchgear (circuit-breaker) panels shall be of single-front type. The covers shall be provided with "DANGER" labels. All panel doors shall open by 90 deg or more.

1.5.8 All circuit-breaker modules shall be of fully draw out type having distinct 'Service' and 'Test' positions. Suitable arrangement with cradle / rollers, guides along with tool / lever operated racking in / out mechanism shall be provided for smooth and effortless movement of the chassis.

1.5.9 All switchboards shall be provided with three phase and neutral busbars. Two separate sets of vertical busbars shall be provided in each panel of double front DBs. Interleaving arrangement for busbars shall be adopted for switchboards with a rating of more than 1600A. Entire busbar system shall be insulated with PVC sleeves. Busbar sleeves shall be compliant to UL224 (Extruded insulating tubing), CE/UL certified, having fire retardant properties and working temperature of 105°C.

1.5.10 ON and OFF position of the operating handle of MCCB shall be displayed and the rotary operating handle shall be mounted on the door of the compartment housing MCCB. The compartment door shall be interlocked mechanically with the MCCB, such that the door cannot be opened unless the MCCB is in OFF position. Means shall be provided for defeating this interlock at any time. MCCB shall be provided with padlocking facility to enable the operating mechanism to be padlocked.

1.5.11 The module identification plate shall clearly give the feeder number and feeder designation. For single front switchboards, similar panel and board identification labels shall be provided at the rear switchgear also.

1.5.12 Temperature raise test of LT switchgear of rating more than 400A: - The temperature rises of the horizontal and vertical busbars and main bus links including all power draw out contacts when carrying 90% of the rated current along the full run shall in no case exceed 55 deg C with silver plated joints and 40 deg C with all other types of joints over

an outside ambient temperature of 50 deg C. The temperature rise of the accessible parts/external enclosures expected to be touched in normal operation shall not exceed 20deg C. The temperature rise of manual operating means shall not exceed 10deg C for metallic & 15 deg C for insulating material. Temperature rise for the busbars shall be carried out at 90% of the rated current.

1.5.13 The carriage and breaker frame shall get earthed while being inserted in the panel and positive earthing of the breaker frame shall be maintained in all positions, i.e., SERVICE & ISOLATED, as well as throughout the intermediate travel.

1.5.14 Electrically controlled circuit breaker boards shall be provided with DC control supply.

1.6 Circuit Breakers

1.6.1 Circuit breakers shall be three pole, air break, horizontal draw out type, and shall have fault making and breaking capacities as specified in "Technical Parameters". The circuit breakers which meet specified parameters of continuous current rating and fault making / breaking capacity only after provision of cooling fans or special device shall not be acceptable.

1.6.2 Circuit breakers along with its operating mechanism shall be provided with suitable arrangement for easy withdrawal. Suitable guides shall be provided to minimize misalignment of the breaker.

1.6.3 There shall be "SERVICE", "TEST" and "FULLY WITHDRAWN" positions for the breakers. In "Test" position the circuit breaker shall be capable of being tested for operation without energizing the power circuits i.e. the power contacts shall be disconnected, while the control circuits shall remain undisturbed. Locking facilities shall be provided so as to prevent movement of the circuit breaker from the "SERVICE", "TEST" or "FULLLY WITHDRAWN" position. Circuit Breaker rack- in and rack-out from Service to Test, Test to Isolated position, or vice-versa shall be possible only in the compartment door closed condition.

1.6.4 Separate limit switches, each having required numbers of contacts shall be provided in both "SERVICE" and "TEST" position of the breaker. All contacts shall be rated for making, continuously carrying and breaking 10 Amp at 240 V AC and 1 Amp (Inductive) at 240 V DC respectively.

1.6.5 Suitable mechanical indications shall be provided on all circuit breakers to show "OPEN", "CLOSE","SERVICE","TEST" AND "SPRING CHARGED" positions.

1.6.6 Main poles of the circuit breakers shall operate simultaneously in such a way that the maximum difference between the instants of contacts touching during closing shall not exceed half a cycle of rated frequency.

1.6.7 Movement of a circuit breaker between "SERVICE" and "TEST" position shall not be possible unless it is in open position. Attempted withdrawal of a closed-circuit breaker shall preferably not trip the circuit breaker. In case the offered circuit breaker trips on attempted withdrawal as a standard interlock, it shall be ensured that sufficient contact exists between the fixed and draw out contact at the time of breaker trip so that no arcing takes place even with the breaker carrying its full rated current.

1.6.8 Closing of a circuit breaker shall not be possible unless it is in "SERVICE" position, "TEST" position or in "FULLY WITHDRAWN" position.

1.6.9 Circuit-breaker cubicles shall be provided with safety shutters operated automatically by the movement of the circuit breaker carriage, to cover the stationary isolated contacts when the breaker is withdrawn. It shall however be possible to open the shutters intentionally against pressure for testing purposes.

1.6.10 Breaker of particular rating shall be prevented from insertion in a cubicle of a different rating.

1.6.11 Circuit breakers shall be provided with coded key / electrical interlocking devices, as per requirements.

1.6.12 Circuit breaker shall be provided with anti-pumping feature and trip free feature, even if mechanical anti-pumping feature is provided.

1.6.13 Mechanical tripping shall be possible by means of front mounted Red "trip" push- button. In case of electrically operated breakers these push buttons shall be shrouded to prevent accidental operation.

1.6.14 Complete shrouding / segregation shall be provided between incoming and outgoing bus links of breakers. In case of bus coupler breaker panels the busbar connection to and from the breaker terminals shall be segregated such that each connection can be approached and maintained independently with the other bus section live. Dummy panels if required to achieve the above feature shall be included in the Bidder's scope of supply.

1.6.15 Circuit breaker open/close shall be possible from SCADA and open/close status and all other important signal status shall be provided for SCADA monitoring.

1.6.16 Power operated mechanism shall be provided with a Universal motor suitable for operation on DC Control supply. In case of DC supply motor should satisfactorily operate with voltage variation between 85% to 110% nominal control supply voltage. Motor insulation shall be class "E" or better.

1.6.17 The motor shall be such that it requires not more than 30 Seconds for fully charging the closing spring at minimum available control voltage. Once the closing springs are discharged, after one closing operation of circuit breaker, it shall automatically iEOIiate recharging of the spring.

1.6.18 The mechanism shall be such that as long as power is available to the motor, a continuous sequence of closing and opening operations shall be possible. After failure of power supply at least one open-close-open operation shall be possible.

1.6.19 Provision shall be made for emergency manual charging and as soon as this manual charging handle is coupled, the motor shall automatically get mechanically decoupled.

1.6.20 All circuit breakers shall be provided with closing and trip coils. The closing coil shall operate correctly at all values of voltage between 85% to 110% nominal control supply voltage. The trip coil shall operate satisfactorily at all values of voltage between 70% to 110% nominal control supply voltage.

1.6.21 Provision for mechanical closing of the breaker only in "Test" and "WITHDRAWN" positions shall be made. Alternately, the mechanical closing facility shall be normally made inaccessible; accessibility being rendered only after deliberate removal of shrouds.

1.6.22 The ACB Panel door shall not be possible to open in breaker closed condition. Further, the racking mechanism shall be accessible only after opening the breaker panel door.

1.6.23 Telescopic trolley or suitable arrangement shall be provided for maintenance of circuit-breaker module in a cubicle at each location. The trolley shall be such that the top most breaker module can be withdrawn on the trolley and can be lowered for maintenance purpose. The telescopic trolley shall be such that all type, size and rating of breaker can be withdrawn /inserted of particular switchgear.

1.6.24 Electrical Parameter of Circuit Breaker.

1)	Type	Air break spring charged stored energy type
2)	Operating duty	O-3 MIN-OC-3 MIN-OC
3)	Symmetrical interrupting	As per system fault current (for one sec)
4)	Short circuit rating	2.1 times of System fault current (peak)
5)	Short Circuit Breaking current	
	a) AC Component	As per system fault current (for one sec)
	b) DC Component	As per IS:13947
6)	Short time withstand	As per system fault current

1.7 AC JUNCTION BOXES (FOR USE WITH STRING INVERTERS)

1.7.1 Separate AC Junction box shall be used for string inverters AC output connection. Protection class for AC junction box shall be IP 54 or better protection. All components of junction box shall be suitable for rated output voltage (with + 10% variation) of string inverter, grid frequency of 50 Hz +/- 5%, ambient temperature 50 deg C and system fault current for 1 sec.

1.7.2 AC junction box shall be of metal enclosed type. All frames and load bearing members shall be fabricated using suitable mild steel structural sections or pressed and shaped cold-rolled sheet steel of thickness 2.0 mm. Frames shall be enclosed in cold-rolled sheet steel of thickness 1.6 mm. Doors and covers shall also be of cold rolled sheet steel of thickness.

1.7.3 1.6 mm. Stiffeners shall be provided wherever necessary. The gland plate thickness shall be 3.0 mm for hot / cold-rolled sheet steel and 4.0 mm for non- magnetic material. The minimum clearance in air between phases and between phases and earth shall be at least twenty-five (25) mm throughout. Wherever it is not possible to maintain these clearances, insulation shall be provided by sleeving or barriers.

1.7.4 All power cable terminals shall be of stud type and the power cable lugs shall be of tinned copper solderless crimping ring type conforming to IS: 8309. All lugs shall be insulated/ sleeved.

1.7.5 EPDM / Neoprene gasket shall be used to prevent ingress of dust into panels.

1.7.6 All non-current carrying metal work of the junction box shall be effectively connected to the system earth bus.

1.7.7 Finishing paint shade for complete panels excluding end covers shall be RAL9002 & RAL5012 for extreme end covers of all boards, unless required otherwise by the Employer. The paint thickness shall not be less than 50 microns.

1.8 TEMPERATURE-RISE (For LT Switch-gear having capacity more than 400A)

1.8.1 The temperature rise of the horizontal and vertical busbars and main bus links including all power draw out contacts when carrying 90% of the rated current along the full run shall in no case exceed 55 deg C with silver plated joints and 40 deg C with all other types of joints over an outside ambient temperature of 50 deg C. The temperature rise of the accessible parts/external enclosures expected to be touched in normal operation shall not exceed 20deg. C. The temperature rise of manual operating means shall not exceed 10deg. C for metallic & 15 deg. C for insulating material. Temperature rise for the busbars shall be carried out at 90% of the rated current.

1.9 DERATING OF COMPONENTS

1.9.1 The Bidder shall, ensure that the equipment offered will carry the required load current at site ambient conditions specified and perform the operating duties without exceeding the permissible temperature as per Indian Standards / Specification. Continuous current rating at 50 deg C ambient in no case shall be less than 90% of the normal rating specified. The Bidder shall indicate clearly the derating factors if any employed for each component and furnish the basis for arriving at these derating factors duly considering the specified current ratings and amp. temperature of 50 deg C.

2. HT SWITCHGEAR

1.10 CODES AND STANDARDS

All standards, specification and codes of practices referred to herein shall be the latest editions including all applicable official amendments and revisions as on date of opening of Techno commercial bid. In case of conflict between this specification and those (IS Codes, Standards etc.) referred to herein, the former shall prevail. All work shall be carried out as per the following standards and codes.

SL. No	IS Code	Name of Equipment
a)	IS: 722	AC electricity meters.
b)	IS: 996	Single phase small AC and universal electrical motors.
c)	IS: 1248	Direct Acting indicating analogue electrical measuringinstruments and Accessories.
d)	IS/IEC: 60947	Degree of protection provided by enclosures for lowvoltage switchgear and control gear.
e)	IS: 2544	Porcelain post insulators for systems with nominal voltages greater than 1000 Volts.
f)	IS: 2705	Current transformers.
g)	IS: 3156	Voltage Transformers
h)	IS: 6005	Code of practice for phosphating of iron and steel.

i)	IS: 5082	Specification for wrought aluminum and aluminum alloy bars, rods, tubes and selections for electrical purposes.
j)	IEC: 61850	Communication Standard for Numerical relays
k)	IEC: 61131-3	Automation Standard for Numerical relays
l)	IS: 9046	AC contactors for voltages above 1000 volts and up to and including 11000 Volts.
m)	IS: 13703	Low voltage fuses
n)	IS: 9385	HV fuses
o)	IS: 9431	Specification for indoor post insulators of organic material for system with nominal voltages greater than 1000 volts up to and including 300 kV
p)	IS: 9921	A.C. disconnectors (isolators) and Earthing switches for voltages above 1000 V
q)	IS: 11353	Guide for uniform system of marking and identification of conductors and apparatus terminals.
r)	IS: 13118	Specification for high voltage AC circuit breakers.
s)	IEC: 60099-4	Metal oxide surge arrestor without gap for AC system
t)	IS/IEC: 62271- 100	High voltage alternating current circuit breakers.
u)	IS/IEC: 62271- 200	High voltage metal enclosed switchgear and control gear.
v)	IEC: 60947-7-1	Terminal blocks for copper conductors
w)	IS :513 (2008)	Cold Rolled Low Carbon Steel Sheets and Strips

1.11 TECHNICAL PARAMETERS

A. SYSTEM PARAMETERS		
a)	Nominal System voltage	33kV
b)	Highest System voltage	36kV
c)	Rated Frequency	50Hz
d)	Number of phases/ poles	Three
e)	System neutral earthing	Solidly Earthed
f)	One-minute power frequency withstand voltage	
	- for Type tests	70kV
	- for Routine tests	70kV

g)	1.2/50 microsecond Impulse withstand voltage	170kV (peak)
h)	Minimum system fault level	As per SLD
i)	Short time rating for bus bars, circuit breakers, current transformers and switchgear assembly.	As per system fault level specified in tender SLD for one (1) sec.
j)	Dynamic withstand rating	2.5 times of system fault current as specified in tenderSLD
k)	- Space heaters	240 V AC singlephase with neutral solidly earthed
l)	Maximum ambient air temperature	50 deg. C
m)	Internal Arc testing	As Specified in chapter-A2

B. BUS BARS		
a)	Continuous current rating at 50^0C ambient:	As Per Requirement
b)	Temper Rise allowed above ambient	40^0C for plain joints 55^0C for Silver plated Joints

C. SWGR. CUBICLE CONSTRUCTIONAL REQUIREMENTS		
a)	Color finish	
	Exterior	RAL9002 (Main body) RAL 5012 (Extreme end covers)
b)	Cable entry	
	Power Cables	Bottom
	Control Cables	Bottom
c)	Earthing conductor	Galvanized steel strip
d)	Service Continuity of SWGRS. (LSC2B-PM)	as per IS/IEC 62271-200

D. CIRCUIT BREAKERS		
a)	The circuit breakers current rating shall be selected from the load current at an ambient of 50 deg. C.	
	Short circuit breaker Current	

b)	a) A.C. component	As per system fault current specified in tender SLD
	b) D.C. component	As per IS: 13118 or IEC-62271
c)	Short Circuit making current	2.5 times of system fault current (peak) specified in tender SLD
d)	Operating Duty	O-3 min-CO-3 min-CO
e)	Total break time	Not more than 4 cycles
f)	Total make time	Not more than 5 cycles
g)	Operating Mechanism	Motor wound spring charged stored energy type as per IEC-62271
E.	**CURRENT TRANSFORMER**	
a)	Secondary Current	1A
b)	Class of Insulation	Class E or better
c)	Rated output of each	Adequate for the relays and devices connected, but not less than five (5) VA.
d)	Accuracy class	
	Protection	5P20
	Measurement	0.5 class / as per tender SLD
e)	Instrument Security Factor for Measurement CTs	5
f)	CT Ratio	CT ratio shall be finalized during details engineering stage. Minimum CT primary side current shall be 110% of rated current.
F.	**VOLTAGE TRANSFORMERS**	
a)	Rated Voltage Factor	1.2 continuous for all VTs, and 1.9 for 8 Hours for star connected VTs.
b)	Class of insulation	Class E or better
c)	Other parameters	0.5 Class. VA requirement shall be application requirement. Suitable damping resistor and additional open delta core with loading resistor shall be provided in all VT's to prevent damage on account of Ferro-Resonance conditions
G. DIGITAL MFM		
Accuracy Class	0.5 or better	
Digital MFM shall be provided for VCB panels as shown in SLD.		

1.12 SWITCHGEAR PANEL

1.12.1 The switchgear boards shall have a single front, single tier, fully compartmentalized, metal enclosed construction complying with clause No.3.102 of IEC 62271-200, comprising of a row of free-standing floor mounted panels. Each circuit shall have a separate vertical panel with distinct compartments for circuit breaker truck, cable termination, main busbars and auxiliary control devices. The adjacent panels shall be completely separated by steel / Aluzinc sheets except in bus bar compartments where insulated barriers shall be provided to segregate adjacent panels. The Service Class Continuity of Switchgears shall be LSC 2B-PM (as per IS/ IEC 622771-200). However, manufacturer's standard switchgear designs without inter panel barriers in busbar compartment may also be considered.

1.12.2 The circuit breakers and bus VTs shall be mounted on withdrawable trucks which shall roll out horizontally from service position to isolated position. For complete withdrawal from the panel, the truck shall rollout on the floor or shall roll out on telescopic rails. In case the later arrangement is offered, suitable trolley shall be provided by the Bidder for withdrawal and insertion of the truck from and into the panel. Testing of the breaker shall be possible in isolated position by keeping the control plug connected.

1.12.3 The trucks shall have distinct SERVICE and ISOLATED positions. It shall be possible to close the breaker compartment door in isolated position also, so that the switchgear retains its specified degree of protection. Circuit Breaker rack-in and rack-out from Service to Test, Test to Isolated position, or vice-versa shall be possible only in the compartment door closed condition. While switchboard designs with doors for breaker compartments would be preferred, standard designs of reputed switchgear manufacturers where the truck front serves as the compartment cover may also be considered provided the breaker compartment is completely sealed from all other compartments and retains the IP-4X degree of protection in the Isolated position. In case the latter arrangement is offered, the Bidder shall explain how this sealing is achieved and shall include blanking covers one for each size of panel per switchboard in his total Techno commercial bid price.

1.12.4 The switchgear assembly shall be dust, moisture, rodent and vermin proof, with the truck in any position SERVICE, ISOLATED or removed, and all doors and covers closed. All doors, removable covers and glass windows shall have gaskets all round with synthetic rubber or neoprene gaskets.

1.12.5 The control / relay compartments shall have degree of protection not less than IP 5X in accordance with IS/IEC 60947. However, remaining compartments can have a degree of protection of IP 4X. All louvers, if provided, shall have very fine brass or GI mesh screen. Tight fitting gourmet / gaskets are to be provided at all openings in relay compartment. Numerical Relays shall be fully Flush mounted on the switchgear panels at a suitable height.

1.12.6 The Switchgear shall have an internal Arc Classification of IAC FLR as specified by IEC 62271-200. The switchgear construction shall be such that the operating personnel are not endangered by breaker operation and internal explosions, and the front of the panels shall be specially designed to withstand these. Pressure relief device shall be provided

in each high voltage compartment of a panel, so that in case of a fault in a compartment, the gases produced are safely vented out, thereby minimizing the possibility of its spreading to other compartments and panels. The pressure relief device shall not however reduce the degree of protection of panels under normal working conditions. To demonstrate that the pressure relief device operates satisfactorily the Bidder shall submit a type test report in line with IEC 62271- 200 Annex – A for each high voltage chamber. Wherever louvers are provided, the construction of louvers should be such that the IAC requirements are satisfied. Further, viewing glass windows shall have the same strength as the enclosure against Internal Arc.

1.12.7 Enclosure shall be constructed with rolled steel / Aluzinc sections. The doors and covers shall be constructed from cold rolled steel sheets of 2.0 mm or higher thickness. Gland plates shall be 2.5 mm thick made out of hot rolled or cold rolled steel sheets and for non-magnetic material it shall be 3.0 mm.

1.12.8 The switchgear shall be cooled by natural air flow.

1.12.9 Total height of the switchgear panels shall not exceed 2600mm. The height of switches, pushbuttons and other hand operated devices shall not exceed 1800mm and shall not be less than 700mm.

1.12.10 Necessary guide channels shall be provided in the breaker compartments for proper alignment of plug and socket contacts when truck is being moved to SERVICE position. A crank or lever arrangement shall preferably be provided for smooth and positive movement of truck between Service and Isolated positions.

1.12.11 Safety shutters complying with IEC 62271-200 shall be provided to cover up the fixed high voltage contacts on busbar and cable sides when the truck is moved to ISOLATED position. The shutters shall move automatically, through a linkage with the movement of the truck. Preferably it shall however, be possible to open the shutters of busbar side and cable side individually against spring pressure for testing purpose after defeating the interlock with truck movement deliberately. In case, insulating shutters are provided, these shall meet the requirements of IEC 62271-200 and necessary tests as per IEC 62271-200 Clause 5.103.3.3 shall be carried out. A clearly visible warning label "Isolate elsewhere before earthing" shall be provided on the shutters of incoming and tie connections which could be energized from another end.

1.12.12 Switchgear construction shall have a bushing or other sealing arrangement between the circuit breaker compartment and the busbar / cable compartments, so that there is no air communication around the isolating contacts in the shutter area with the truck in service position.

1.12.13 The breaker and the auxiliary compartments provided on the front side shall have strong hinged doors. Busbar and cabling compartments provided on the rear side shall have separate bolted covers with self-retaining bolts for easy maintenance and safety. Breaker compartment doors shall be provided with single-shot latch type handle and shall have locking facility. Suitable interlock shall be provided, which will ensure that breaker is OFF before opening the back doors. Suitable interlock shall be provided to prevent opening of any compartment doors which has any of the MV equipment, in case the supply is ON.

1.12.14 In the Service position, the truck shall be so secured that it is not displaced by short circuit forces. Busbars, jumpers and other components of the switchgear shall also be properly supported to withstand all possible short circuit forces corresponding to the short circuit rating specified.

1.12.15 Suitable base frames made out of steel channels shall be supplied along with necessary anchor bolts and other hardware, for mounting of the switchgear panels. These shall be dispatched in advance so that they may be installed and leveled when the flooring is being done, welding of base frame to the insert plates as per approved installation drawings shall be in Bidder's scope.

1.12.16 Alternatively, Outdoor HT switchgear can be offered. The outdoor switchgear shall have minimum IP 55 or better protection. The bidder shall submit the relevant details of the switchgear including the datasheets, drawings and applicable type test reports during the detailed engineering for Employers approval. Internal Arc requirement shall be same as indoor type switchgear.

1.13 CIRCUIT BREAKERS

1.13.1 The circuit breakers shall be of Vacuum type.

1.13.2 They shall comprise of three separate, identical single pole interrupting uEOIs, operated through a common shaft by a sturdy operating mechanism.

1.13.3 Circuit breaker shall be re strike free, stored energy operated and trip free type. Motor wound closing spring charging shall only be acceptable. An anti-pumping relay shall be provided for each breaker, even if it has built-in mechanical anti- pumping features. An arrangement of two breakers in parallel to meet a specified current rating shall not be acceptable.

1.13.4 During closing, main poles shall not rebound objectionably and mechanism shall not require adjustments. Necessary dampers shall be provided to withstand the impact at the end of opening stroke.

1.13.5 Plug and socket isolating Contacts for main power circuit shall be silver plated, of self-aligning type, of robust design and capable of withstanding the specified short circuit currents. They shall preferably be shrouded with an insulating material. Plug and socket contacts for auxiliary circuits shall also be silver plated, sturdy and of self-aligning type having a high degree of reliability. Thickness of silver plating shall not be less than 10 microns.

1.13.6 All working part of the mechanism shall be of corrosion resisting material. Bearings which require greasing shall be equipped with pressure type grease fittings. Bearing pins, bolts, nuts and other parts shall be adequately secured and locked to prevent loosening or change in adjustment due to repeated operation of the breaker and the mechanism.

1.13.7 The operating mechanism shall be such that failure of any auxiliary spring shall not prevent tripping and shall not lead to closing or tripping of circuit breaker. Failure of any auxiliary spring shall also not cause damage to the circuit breaker or endanger the operator.

1.13.8 Mechanical indicators shall be provided on the breaker trucks to indicate OPEN / CLOSED conditions of the circuit breaker, and CHARGED / DISCHARGED conditions of the closing spring. An operation counter shall also be provided. These shall be visible without opening the breaker compartment door.

1.13.9 The rated control supply voltage shall be as mentioned elsewhere under Technical parameters. The closing coil and spring charging motor shall operate satisfactorily at all values of control supply voltage between 85% to 110% rated DC voltage. The shunt trip coil shall operate satisfactorily under all operating conditions of the circuit breaker upto its rated short circuit breaking current at all values of control supply voltage between 70% to 110% of rated DC voltage. The trip coil shall be so designed that it does not get energized when its healthiness is moEOIored by two indicating lamps (Red) and one trip coil supervision relay.

1.13.10 The time taken for charging of closing spring shall not exceed 30 seconds. The spring

charging shall take place automatically preferably after a closing operation. Breaker operation shall be independent of the spring charging motor which shall only charge the closing spring. Opening spring shall get charged automatically during closing operation. As long as power supply is available to the charging motor a continuous sequence of closing and opening operations shall be possible. One open-close- open operation of the circuit breaker shall be possible after failure of power supply to the motor. Spring charging motors shall be capable of starting and charging the closing spring twice in quick succession without exceeding acceptable winding temperature when the control supply voltage is anywhere between 85% to 110% rated DC voltage. The initial temperature shall be as prevalent in the switchgear panel during full load operation with 50 deg. C ambient air temperature. The motor shall be provided with short circuit protection.

1.13.11 Motor windings shall be provided with class E insulation or better. The insulation shall be given tropical and fungicidal treatment for successful operation of the motor in a hot, humid and tropical climate.

1.13.12 Circuit breaker shall be provided with inter pole barriers of insulating materials. The use of inflammable materials like Hylam shall not be acceptable.

1.14 CONTROLS & INTERLOCKS

1.14.1 Rotary type Control switches shall be provided in each switchgear panel. The circuit breaker will normally be controlled from remote control panels through closing and shunt trip coils. The control switch and local control console of the relay flush mounted on the switchgear would normally be used only for testing of circuit breaker in isolated position, and for tripping it in an emergency. The closing and opening of the breaker shall also be possible from the Laptop through front serial port of the relay to facilitate commissioning activities.

1.14.2 The basic control scheme shall be developed in the numerical relay using programmable (soft) logics.

1.14.3 Facilities shall be provided for mechanical tripping of the breaker and for manual charging of the stored energy mechanism for a complete duty cycle, in an emergency.

1.14.4 Each panel shall have two separate limit switches, one for the Service position and the other for isolated position.

1.14.5 Auxiliary Contacts of breaker may be mounted in the fixed portion or in the withdrawable truck as per the standard practice of the manufacturer, and shall be directly operated by the breaker operating mechanism.

1.14.6 Auxiliary contacts mounted in the fixed portion shall not be operable by the operating mechanism, once the truck is withdrawn from the service position, but remain in the position corresponding to breaker open position. Auxiliary contacts mounted on the truck portion, and dedicated for Employer's use shall be wired out in series with a contact denoting breaker service position. With truck withdrawn, the auxiliary contacts shall be operable by hand for testing. There shall be at least 2 NO and 2 NC breaker/contactor original Auxiliary contacts made available for the of the Employer's use.

1.14.7 The contacts of all limit switches and all breaker auxiliary contacts located on truck portion and fixed portion shall be silver plated, rated to make, carry and break 1.0A 240V DC (Inductive) / 10A 240V AC. Contacts of control plug and socket shall be capable of carrying the above current continuously.

1.14.8 Movement of truck between SERVICE and ISOLATED positions shall be mechanically prevented when the breaker is closed. An attempt to withdraw a closed breaker shall not trip it.

1.14.9 Closing of the breaker shall be possible only when truck is either in ISOLATED or in SERVICE position and shall not be possible when truck is in between. Further, closing shall be possible only when the auxiliary circuits to breaker truck have been connected

up, and closing spring is fully charged.

1.14.10 It shall be possible to easily insert breaker of one typical rating into any one of the panels meant for same rating but at the same time shall be prevented from inserting it into panels meant for a different type or rating.

1.14.11 Indications shall be provided in the relay console flush mounted on the panel front as brought out in the specification elsewhere. It shall be possible to easily make out whether the truck in SERVICE OR ISOLATED POSITION even when the compartment door is closed.

1.14.12 Reverse blocking and Inter tripping shall be implemented in switchgear boards level. Detailed scheme for the same shall be finalized during detailed engineering stage.

1.14.13 All required interlock shall be provided for safe operation of switchgears. Capacitive voltage detection or other alternative suitable arrangement (VT shall not be used) shall be used for outgoing feeder backdoor (cable chamber) open interlock.

1.15 NUMERICAL RELAYS AND NETWORKING

1.15.1 Numerical relays (IED, i.e., Intelligent Electronic Device) shall comply with IEC- 61850, having protection, control, measurement and monitoring features. These relays shall be networked and suitably interfaced with the Solar SCADA system for dynamic SLD display, status monitoring, measurements, event / alarm displays, reports, etc. The relays shall be flush mounted on panel front with connections from the inside. These numerical relays shall be of types as proven for the application and shall be subject to Employer's approval. Numerical relays shall have appropriate setting ranges, accuracy, resetting ratio and other characteristics to provide required sensitivity. All equipment's shall have necessary protections.

1.15.2 The numerical relay shall be capable of measuring and storing values of a wide range of quantities, events, faults and disturbance recordings. The alarm / status of each of protection function and trip operation shall be communicated to Solar SCADA. The numerical relays shall have built in feature / hardware interface to provide such inputs to Solar SCADA / for analog / digital values.

1.15.3 All relays shall be rated for control supply voltage as mentioned elsewhere under parameters and shall be capable of satisfactory continuous operation between 80-120% of the rated voltage. Making, carrying and breaking current ratings of their contacts shall be adequate for the circuits in which they are used. Contacts for breaker close and trip commands shall be so rated as to be used directly used in the closing and tripping circuits of breaker without the need of any interposing / master trip relays. Threshold voltage for binary inputs shall be suitably selected to ensure avoidance of mal operation due to stray voltages and typically shall be more than 70% of the rated control supply voltage.

1.15.4 One-minute power frequency withstand test voltage for all numerical relays shall at least be 2kV (rms).

1.15.5 Failure of a control supply and de-energization of a relay shall not iEOliate any circuit breaker operation.

1.15.6 Disturbance Record waveforms, event records & alarms shall be stored in Non- volatile memory and failure of control supply shall not result in deletion of any of these data.

1.15.7 All numerical relays shall have freely programmable optically isolated binary inputs (BI) and potential free binary output (BO) contacts as per the requirement of control schematics. The quantities of such input / outputs shall be finalized during detailed engineering.

1.15.8 All the numerical relays shall have communications on two ports, local front port

communication to laptop and rear port on IEC 61850 to communicate with the interface equipment for connectivity with the Solar SCADA. Laptop provided with PCU/SCADA shall be used to facilitate numerical relay configuration, DR and event/fault records downloading from relay locally. Latest version of hardware and Software for interfacing the numerical relays with laptop shall be provided. At least two sets of communication cable for Laptop to relay communication shall be provided.

1.15.9 All the numerical relays shall have adequate processor memory for implementing the programmable scheme logic required for the realization of the protection / control schemes, in addition to the built-in protection algorithms. Numerical relays shall have inrush detection feature for blocking of user selectable protection functions.

1.15.10 Numerical relays used at main pooling switchgear shall have features for electrical measurements including voltage, current, power (active & reactive), frequency, power-factor and energy parameters. All other location the numerical relay shall have feature of current measurement. Relay shall be able to provide the same in soft to solar SCADA system.

1.15.11 Relays shall have event recording feature, recording of abnormalities and operating parameters with time stamping.

1.15.12 Master trip (86) and non-86 trips shall be software configurable to output contacts and no separate master trip relay shall be used.

1.15.13 Numerical relays used at main pooling switchgear shall have provision of both current and voltage inputs. Number of CT inputs shall be as per actual protections requirement but not less than 4 sets, 3 nos. for phase fault & 1 no. for earth fault. Relays shall be suitable for CT secondary current of 1A. At 11/22kV main pooling switchgear (switchgear with two outgoing and one bus coupler arrangement) outgoing feeders (to grid) and bus coupler numerical relay shall have provision of 4 VT inputs for metering, protection and synchronization purpose. All 11/22kV feeders shall be provided with non-directional EF and OC protection. Numerical relays used at main pooling switchgear shall have voltage protection and measurement feature.

1.15.14 Relay setting shall be based on time grading principle with minimum 100mSec shall be the grading margin. Least time setting at inverter transformer feeders and shall be increased towards the evacuation point (towards grid). Relay time setting shall be minimum 100 m/sec. However, relay current and time setting including time grading margin shall be as per Bidder offered system (with minimum as per above) considering smooth plant operation and proper protection integration/coordination with grid. Bidder can use same relay time setting for tie feeder panels between two switchgears. Relay setting of solar plant feeders shall be done in coordination with 11/22kV main pooling switch (grid side) relay setting. Collection of the relay setting of main pooing switchgear from the respective state authority is in the bidder scope. Any special/other protections, control interlocks etc. as per requirement shall be provided by the Bidder. Details shall be finalized during details engineering stage.

1.15.15 For relay setting calculation grid side shall be taken upstream and inverter side shall be taken downstream. For any switchgear outgoing feeder shall be towards grid and incoming feeders shall be towards inverter shall be considered.

1.15.16 All CT & VT terminals on the relays shall be of fixed type suitable for connection of ring-type lugs to avoid any hazard due to loosen connection leading to CT open- circuit. In no circumstances Plug In type connectors shall be used for CT/ VT connections.

1.15.17 All numerical relay shall have key pad / keys to allow relay settings from relay front. All hand reset relays shall have reset button on the relay front. Relay to be self or hand

reset shall be software selectable. Manual resetting shall be possible from remote.

1.15.18 Relays shall have self-diagnostic feature with self-check for power failure, programmable routines, memory and main CPU failures and a separate output contact for indication of any failure.

1.15.19 Relays shall have at least two sets or groups of two different sets of adaptable settings. Relays shall have multiple IEC / ANSI programmable characteristics.

1.15.20 Design of the relay must be immune to any kind of electromagnetic inteEOIrence. Vendor shall submit all related type test reports for the offered model along with the offer.

1.15.21 All cards / hardware of numerical relays shall be suitable for operation in Harsh Environmental conditions with respect to high temperature, humidity & dust.

1.15.22 Relay shall be immune to capacitance effect due to long length of connected control cables. Any external hardware, if required for avoiding mal operation of the relay due to cable capacitance shall be included as a standard feature.

1.15.23 All I/Os shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc.

1.15.24 Numerical relays shall have two level password protections, one for read only and other for authorization for modifying the setting etc.

1.15.25 Numerical relays shall have feature for Time synchronization through the SCADA System / networking. The resolution of time synchronization shall be +/- 1.0 millisecond or better throughout the entire system.

1.15.26 Relays shall be suitable to accept both AC & DC supplies with range of 70 % to 120 % of rated voltage.

1.15.27 Disturbance Record waveforms, event records & alarms shall be stored in non-volatile memory and failure of control supply shall not result in deletion of any of these data.

1.15.28 Bidder to depute relay OEM protection engineer at OREDA EOC office for finalization of relay setting and configuration during detail engineering stage. All numerical protection relay configuration and setting shall be done as per approved setting and configuration at switchgear manufacturer work by relay OEM or his authorized representative. All numerical relay testing and logic/interlock checking during commissioning stage at site shall be done under the supervision of Relay OEM or his authorized representative.

1.16 OTHER PROTECTIONS AND CONTROL FUNCTIONS IN THE RELAYS

1.16.1 Trip circuit supervision shall be provided for all feeders to moEOIor the circuit breaker trip circuit both in pre-trip and post trip conditions.

1.16.2 Schematics requiring auxiliary relays / timers for protection function shall be a part of numerical relay. The number of auxiliary relay and timer function for protection function shall be as required. Timer functions shall be programmable for on/off delays.

1.16.3 The numerical relay shall be able to provide supervisory functions such as trip circuit monitoring, circuit breaker state monitoring, PT and CT supervisions and recording facilities with Post fault analysis.

1.16.4 The numerical processor shall be capable of measuring and storing values of a wide range of quantities, all events, faults and disturbance recordings with a time stamping using the internal real time clock. Battery backup for real time clock in the event of power supply failure shall be provided.

1.16.5 At least 200 time tagged events / records shall be stored with time stamping. Details of

at least 5 previous faults including the type of protection operated, operating time, all currents & voltages and time of fault.

1.16.6 Diagnostics Automatic testing, power on diagnostics with continuous monitoring to ensure high degree of reliability shall be provided. The results of the self- reset functions shall be stored in battery back memory. Test features such as examination of input quantities, status of digital inputs and relay outputs shall be shall be available on the user interface.

1.16.7 The alarm/status of each individual protection function and trip operation shall be communicated to solar SCADA.

1.16.8 Sequence of events shall have 1 ms resolution at device level. Measurement accuracy shall be 1 % for RMS Current and voltage.

1.17 BUSBARS AND INSULATORS

1.17.1 All Busbar and jumper connections shall be of high conductivity aluminum alloy. They shall be adequately supported on insulators to withstand electrical and mechanical stresses due to specified short circuit currents.

1.17.2 Busbar cross-section shall be uniform throughout the length of switchgear. Busbars and other high voltage connection shall be sufficiently corona free at maximum working voltage.

1.17.3 Contact surfaces at all joints shall be silver plated or properly cleaned and non- oxide grease applied to ensure an efficient and trouble-free connection. All bolted joints shall have necessary plain and spring washers. All connection hardware shall have high corrosion resistance. Bimetallic connectors or any other technically proven method shall be used for aluminum to copper connections.

1.17.4 Busbar insulators shall be of arc and track resistant, high strength, non- hygroscopic, non-combustible type and shall be suitable to withstand stresses due to over- voltages, and short circuit current. Busbar shall be supported on the insulators such that the conductor expansion and contraction are allowed without straining the insulators. In case of organic insulator partial discharge shall be limited to 100pico coulomb at rated voltage x 1.1 / 3. Use of insulators and barriers of in-flammable material such as Hylam shall not be accepted.

1.17.5 Successful Bidder shall furnish calculation establishing adequacy of busbar sizes for the specified continuous and short time current ratings.

1.17.6 All busbars shall be color coded.

1.17.7 The temperature of the busbar and all other equipment, when carrying the rated current continuously shall be limited as per the stipulations of relevant Indian Standards, duly considering the specified ambient temperature (50 deg. C). The temperature rise of the horizontal and vertical busbars when carrying the rated current shall in no case exceed 55 deg C for silver plated joints and 40 deg. C for all other type of joints. The temperature rise at the switchgear terminals intended for external cable termination shall not exceed 40 deg. C. Further the switchgear parts handled by the operator shall not exceed a rise of 5 deg. C. The temperature rise of the accessible parts / external enclosure expected to be touched in normal operation shall not exceed 20 deg C.

1.18 EARTHING AND EARTHING DEVICES

1.18.1 A copper / galvanized steel earthing bus shall be provided at the bottom and shall extend throughout the length of each switch board. It shall be bolted/ welded to the

framework of each panel and each breaker earthing contact bar.

1.18.2 A copper / galvanized steel earthing bus shall be provided at the bottom and shall extend throughout the length of each switch board. It shall be bolted/ welded to the framework of each panel and each breaker earthing contact bar.

1.18.3 The earth bus shall have sufficient cross section to carry the momentary short- circuit and short time fault currents to earth as indicated under switchgear parameters without exceeding the allowable temperature rise.

1.18.4 Suitable arrangement shall be provided at each end of the earth bus for bolting to Employer's earthing conductors. All joint splices to the earth bus shall be made through at least two bolts and taps by proper lug and bolt connection.

1.18.5 All non-current carrying metal work of the switchboard shall be effectively bonded to the earth bus. Electrical continuity of the whole switchgear enclosure frame work and the truck shall be maintained even after painting.

1.18.6 The truck and breaker frame shall get earthed while the truck is being inserted in the panel and positive earthing of the truck and breaker frame shall be maintained in all positions i.e. SERVICE and ISOLATED as well as throughout the intermediate travel. The truck shall also get and remain earthed when the control plug is connected irrespective of its position.

1.18.7 All metallic cases of relays, instruments and other panel mounted equipment shall be connected to earth by independent stranded copper wires of size not less than 2.5 sq. mm. Insulation color code of earthing wires shall be green. Earthing wires shall be connected to terminals with suitable clamp connectors and soldering shall not be acceptable. Looping of earth connections which would result in loss of earth connection to other devices, when a device is removed is not acceptable. However, looping of earth connections between equipment to provide alternative paths of earth bus is acceptable.

1.18.8 VT and CT secondary neutral point earthing shall be at one place only on the terminal block. Such earthing shall be made through links so that earthing of one secondary circuit may be removed without disturbing the earthing of other circuits.

1.18.9 Separate earthing trucks shall be provided by the Contractor for maintenance work. These trucks shall be suitable for earthing the switchgear busbars as well as outgoing / incoming cables or busducts. The trucks shall have an interlock to prevent earthing of any live connection.

1.18.10 As an alternative to separate earthing trucks the Bidder may also offer built-in earthing facilities for the busbars and outgoing / incoming connections, in case such facilities are available in their standard proven switchgear design. The inbuilt earthing switches shall have provision for short circuiting and earthing a circuit intended to be earthed. These switches shall be quick make type, independent of the action of the operator and shall be operable from the front of the switchgear panel. These switches shall have facility for padlocking in the earthed condition.

1.18.11 Interlocks shall be provided to prevent:

1.18.12 Closing of the earthing switch if the associated circuit breaker truck is in Service position.

1.18.13 Insertion of the breaker truck to Service position if earthing switch is in closed position.

1.18.14 Closing of the earth switch on a live connection.

1.18.15 Energizing an earthed Section: Complete details of arrangement offered shall be provided during detailed engineering, describing the safety features and interlocks.

1.18.16 The earthing device (truck / switch) shall have the short circuit withstand capability

equal to that of associated switchgear panel.

1.18.17 All hinged doors shall be earthed through flexible earthing braid.

1.19 PAINTING

All sheet steel work shall be pretreated, in tanks, in accordance with IS: 6005. Degreasing shall be done by alkaline cleaning. Rust and scales shall be removed by pickling with acid. After pickling, the parts shall be washed in running water. Then these shall be rinsed in slightly alkaline hot water and dried. The phosphate coating shall be "Class-C" as specified in IS: 6005. The phosphate surfaces shall be rinsed and passivated. After passivation, Electrostatic Powder Coating shall be used. Powder should meet requirements of IS 13871 (Powder costing specification). Finishing paint shade for complete panels excluding end covers shall be RAL9002 & RAL5012 for extreme end covers of all boards, unless required otherwise by the Employer. The paint thickness shall not be less than 50 microns. Finished parts shall be suitably packed and wrapped with protective covering to protect the finished surfaces from scratches, grease, dirt and oil spots during testing, transportation, handling and erection.

1.20 INSTRUMENT TRANSFORMERS

1.20.1 All current and voltage transformers shall be completely encapsulated cast resin insulated type, suitable for continuous operation at the ambient temperature prevailing inside the switchgear enclosure, when the switchboard is operating at its rated load and the outside ambient temperature is 50 deg. C. The class of insulation shall be E or better.

1.20.2 All instrument transformers shall withstand the power frequency and impulse test voltage specified for the switchgear assembly. The current transformer shall further have the dynamic and short time ratings at least equal to those specified for the associated switchgear and shall safely withstand the thermal and mechanical stress produced by maximum fault currents specified when mounted inside the switchgear for circuit breaker modules.

1.20.3 The parameters of instrument transformers specified in this specification are tentative and shall be finalized by the Employer in due course duly considering the actual burden of various relays and other devices finally selected. In case the Bidder finds that the specified ratings are not adequate for the relays and other devices offered by him, he shall offer instrument transformer of adequate ratings and shall bring out this fact clearly in his Techno commercial bid.

1.20.4 All instrument transformers shall have clear indelible polarity markings. All secondary terminals shall be wired to separate terminals on an accessible terminal block.

1.20.5 Current transformers may be multi or single core and shall be located in the cable termination compartment. All voltage transformers shall be single phase type. The bus VTs shall be housed in a separate panel on a truck so as to be fully withdrawable. At 11/22kV main pooling switchgear, Bus VTs panels and line VTs in outgoing feeders shall be provided. All other switchgear location, at outgoing feeder cable charge indication shall be provided based on voltage sensing or use of voltage transformer.

1.20.6 All voltage transformers shall have suitable current limiting fuses on both primary and secondary sides. Primary fuses shall be mounted on the withdrawable portion. Replacement of the primary fuses shall be possible with VT truck in isolated position. The secondary fuses shall be mounted on the fixed portion and the fuse replacement

shall be possible without drawing out the VT truck from service position.

1.20.7 All voltage transformers shall be designed and manufactured for 0.8 Tesla operating point on B-H curve. VT shall be fully insulated type (i.e. double pole construction and neutral side fully insulated to rated BIL). VT shall be manufactured without any joint in secondary winding.

1.21 SURGE ARRESTOR

1.21.1 The surge arrestors shall be provided as per tender SLD/ as per system requirement and shall be of metal oxide, gapless type generally in accordance with IEC 60099-4 and suitable for indoor duty. These shall be mounted within the switchgear cubicle between line and earth, preferably in the cable compartment. Surge arrestor selected shall be suitable for un-earthed system and rating shall be in such a way that the value of steep fronted switching over voltage generated at the switchgear terminals shall be limited to the requirements of switchgear.

1.22 CONTROL SUPPLY AND SPACE HEATER SUPPLY

1.22.1 Each switchboard shall be provided at least two (02) Nos of DC feeders for the control supply in case two DC sources are provided, then suitable rated blocking diodes in both circuits has to be provided. Alternately Bidder can provide source selection switch.

1.22.2 One suitable rated 240V single phase AC supply feeder per switchboard / Switchboard section for space heater supply. Bidder shall provide necessary switch and fuse to receive, isolate and distribute to each panel.

1.22.3 Each sub circuit shall have separate fuses. Fuse size shall be determined so as to achieve selective clearance between main circuit and sub circuit in case of fault. Potential circuits for protection and metering shall also be protected by separate fuse.

1.22.4 All fuses shall be of link type conforming to IS: 13703 / 9385 mounted on suitable fuse bases. Fuses shall have operation indicators for indicating blown fuse condition. Fuse carrier base shall have imprints of the fuse rating and voltage. All accessible live connection to fuse bases shall be adequately shrouded.

1.22.5 All DC circuits shall be fused on both poles. Single phase AC circuits shall have fuses on line and link on neutral.

1.22.6 DC and AC supply monitoring relay shall be provided and alarm shall be generated in SCADA system in case of failure of supply.

1.23 SPACE HEATER

1.23.1 Each switchgear panel shall be equipped with thermostatically controlled space heater(s), suitably located in breaker and cable compartments to prevent condensation within the enclosure. The space heater shall be connected to 240V single phase AC auxiliary supply available in the switchgear, through switches and fuses provided separately for each panel. A 240V single phase 50 Hz AC plug point shall be provided in the interior of each cubicle with ON-OFF switch for connection of hand lamp.

1.24 TERMINAL BLOCKS

1.24.1 Terminal blocks shall be 650V grade, 10Amps rated, made up of unbreakable polyamide 6.6 grade. The terminals shall be screw type or screw-less (spring loaded) / cage clamp type with lugs. Marking on terminal strips shall correspond to the terminal numbering in wiring diagrams. All metal parts shall be of non- ferrous material. In case of screw type terminals, the screw shall be captive, preferably with screw locking design.

1.24.2 Terminal blocks for CT and VT secondary leads shall be of stud type, made up of unbreakable polyamide 6.6 grade. They shall be provided with links to facilitate testing, isolation star / delta formation and earthing. Terminal blocks for CT secondary shall have the short-circuiting facility. The terminals for remote ammeter connection etc. shall also be disconnecting type only. All metal parts shall be of non-ferrous material. Screws shall be captive.

1.24.3 At least 10% spare terminals for external connections shall be provided on each panel and these spare terminals shall be uniformly distributed on all terminal blocks. Space for adding another 10% spare terminals shall also be available in each panel.

1.24.4 There shall be minimum clearances of 250 mm between the terminal blocks and the cable gland plate and 150 mm between two rows of terminal blocks.

1.24.5 All panel wring for external connections shall terminate on separate terminal blocks which shall be suitable for connecting two (2) stranded copper conductors of 2.5 sq. mm on each side, or alternatively, the terminal blocks shall have the possibility of double shorting space to facilitate looping.

1.25 SWITCHGEAR WIRING

1.25.1 All Switchgear panels shall be supplied completely wired internally upto the terminal block ready to receive Employer's external cabling. All inter cubicle wiring and connections between panels of same switchboard including all bus wiring for AC and DC supplies shall be provided / done by the Contractor.

1.25.2 All internal wiring shall be carried out with 650 V grade, single core, 1.5 sq. mm. stranded copper wires having minimum of seven strands per conductor and color coded, PVC insulation. CT circuits shall be wired with 2.5 sq. mm. wires which otherwise are similar to the above. Extra flexible wires shall be used for wiring between fixed and moving parts such as hinged doors.

1.25.3 All wiring shall be properly supported neatly arranged, readily accessible and securely connected to equipment, terminals and terminal blocks. Wiring troughs or gutters be used for this purpose.

1.25.4 Internal wire terminals shall be made with solderless crimping type tinned copper lugs which shall firmly grip the conductor. Insulation sleeves shall be provided over the exposed parts of lugs.

1.25.5 Printed single tube ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. The wire identification marking shall be in accordance with IS: 375. Red Ferrules should be provided on trip circuit wiring.

1.25.6 Interconnection to adjacent panels shall be brought out to a separate set of terminal blocks located near the slots or holes, meant for the interconnecting wires. Arrangement shall permit neat layout and easy interconnections to adjacent panels at site and wires for this purpose shall be provided by Contractor looped and bunched properly inside the panels.

1.25.7 Contractor shall be fully responsible for the completeness and correctness of the internal wiring and for the proper functioning of the connected equipment.

1.25.8 The Contractor shall provide the necessary clamps wiring troughs etc. for all wiring inside the switchgear enclosed including the Employer's power and control cables.

1.26 POWER CABLE TERMINATION

1.26.1 Cable termination compartment shall receive the stranded Aluminum conductor, XLPE insulated, shielded, armored / unarmored, PVC jacketed, single core / three core, unearthed / earthed grade power cable(s).

1.26.2 A minimum clearance of about 600 mm shall be kept between the cable lug bottom ends and gland plates for stress cone formation for XLPE cables. Interphase clearance in the cable termination compartment shall be adequate to meet electrical and mechanical requirement besides facilitating easy connections and disconnection of cables. Dimensional drawing of cable connection compartment showing the location of lug, glands, CTs, gland plates etc. and the electrical clearances available shall be submitted for Employer's approval during detail engineering.

1.26.3 Cable termination compartment shall have provision for termination of power cables of sizes as indicated during detailed engineering with removable undrilled gland plates. For all single core cables gland plates shall be of nonmagnetic material. Cable entry shall be from bottom. Any change will be intimated later.

1.27 NAME PLATES AND LABELS

1.27.1 Each switch board shall have a name plate for its identification. All enclosure mounted equipment shall be provided with individual engraved name plates for clear equipment identification. All panels shall be identified on front as well as backside by large engraved name plates giving the distinct feeder description along with panel numbers. Back side name plates shall be fixed in panel frame and not on the rear removable cover.

1.27.2 Name plate shall be of non-rusting metal or 3-ply lamacoid with white engraved letterings, on black background. Inscriptions and lettering shall be subjected to Employer's approval.

1.27.3 Suitable stenciled paint mark shall be provided for identification of all equipment, located inside the enclosure, as well as for door mounted equipment, from the back side in addition to plastic sticker labels, if provided. These labels shall be located directly by the side of the respective equipment, shall be clearly visible and shall not be hidden by equipment wiring. Labels shall have device number as mentioned in wiring drawings. Type of labels and fixing of labels shall be such that they are not likely to peel off / fall off during prolonged use.

1.28 TEST

1.28.1 TYPE TESTS

All equipment to be supplied shall be of type tested design. During detailed engineering, the contractor shall submit for Owner's approval the reports of all the following type tests carried out not earlier ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.

A)	Reports of the following type tests carried out on circuit breaker / circuit breaker panels, of each voltage class and current rating shall be submitted.
i)	Short circuit duty test on circuit breaker, mounted inside the panel offered along with CTs, bushing and separators
ii)	Short time withstand test on circuit breaker, mounted inside panel offered together with CTs, bushings and separators.
iii)	Power frequency withstand test on breaker mounted in side panel.

iv)	Lightning impulse withstand test on breaker mounted in side panel.
v)	Temperature rise test on breaker and panel together. For this test, the test set up shall include three panels with breakers, the test breaker and panel being placed in the center.
vi)	The adjacent panels shall also be loaded to their rated current capacity. Alternatively, the test panel may be suitably insulated at the sides, which willbe adjoining to other panels in actual site configuration
vii)	Internal Arc Test as per IEC 62271-200
viii)	Measurement of resistance of main circuit.
ix)	Mechanical operation test.
B)	Short circuit withstand test of earthing device (truck / switch).
C)	Testing to observe compliance to degree of protection, shall be checked for each switch board enclosure and busbar chambers during routine inspection shall be as under. IP -4X: It shall not be possible to insert a one (1) mm. dia steel wire into the enclosure from any direction, without using force. IP-5X: It shall not be possible to insert a thin sheet of paper under gaskets and through enclosure joints.

a) However, if the contractor is not able to submit report of the type test(s) conducted not earlier than ten years prior to the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract free of at no additional cost to the owner either at third party lab or in presence of client/owner's representative and submit the reports for approval.

b) All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.

c) The type test reports once approved for any projects shall be treated as reference. For subsequent projects of OREDA, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design Change". Minor changes if any shall be highlighted on the endorsement sheet.

D) Type test reports for the following tests on the model of the Numerical relays, Ethernet switches shall be submitted for employer's review

S. No.	**TEST ITEMS**	**Standard**
i)	Dimensions of structure and visual inspection	IEC 60297-3-101
ii)	Functional requirements:	Relevant IEC 60255-100 Series
	– Steady-state simulation	
	– Dynamic simulation	
iii)	Product safety requirements	IEC 60255-27

	(including the dielectric tests and thermal short time rating)	
iv)	EMC requirements:	IEC 60255-26
	– Emission	
	– ImmuEOIy	
v)	Energizing quantities:	
	– Burden	N/A
	– Change of auxiliary energizing quantity	IEC 60255-11
vi)	Contact performance	N/A
vii)	Communication requirements	IEC 61850
viii)	Climatic environmental requirements:	IEC 60068-2-14, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-78, IEC 60068-2-30, IEC 60255-27
	– Cold	
	– Dry heat	
	– Change of temperature	
	– Damp heat	
ix)	Mechanical requirements: – Shock	IEC 60255-21-1, IEC 60255-21-2, IEC 60255-21-3
	– Vibration	
	– Bump	
	– Seismic	
x)	Enclosure protection	IEC 60529, IEC 60255-27

Two (2) protected soft copies on CD-ROM of the approved test results shall be furnished with the equipment. These shall include complete reports and results of the routine tests and type tests (if the latter is carried out) on equipment. If the type tests are not conducted, the CDs shall contain copies of the results of type tests carried out on identical equipment earlier.

1.28.2 ROUTINE TESTS

a) All acceptance and routine tests as per the specification and relevant standards IEC 62271-200 & IEC 62271-100 shall be carried out. Charges for these shall be deemed to be included in the equipment price
b) An indicative list of tests / checks is mentioned as QA chapter on HT switchgear.
c) However, the manufacturer is to furnish a detailed Quality Plan indicating the practice and procedure along with relevant supporting documents.

1.28.3 COMMISSIONING CHECKS / TESTS

After installation of panels, power and Control wiring and connections, Contractor shall perform commissioning checks as listed below to verify proper operation of switchgear

/ panels and correctness of all equipment in all respects. In addition, the Contractor shall carry out all other checks and tests recommended by the manufacturers.

GENERAL

a. Check name plate details according to specification.
b. Check for physical damage
c. Check tightness of all bolts, clamps and connecting terminals
d. Check earth connections.
e. Check cleanliness of insulators and bushings
f. Check heaters are provided
g. H.V. test on complete switchboard with CT & breaker in position.
h. Check all moving parts are properly lubricated.
i. Check for alignment of busbars with the insulators to ensure alignment and fitness of insulators.
j. Check for interchange ability of breakers.
k. Check continuity and IR value of space heater.
l. Check earth continuity for the complete switchgear board

CIRCUIT BREAKERS

a. Check alignment of trucks for free movement.
b. Check correct operation of shutters.
c. Check slow closing operation (if provided)
d. Check control wiring for correctness of connections, continuity and IR values.
e. Manual operation of breakers completely assembled.
f. Power closing / opening operation, manually and electrically at extreme condition of control supply voltage.
g. Closing and tripping time.
h. Trip free and anti-pumping operation.
i. IR values, resistance and minimum pick up voltage of coils.
j. Simultaneous closing of all the three phases.
k. Check electrical and mechanical interlocks provided.
l. Checks on spring charging motor, correct operation of limit switches and time of charging
m. All functional checks.

CURRENT TRANSFORMERS

a. IR value between windings and winding terminals to body.
b. Polarity tests.
c. Ratio identification checking of all ratios on all cores by primary injection of current.
d. Magnetization characteristics & secondary winding resistance.
e. Spare CT cores, if any to be shorted and earthed.

VOLTAGE TRANSFORMERS

a. Insulation resistance test.
b. Ratio test on all cores.
c. Polarity test.
d. Line connections as per connection diagram

CUBICLE WIRING

a. Check all switch developments.
b. It should be made sure that the wiring is as per relevant drawings. All

interconnections between panels shall similarly be checked.

c. All the wires shall be checked for IR value.
d. Functional checking of all control circuit e.g., closing, tripping interlock, supervision and alarm circuit including proper functioning of component/ equipment.
e. Check terminations and connection.
f. Wire ducting.

1.29 SPECIFICATION FOR 11/33kV RING MAIN UEOI

Each Ring Main UEOI shall have all the following major components in addition to the other items required for satisfactory performance of equipment:

a) Painted MS enclosure with steel base frame for Ring Main UEOI suitable for outdoor installation.
b) 11/22 kV Ring Main UEOIs, Non-extensible type along with requisite number of electrically operated breakers and manually operated Load break switches and earth switches as per Single line Diagram
c) Control protection and metering requirements as per system requirement and single line Diagram
d) Internal cabling for connections between the equipment's of Ring Main UEOI, lighting & earthing system along with required hardware, gaskets, gland plates etc. as required.

1.29.1 CODES AND STANDARDS

IS: 13118, IEC: 62271-200

1.29.2 TECHNICAL SPECIFICATIONS

The equipment shall have the following features:

1. ELECTRICAL SYSTEM PARAMETERS		
I	Nominal system voltage	11/22 kV
Ii	Highest system voltage	12/24 kV
Iii	Rated insulation level for 11/22 kV i) Impulse withstand voltage with 1.2 / 50 Micro second wave ii) One-minute power frequency with-stand voltage (Dry)	75/125 KV(Peak) 55/75 KV (RMS)
Iv	Rated short circuit breaking capacity at specified site conditions (Minimum)	Short circuit current as per SLD with %age of DC component as per IEC- 62271-100 corresponding to minimum operating time with operating conditions specified.
V	Rated short circuit making current (minimum)	2.5 time of short circuit current as per Bidder design

Vi	Rated short time withstand capacity (Minimum)	As per Bidder detailed design
Vii	Rated operating duty cycle	O-3 minute-CO-3 minute – CO
Viii	Maximum temperature rises over and ambient temperature of 50 deg-C	As per IEC: 62271-100
2. RMU CONFIGURATION		
I	RMU Configuration	As per SLD
Ii	Extensibility	Non-extensible type
Iii	Load break switch, Circuit breaker& earth switch in RMU panel	All shall be fixed (Non-draw out) type
Iv	Insulation medium for panel/ bus bar	SF6 gas or Dry air in sealed metallic Tank
V	Breakers & load break switches	SF6 gas or Vacuum type (with disconnector & earth switch)
Vi	Internal Arc classified FLR	As per system fault current as per SLD,1sec
3. RMU CONSTRUCTIONAL FEATURES		
I	RMU Panel type	Metal enclosed panel construction
Ii	Service Location	Outdoor
Iii	Mounting	Free Standing
Iv	Overall enclosure protection	IP54 minimum for MV Switchgear Compartments, Vermin proof

V	Doors	Front access with anti-theft hinge
Vi	Covers	Bolted for rear access, with handles. All the accessible bolts / screws shall be vandal proof. One set of required Special tools per RMU shall be in the scope of supply.
Vii	Construction	Sheet metal 2 mm thick CRCA/Aluzinc/Stainless Steel (minimum) suitable for outdoor application.
Viii	Base frame made of steel for RMU	Raised frame of 300 mm height
Ix	Lifting lugs	Four numbers
X	Cable entry	Bottom
Xi	Bus bar continuous rated current at designed 50^0 C ambient Temperature	As per system requirement.
Xii	Bus bar short time withstand capacity	As per SLD (minimum)
Xiii	Maximum temperature rises above reference ambient 50 deg C	In line with Table 3 of IEC694

Xiv	Earth bus bar	Aluminum sized for rated fault duty for 1 sec
Xv	Cooling arrangement	By natural air (without fan)
Xvi	Panel internal wiring	Stranded flexible color- coded PVC insulated copper wire 1.5 sq. mm.(min.), 1100-volt grade
xvii	Gasket	Neoprene rubber
xviii	Marshalling terminal blocks	1.5 Sq mm, Nylon 66 material, screw type + 20% spare in each row of TB.
Xix	Padlock facility	Required for all earth switches & all handles
Xx	Explosion vents	To ensure operator's safety, design should ensure that gases / flames generated during flash over / blast in any of the compartment, must not come out from the front of RMU. Cable compartment & other compartments of the RMU should withstand Internal arc test for the indicated system fault current.
4. Requirements of sealed housing live parts (RMU SF6 gas chamber)		
I	Enclosure	Stainless steel enclosure, IP67 class
Ii	SF6 gas pressure low alarm	To be given
Iii	Provision for SF6 gas filling	To be given (For 'sealed for life' design of RMU, this is not applicable)
Iv	Provision for SF6 gas pressure Measurement	Manometer with non-return valve Indication
V	Arc interruption method for SF6 breaker / Load break switch	Puffer type / rotating arc type
Vi	Potential free contacts for SF6 gas 1NO +1NC pressure low	1NO +1NC
Vii	Electrical Bushing	Bushing should be suitable for replacement at site.
5. LOAD BREAK SWITCH (LOAD BREAK ISOLATOR)		
I	Type	Three poles operated simultaneously by a common shaft
Ii	Arc interruption in dielectric medium	SF6 or vacuum
Iii	Operating mechanism for close/ open	Manual.

Iv	Continuous current rating of LBS at design ambient temperature of 50 deg C	100 Amps minimum or as per system requirement
6. CIRCUIT BREAKER		
I	Type	Three poles operated simultaneously by a common shaft
Ii	Arc interruption in dielectric medium	SF6 or vacuum
Iii	Operating mechanism	Electrically Operated
Iv	Emergency trip / open push button	On panel Front
V	Continuous current rating of Breaker at design ambient temp of 50 deg. C	100 Amps minimum or as per system requirement
Vi	Short time withstand capacity	As per SLD
Vii	Breaker status auxiliary contact	2NO + 2NC wired to terminal block
Viii	Current transformer Ratio	Suggestive rating: 100/1 A or as per requirement Other ratings as per manufacturer's standard may also be adopted. Sufficient space must be provided both in horizontal & vertical directions for mounting of CT's. Additionally, some CAUTION marking (by sticker/ paint) should be there to avoid CT's installation above the screen of cable (i.e. earth potential point.)
Ix	CT accuracy class	Protection: 5P20 Metering: 0.5
X	Potential Transformer (PT) ratio and Accuracy Class	11/22000/ √3 /110/ √3-volt Accuracy class:0.5 suitable for converter duty application as mentioned elsewhere in the Specification
Xi	Protections	Numerical relay as per requirements mentioned elsewhere in the specification. In addition to above Transformer protections like OTI, WTI, Buchholz, and Pressure Relief Valve (PRV) operated shall be suitably integrated in the protection circuit. Any AC/DC auxiliary supply requirement for the RMU shall be arranged as per requirement mentioned elsewhere in the specification.
Xii	Relay aux contacts for remote Indication	1NO+1NC Potential free wired to TB
Xiii	Shunt trip (for door limit switch of enclosure or transformer) as per the adopted voltage	To be wired to terminal blocks
7. EARTH SWITCH		

I	Type	Three poles operated simultaneously by a common shaft
Ii	Switching in dielectric medium	Dry air in sealed medium or SF6
Iii	Operating mechanism for Close/Open	Manual
Iv	Short time withstand capacity	As per SLD
V	Aux contacts	1NO+1NC free wired to TB
Vi	LBS Earth Switch close / open	Potential free contacts wired to terminal block
8. INDICATION		
I	Cable charge status indication for all Load Break Switches & CircuitBreaker	Circuit breaker capacitor typevoltage indicators with LED on all thephases (Shall be clearly visible in day light)
Ii	Spring charge status indication	On front for breaker
Iii	Earth switch closed indication (For Each LBS)	Front
Iv	Load break switch ON/OFF Indication	Green for OFF / Red for ON
V	Circuit breaker ON/OFF indication	Green for OFF / Red for ON
Vi	Deleted	
Vii	CB close / open	Potential free contacts wired to terminal block.
Viii	Protection relay operated	Potential free contacts wired to terminal block.
Ix	SF6 gas pressure low	Potential free contacts wired to terminal block.
X	Cable fault Direction	Cable Fault passage Indicator
9. RMU OPERATIONAL INTERLOCK		
I	Interlock type	Mechanical
Ii	Load break switch & respective earth Switch	Only one in 'close' condition at a time
Iii	Circuit breaker & respective earth Switch	Only one in 'close' condition at a time
Iv	Prevent the removal of respective cable covers if load break switch or circuit breaker is 'ON'	Electrical / Mechanical

V	Prevent the closure of load break switch or circuit breaker if respective cable cover is open	Electrical / Mechanical
Vi	Cable test plug for LBS/CB accessible only if Earth switch connected to earth	Mechanical
10. MIMIC DIAGRAM, LABEL AND FINISH		
I	On panel front with description of function & direction of operation of handles/buttons	
Ii	Mimic diagram (Shall not be preferred with Stickers)	
Iii	Operating instruction chart and Do's & Don'ts to be displayed on left / front side of panel enclosure on Al Sheet, duly affixed on panel.	
Iv	Name plate on panel front	Fixing by rivet only
V	Material	Anodized aluminum 16SWG / SS
Vi	Background	Satin Silver
Vii	Letters, diagram & border	Black
Viii	Process	Etching
Ix	Name plate details	Month & year of manufacture, equipment type, input & output rating, purchaser name & order Number, guarantee period.
X	Labels for meters & indications	Anodized aluminum with white character on black background OR 3 Ply lamicoid.
Xi	Danger plate on front & rear side	Anodized aluminum with white letters on red background
Xii	Painting surface preparation	Shot blasting or chemical 7 tank Process
Xiii	Painting external finish	Powder coated epoxy polyester base grade A, shade - RAL 7032
Xiv	Painting internal finish	Powder coated epoxy polyester base grade A, shade - white

1.29.3 TESTS OF RMU

a. 11/22 kV Switchgear/Ring Mains UEOI shall be of type tested design. During detailed engineering, the contractor shall submit for OREDA approval the reports of all the type tests carried out within last ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.

b. However, if the contractor is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test

report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client/owners representative and submit the reports for approval.

c. All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.

d. The type test reports once approved for any projects shall be treated as reference. For subsequent projects of OREDA, an endorsement sheet will be furnished by the manufacturer confirming similarity and “No design Change”. Minor changes if any shall be highlighted on the endorsement sheet.

2 INVERTER TRANSFORMER

2.1 DRY TYPE INVERTER TRANSFORMER

Sr. No.	PARAMETERS	INVERTER TRANSFORMER
i)	**Type**	Epoxy cast resin/resin encapsulated
ii)	**Duty, Service & Application**	Continuous Solar Inverter application and converter duty (Indoor)
iii)	**MVA & Voltage Ratio**	As per system requirement and SLD.
iv)	**Vector group**	
v)	**Termination & Bushing CT**	
vi)	**Fault Level & Earthing**	
vii)	**Tap changer type & range**	As per system requirement and SLD. OCTC +/-5% (min.)
viii)	**Impedance**	As per system requirement and SLD & as per Inverter manufacturer recommendation.
ix)	**Number of Phases**	Three (3)
x)	**Type of cooling**	**AN** Transformer shall be provided with suitable ventilation system to ensure the temperature rise limits under most severe condition while in service however all tests and performance guarantee shall correspond to air natural (AN) cooling.

xi)	**Bushing rating, Insulation class (Winding & bushing)**	As per relevant IS/IEC (However, Inverter Transformer LV side winding & bushing insulation class shall be of at least 3.6 kV)
Sr. No.	**PARAMETERS**	**INVERTER TRANSFORMER**
xii)	**Maximum Temperature rise of winding over 50 deg. C ambient. (by resistance method) with Air Natural (AN) cooling.**	90 deg. C. (class F) 115 deg. C. (class H)
xiii)	**SC withstands time (thermal)**	2 sec
xiv)	**Noise Level**	Not to exceed values specified in NEMA TR- 1.
xv)	**PD Level (max. Allowable)**	10 pc
xvi)	**Loading Capability**	Continuous operation at rated KVA on any tap with voltage variation of +/-10% corresponding to the voltage of the tap as well as in accordance with IEC60076-12/IS: 6600.
xvii)	**Flux Density**	Not to exceed 1.9 Wb/sq. m. at any tap position with +/-10% voltage variation from voltage corresponding to the tap. Transformer shall also withstand following over fluxing conditions due combined voltage and frequency fluctuations: a) 110% for continuous rating. b) 125% for at least one minute. c) 140% for at least five seconds.

2.1.1 CODES AND STANDARDS

Dry type transformers	IS: 11171, IEC 60076-11
Indian Electricity Act 2003 and Indian Electricity Rules, BEE notification & CEA guidelines	

2.1.2 DESIGN AND CONSTRUCTIONAL FEATURES

a. The core shall be constructed from high grade non-ageing cold rolled grain- oriented silicon steel laminations of M4 grade or better quality. The insulation of core to clamp-plates shall be able to withstand a power frequency voltage of 2 kV (rms) for one (1) minute.
b. The transformers shall be housed in a metal protective housing, having a degree of protection of IP-23. In case it is placed outdoor, IP for enclosure shall be minimum IP-42 or higher. Enclosure shall be of a tested quality sheet steel of minimum thickness 2mm & shall also accommodate cable terminations. The housing door shall be interlocked such that it should be possible to open the door only when transformer is off. The enclosure shall be provided with lifting lugs and other hardware for floor mounting. Suitable bi-directional skids with pre-drilled holes shall be provided integral with the enclosure or bi-directional rollers shall be provided with suitable locking arrangement.
c. Winding conductor shall be electrolytic grade Copper/ Aluminum. Windings shall be of class F insulation or better. All windings are to be uniformly insulated.
d. Transformer HV bushings and LV bushings can be either solid porcelain or epoxy type. Bushing shall be suitable for satisfactory operation in the high ambient temperature inside Bus Duct enclosure (if applicable). LV flange area shall be of non-magnetic material.
e. Bushing CTs shall be provided in the LV neutral side of adequate rating for REF protection, WTI, etc. (as applicable).
f. For Marshalling Box, the sheet steel used shall be at least 1.6 mm thick cold rolled. The box shall be tank mounted type. The degree of protection shall be IP- 54 in accordance with IS-13947. Wiring Scheme shall be engraved in a stainless- steel plate with viewable font size and the same shall be fixed inside the Marshalling Box door.
g. Transformer shall be provided with suitable ventilation system to ensure the temperature rise limits under most severe condition while in service however all tests and performance shall correspond to air natural cooling.

2.1.3 PAINTING

The inside of enclosure and accessories (except M. Box) shall be painted with two coats of fully glossy white color with total DFT of 25 to 60 microns. The external paint color of transformer & accessories shall be blue corresponding to RAL 5012. The external surface of transformer & accessories shall have two coats of chemical resistant epoxy zinc phosphate primer and two coats of polyurethane finish paint with total DFT of 80 to 150 microns. The internal surface of M. Box shall have two coats

of chemical resistant epoxy zinc phosphate primer and two coats of chemical & thermal resistant epoxy enamel white paint with total DFT of 80 to 150 microns.

2.1.4 TESTS AND INSPECTION

- In case the bidder/contractor has conducted type test(s) within last ten years, he may submit the type test reports to the owner for waiver of conductance of such type test(s). These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.
- In case the Bidder is not able to submit report of the type test(s) conducted within last ten years from the date of LOA by MAHAPREIT, or in case the type test report(s) are not found to be meeting the specification requirements, the Bidder shall conduct all such tests under this contract at no additional cost to the Employer and submit the reports for approval
- Short Circuit Test:- In case short circuit test has not been conducted or the test report not meeting the specification requirement for the offered transformer manufacturer, Bidder /Sub-vendor shall establish" Ability to withstand the dynamic effects of short circuit "for the offered transformer as per latest IEC 60076-5.The ability to withstand the dynamic effects of short circuit can be established either by performing actual short circuit test or by method of calculation with reference to short circuit tested reference transformer as per IEC- 60076-5/Annexure-A&B. Bidder shall choose any one the two options mentioned below:
    - Option-1: - Performing actual short circuit test as Type Test. In order to meet project schedule, Bidder/Sub vendor shall take suitable steps quite in advance to ensure successful conduction of short circuit test within three months' time from date of LOA failing which the offered make of the transformer shall not be considered.
    - Option-2: By theoretical evaluation of the ability to withstand dynamic effect of short circuit based on 'Calculation and Design and Manufacture Consideration'. In this regard the guidelines given in Annexure-A with applicable tables of the IEC 60076-5 is to be followed. The reference transformer chosen shall be of same application, winding configuration, conductor current density and as per Annexure-B of latest IEC-60076-5.
- Necessary Design document and reference test reports related to theoretical comparative evaluation must be submitted by Manufacturer/Bidder as required by OREDA in this case.

S.N.	ROUTINE TESTS	
1.	All routine test shall be carried out in accordance with IEC 60076.	✓
2.	Measurement of Voltage Ratio & phase displacement (as perIEC 60076-1)	✓

3.	Measurement of winding resistance on all the taps (as per IEC 60076-1)	✓
4.	Vector group and Polarity Check (as per IEC 60076-1)	✓
5.	Magnetic Balance and Magnetizing Current Test	✓
6.	Measurement of no-load current with 415 V, 50 Hz AC supply	✓
7.	Measurement of no-load losses and current at 90%, 100% & 110% of rated voltage (as per IEC 60076-1)	✓
8.	Load Loss & Short Circuit Impedance Measurement on principal & Extreme Taps	✓
9.	IR measurement (As per IEC 60076-1)	✓
10.	Measurement of capacitance & tan delta to determine capacitance between winding & earth.	✓
11.	Separate Source Voltage Withstand Test /Applied voltage test(as per IEC 60076-3)	✓
12.	Induced overvoltage test/Induced voltage withstand (IVW) test as per IEC60076 part 3	✓
13.	Repeat no load current/loss & IR after completion of allelectrical test	✓
S.N.	**ROUTINE TESTS**	
14.	Oil leakage test on completely assembled transformer along with radiators (as per relevant clause of this sub section)	✓
15.	Jacking test followed by D.P. test	✓
16.	Marshalling Box/Cable box: It shall not be possible to insert a thin sheet of paper under gaskets and through enclosure joints.	✓
17.	IR measurement on wiring of Marshalling Box.	✓

S. N.	**TYPE TESTS#** **(To be carried out on one transformer of each rating)**	
1.	Lightning impulse (Full and chopped wave) test on windings (as per IEC 60076-3) (Not applicable for LV)	✓
2.	Short circuit test (special test) as per IEC 60076-5 (if applicable).	✓
3.	Temperature Rise test at a tap corresponding to maximum losses as per IEC 60076. Gas Chromatography shall be conducted on oil sample taken before & immediately after temp. rise test. Gas analysis shall be as per IS: 9434 (based on IEC: 60567), results will be interpreted as per IS: 10593 (based on IEC: 60599).	✓
4.	Measurement of harmonics of no-load current (special test)	✓

5.	Measurement of acoustic noise level as per NEMA TR-1 (special test)	✓
6.	Tank Vacuum & Pressure Test (as per CBIP norms)	✓

(#) NOTE: -

i. *All the type and special tests shall be conducted after performing Short Circuit Test. If Tank Vacuum & Pressure Test is to be carried-out then it shall be conducted before SC test.*

ii. *Inverter Transformer LV winding Di-electric tests (except for lightning impulse test for LV winding) shall be carried out corresponding to levels (as per IEC 60076) for 3.6 kV class.*

iii. *All Type tests should be done as per MAHAPREITs approved procedure.*

- **Routine / Type Tests (Dry Type Transformers):** Transformer shall be short circuit tested after conducting the routine tests. Rest of the type tests shall be conducted after successful short circuit testing (as applicable). All routine tests in accordance with IS: 11171 shall be carried out on each transformer. And All Type tests should be done as per Employer's approved procedure.

Routine / Type Tests (Dry Type Transformers)			
a)	Measurement of winding Resistance for each tap position.		Routine
b)	Measurement of voltage ratio at each taps position.		Routine
c)	Vector group and polarity check		Routine
d)	Measurement of impedance voltage/short circuit impedance & load loss at principal tap and extreme taps		Routine
e)	Measurement of no-load losses and magnetizing current at rated frequency and 90%, 100% and 110%rated voltage.		Routine
f)	Measurement of insulation resistance		Routine
g)	Measurement of capacitance and tan delta		Routine
h)	Dielectric Tests		
	1)	PF/Separate source AC withstand voltage test.	Routine
	2)	Chopped wave lightning impulse voltage test on windings (as per IEC 60076-3) (Not applicable for LV)	Type
	3)	Induced over voltage withstand test	Routine
i)	Partial discharge measurement		Routine
j)	Measurement of iron loss & IR (repeat after induced voltage test)		Routine
k)	Short Circuit test as per IEC (if applicable)		Type
l)	Noise Level Measurement		Type
o)	Temperature rise test as per IEC (HV & LV winding)		Type

3 AUXILLARY TRANSFORMER

3.1 TECHNICAL REQUIREMENTS

Sr. No.	DESCRIPTION	AUXILIARY TRANSFORMER (AT)
i)	VA Rating & Quantity	As per system requirement and /or SLD*
ii)	Voltage Ratio (KV)	As per system requirement and / or SLD*

iii)	Duty, Service & Application		Continuous application (Outdoor)
iv)	Winding		TWO
v)	Frequency		50 Hz
vi)	Nos. of Phase		THREE
vii)	Vector Group & Neutral earthing		As per system requirement and /or SLD*
viii)	Cooling		ONAN
ix)	Tap Changer		As per system requirement and /or SLD*
x)	Impedance at 75^0 C		
	a) Principal Tap		As per system requirement and /or SLD*.
	b) Other Taps		
xi)	Permissible Temperature rise over an ambient of 50 deg C (irrespective of tap)		
	a) Top Oil		35^0C
	b) Winding		40^0C
Sr. No.	DESCRIPTION		AUXILIARY TRANSFORMER (AT)
xii)	SC withstands (thermal)	Time	2 sec.
xiii)	Fault Level & Bushing CT		As per system requirement and SLD*
xiv)	Termination		As per system requirement and SLD*
xv)	Bushing rating, Insulation class (Winding & bushing)		As per relevant IS/IEC
xvi)	Noise level		AS PER NEMA TR-1
xvii)	Loading Capability		Continuous operation at rated MVA on any tap with voltage variation of +/-10%, also transformer shall be capable of being loaded in IS: 6600.

xviii)	Flux density	Not to exceed 1.9 Wb/sq. m. at any tap position with +/- 10% voltage variation from voltage corresponding to the tap. Transformer shall also withstand following over fluxing conditions due to combined voltage and frequency fluctuations: a) 110% for continuous rating. b) 125% for at least one minute. c) 140% for at least five seconds. Bidder shall furnish over fluxing char.up to 150%
xix)	Air Clearance	As per CBIP

Note (common for Oil filled and dry type transformer):

- Auxiliary transformers shall be suitable for 3 phase, 4 wire system with additional LVN bushing for equipment earthing.
- Auxiliary Transformer can be either Oil filled or Dry Type (refer relevant specification. If auxiliary transformer is provided indoor, it shall be necessarily dry type.

3.2 CODES AND STANDARDS

Transformers	IS:2026, IS:6600
Bushings	IS:2099, IS 3347
Insulating oil	IEC 60296
Bushing CTs	IS:2705
Indian Electricity Act 2003, BEE Guideline & CEA notifications	

3.3 GENERAL INSTRUCTIONS

Transformer shall be constructed in accordance to IS: 2026 and IS: 3639 or equivalent to any other international standard. Transformer shall be complete & functional in all respect and shall be in scope of supplier.

The other important construction particulars shall be as below:

a. The Transformer tank and cover shall be fabricated from high grade low carbon plate steel of tested quality. The tank and the cover shall be of welded construction and there should be provision for lifting by crane.

b. A double float type Buchholz relay conforming to IS: 3637 shall be provided.

c. Suitable Inspection hole(s) with welded flange(s) and bolted cover(s) shall be provided on the tank cover. The inspection hole(s) shall be ofsufficient size to afford easy access to the lower ends of the bushings, terminals etc.

d. All bolted connections to the tank shall be fitted with suitable oil-tight gaskets which shall give satisfactory service under the operating conditions for complete life of the transformer if not opened for maintenance at site

e. The transformer shall be provided with conventional single compartment conservator. The top of the conservator shall be connected to the atmosphere through indicating type cobalt free silica gel breather (in transparent enclosure). Silica gel shall be isolated from atmosphere by an oil seal.

f. Transformer shall have adequate capacity Conservator tank to accommodate oil preservation system and volumetric expansion of total transformer oil.

g. Transformer shall have Oil Temperature Indicator and Winding temperature Indicator (WTI applicable for transformer above 50 KVA) with accuracy class of +/-2 deg.

h. For Transformers above 100KVA, radiators shall be detachable type, mounted on the tank with shut off valve at each point of connection to the tank, lifts, along with drain plug/valve at the bottom and air release plug at the top.

i. M. Box shall be of sheet steel, dust and vermin proof provided with proper lighting and thermostatically controlled space heaters. The degree of protection shall be IP 55. Marshalling Box of all transformers shall be preferably Tank Mounted. One dummy terminal block in between each trip wire terminal shall be provided. At least 20% spare terminals shall be provided on each panel. The gasket used shall be of neoprene rubber. Also Marshalling Box, shall be at least 450 mm above ground level (for transformer above 100 KVA). For transformer above 100 KVA, wiring scheme (TB details) shall be engraved in a stainless-steel plate with viewable font size and the same shall be fixed inside the Marshalling Box door.

3.4 WINDINGS

a) The bidder shall ensure that windings of all transformers are made indust proof & conditioned atmosphere.

b) The conductors shall be of electrolytic grade copper free from scales& burrs.

c) All windings of the transformers shall have uniform insulation.

d) Tapping shall be so arranged as to preserve the magnetic balance of the transformer at all voltage ratio.

3.5 CORE

a) The core shall be constructed from non-ageing, cold rolled, super grain-oriented silicon steel laminations equivalent to M4 grade steels or better.

b) Core isolation level shall be 2 kV (rms.) for 1 minute in air.

c) Adequate lifting lugs will be provided to enable the core & windings to be lifted.

3.6 INSULATING OIL

No inhibitors shall be used in the transformer oil. The oil supplied with transformers shall be new and previously unused and must conform to following while tested at supplier's premises and shall have following parameters

S.No.	Property	Permissible values
1.	Kinematic Viscosity, mm^2/s	12 at 40 ° C 1800.0 at (-)30 ° C
2.	Flash Point, °C	□ 140-° C
3.	Pour point, °C	□ (-)40 V C
4.	Appearance	Clear, free from sediment and suspended matter
5.	Density ($kg/dm^{3)}$ at 20 VC	0.895
6.	Interfacial Tension N/m at 25V C	0.04
7.	Neutralization value, mg KOH/g	0.01
8.	Corrosive Sulphur	Non-Corrosive
9.	Water content mg/kg	30 in bulk supply 40 in drum supply
10.	Anti-oxidants additives	Not detectable
11.	Oxidation Stability -Neutralization value, mg KOH/g -Sludge, % by mass	 1.2 0.8
12.	Breakdown voltage	
	As delivered, kV After treatment, kV	30 70
13.	Dissipation factor, at 90 □C And 40 Hz to 60 Hz	0.005
14.	PCA content	1%
15.	Impulse withstand Level, kV p	145
16.	Gassing tendency at 50 Hz after 120 min, mm3/min	5

3.7 BUSHINGS

- Bushing below 52 kV shall be oil communicating type with porcelain insulator.
- No arcing horns to be provided on the bushings.

3.8 BUSHING CTS

- Shall be of adequate rating for protection as required, WTI (WTI CT applicable for transformer above 50 KVA) etc. All CTs (except WTI) shall be mounted in the turret of bushings, mounting inside the tank is not permitted.
- All CT terminals shall be provided as fixed type terminals on the M. Box to avoid any hazard due to loosen connection leading to CT opening. In no circumstances Plug In type connectors shall be used for CT.

3.9 VALVES

- All valves up to and including 50 mm shall be of gun metal or of cast steel. Larger valves may be of gun metal or may have cast iron bodies.
- Sampling & drain valves should have zero leakage rate.

3.10 GASKETS

- Gasket shall be fitted with weather proof, hot oil resistant, rubberized cork gasket.
- If gasket is compressible, metallic stops shall be provided to prevent over compression.
- The gaskets shall not deteriorate during the life of transformer if not opened for maintenance at site. All joints flanged or welded associated with oil shall be such that no oil leakage or sweating occurs during the life of transformer. The quality of these joints is considered established, only if the joints do not exhibit any oil leakage or sweating for a continuous period of at least 3 months during the guarantee period. In case any sweating / leakage is observed, contractor shall rectify the same & establish for a further period of 3 months of the same. If it is not established during the guaranteed period, the guaranteed period shall be extended until the performance is established.

3.11 NEUTRAL EARTHING ARRANGEMENT

Neutral earthing shall be done as per system requirement and SLD. In case of solidly earthed neutral of Transformers, it shall be brought through insulated support from tank to the ground level at a convenient point with 2 nos. copper flat, for connection to ground network (as applicable). Neutral of Transformer if not used should be taken out through bushing and covered by insulating cap.

3.12 Cable boxes & disconnecting chamber (Disconnecting chamber applicable 3.3 kV and above)

a) HV Cable boxes shall be of phase segregated air insulated type & shall be of sufficient size to accommodate Employer's cable & termination. Phase segregation shall be achieved by insulating barriers (for 3.3 kV and above side)

b) Cable boxes shall have bus bars / suitable terminal connectors of adequate size & bolt holes to receive cable lugs. The degree of protection of cable boxes shall be IP 55.

c) A suitable removable gland plate of non-magnetic material drilled as per

d) the Employer's instruction shall also be provided in the cable box

e) The support from base for the cable box (for 3.3 kV and above side) shall be of galvanized iron

f) The contractor shall provide earthing terminals on the cable box, to suit

g) Employer's GI flat.

h) The minimum length provided for terminating 22 kV, 11KV & 3.3 KV XLPE cable shall be 1000 mm (for 22 kV) 650 mm (11 kV) from cable gland plate to the cable lug) for the cable boxes, for 11/22V side suitable length shall be provided (shall be discussed during detail engineering). The final cable size, number & length of terminating XLPE cable shall be furnished during detailed engineering.

i) Cable boxes shall be designed such that it shall be possible to move away the transformer without disturbing the cable terminations, leavingthe cable box on external supports (as applicable).

j) Cable boxes shall have removable top cover (for transformer above

k) 100 KVA) & ample clearance shall be provided to enable either transformer or each cable to be subjected separately to high voltage testhas been specified, these may be highlighted separately.

9.

S.No	Specification	Details
a	Solar PV Module Origin	Modules to be made in India and comply with IEC 61215/IS14286 for crystalline silicon, IEC 61730 Part-1 & Part-2 for safety, and IEC 61701 (salt mist).
b	Solar PV Array Capacity	Total array capacity ≥ required capacity, with crystalline PV modules of minimum 300 Wp and 144 cells each.
c	Surge Protection	Protective devices against surges and low voltage drop bypass diodes to be provided.
d	Testing and Approval	Modules must be tested and approved by MNRE/IEC-authorized test centers.
e	Module Frame	Frame made of corrosion-resistant anodized aluminum, minimum thickness 1.5 mm, and width 40 mm.
f	General Specifications	Rated output power tolerance: ±3%.
i.	Peak Power Variation	Voltage and current at peak power point must not vary by more than 2% from arithmetic mean.
ii.	Junction Box	Junction box with external screw terminal or sealed type, weatherproof (IP21/20), with by-pass diode provision.
iii.	Curves and Warranties	I-V & P-V curves at STC to be provided. Output wattage warranty: ≥90% at 10 years, ≥80% at 25 years.
g	RFID Tag	Modules must have an RFID tag containing:
i.	Manufacturer Information	Manufacturer name (PV module and solar cells).
ii.	Manufacturing Details	Month/year and country of origin for cells and modules.
iii.	Electrical Details	I-V curve, wattage, Im, Vm, FF for the module.
iv.	Identification	Unique Serial No, Model No, IEC certificate date/year, test lab name.
v.	Traceability	Other information per ISO 9001 and ISO 14001 for solar cells and modules.

2. Appendix Form 2 (Spares)

The Successful Bidder shall maintain, all the time, the following spares for RSPS as mentioned below:

Name of the Spares	Technical Specification	UEOI	Total quantum requirement in no.
Solar photovoltaic modules @ 2% of the total capacity	As per the Technical Specification of the EOI	kW	
1 inverter (higher capacity as per the various RSPS capacities to be allocated)	As per the Technical Specification of the EOI	No.	

In case of any non-compliance, OREDA will take necessary action against the Bidder. Please note that the Spares shall be maintained at the central/ local offices set by the Bidders.

Solar Power Plant Performance Certificate

This is to certify that the selected bidder [insert name of Bidder] has successfully installed ____ nos. of SPV power plant of capacity _____ (kW) at _____ [insert name of beneficiary] of [insert] block at [insert] district of Odisha. The date of commissioning of the ___ (kW) _____ (Mention Type of Power Plant) Solar Power Plant is _____. (DD/MM/YYYY)

The Solar Power Plant is operating successfully from the period (DD/MM/YYYY) to (DD/MM/YYYY). The generation report of the above power plant for the above-mentioned period is tabulated below.

Remark if any:

Reference:

1. EOI no. [insert] dated [DD MMM YYYY]
2. Letter of Intent no. [insert] dated [DD MMM YYYY]
3. Work Order no. [insert] dated [DD MMM YYYY]
4. Commissioning Certificate Date: [DD MMM YYYY] (As mentioned in JCC)

Report:

1. **The Monthly Generation Data of the Solar Power Plant is mentioned below (Actual generation) (Generation Meter reading/Inverter Reading/Electric bill)**:

(The Generation Data is Mentioned for the above-mentioned period in electrical uEOIs i.e; 1uEOIs = 1 kWhr)

Year	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC

Note: Electrical bill of the beneficiary/consumer may be attached for reference for the above-mentioned period for reference.

2. Monthly Generation data at 16% CUF performance of the Power Plant (Comparison Data)

Year	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC

(Sign with Date & Seal)	(Sign with Date & Seal)	(Sign with Date & Seal)
Representative of the Beneficiary	Representative of OREDA	Representative of Bidder
Name:	Name:	Name:
Designation:	Designation:	Designation:

3. Appendix Form 6 (Scheduled Maintenance):

1. Scheduled Maintenance for Solar PV system:

The periodic Scheduled Maintenance protocol as applicable

Sr. No.	Task	Quarterly	Semi-annual	Annual	Bi-annual
1	**PV Array**				
A	Inspect each PV modules for damage				
B	Observe PV array shading and take corrective measures				
C	Clean array with water and removes debris around the array				
D	Inspect array mounting structure, check for loose fasteners, corrosion, broken/ damaged concrete footings, etc. and take corrective measures, if necessary.				
E	Check the array junction box, all wires and cables to take corrective measures if necessary.				
F	Adjust tilt angle, if necessary				
G	Check array current & voltage. If required each module current, voltage & bypass diode condition.				
H	Check for any loose contacts in the string connection (+ve/-ve MC4 connectors)				
2	**PCU (As Applicable)**				
A	Check the inverter and/or charge controller for correct settings				
B	Check Inverter capacity and max allowable load using dummy load.				
C	Ventilation fan condition/filter cleaning				
D	Check all the parameters (I/P & O/P) as per Manufacturer datasheet for any Malfunctioning				
3	**Protection devices**				
A	Check for continuity of lightning arrestor				
B	Check system earthing				
C	Check all SPDs				
D	Check all bypass/ blocking diodes and take corrective measures if necessary.				
4	**AC Side**				
A	Transformer Oil				
B					
C					
D					

4. Appendix Form 7 (Test Certificates – IEC and IP certifications)

The Test Certificate requirements for the Project are given below:

Sl. No.	Major Component	Test Certificates Required	Test description
1	Crystalline Silicon Terrestrial PV Modules	IEC 61215/ or equivalent BIS standard (IS 14286)	Design qualification
		IEC 61730 -1,2	Safety Qualification Part 1: Requirements for Construction Part 2: - Requirements for Testing
		IEC 61701	Salt Mist Corrosion Test
		IEC 62716	Ammonia (NH3) Corrosion Testing, (As per site condition like dairies, toilets)
		IEC 61853-Part 1 & 2 /IS 16170: Part 1	Performance testing and energy rating: - Irradiance and temperature performance measurements and power rating.
		IEC 61683	Efficiency Test
		IEC 62804:	Potential Induced Degradation test
		IEC 62782	Dynamic Mechanical Load Test
		IEC 61726:2022	shielding effectiveness of cable assemblies, cables, connectors, and passive microwave components Test
		IEC 60068-1:2013	Sand & Dust Test
2	Inverter*	IEC 60068-2-1,2,14,30/ IEC 62093	Environmental Test
		IEC 61683	Energy Efficiency
		IEC62109-1,2	Safety test
		IEC 62116	Anti islanding
		IEC 61727	Utility Interface
		IEC 61000	EMC

Note: The proof of all documents showcasing the possession of such copies of the Test Certificates by the Bidder shall be submitted along with LoI document.

5. **Appendix Form 8 (CMC Performance Report)**

CMC Performance Report - Project

(To be issued by OREDA on the letterhead)

TO WHOMSOEVER IT MAY CONCERN

Date: [DD MMM YYYY]

To

[Successful Bidder's name]
[Address]
[Email id]
[Mobile no.]

Reference:

14. EOI no. [insert] dated [DD MMM YYYY]
15. EOI no. [insert] dated [DD MMM YYYY]
16. Letter of Intent no. [insert] dated [DD MMM YYYY]
17. Work Order no. [insert] dated [DD MMM YYYY]
18. Commissioning Certificate no. [insert] dated [DD MMM YYYY]
19. Acceptance Certificate no. [insert] dated [DD MMM YYYY]
20. Any other correspondence, if any:

This is to certify that [Name of the Successful Bidder] having its registered office at [address] has commissioned [insert capacity and type of project] Project at [project site details] with respect to the ref. no. 5 and 6 on [date of commissioning of project] and it is operating successfully and [Name of the Successful Bidder] has provided CMC during [insert financial year] which is [insert year of CMC] from the date of the Commissioning Certificate.

CMC Period	Year 1/2/3/4/5		CMC Start month
On grid application type			CMC End month

Vendor name	Vendor 1		
	SM closed as per schedule	CM closed within TAT	% Assets functional
UEOI	%	%	%
Min Requirement (Yearly Average)	**90%**	**80%**	**90%**
Average			
Jul			
Aug			
Sep			
Oct			
Nov			
Dec			
Jan			
Feb			
Mar			
Apr			
May			
Jun			

*In the above case, Jul is the CMC start month and Jun is CMC end month for illustration

CMC Performance of [Name of the Successful Bidder] is acceptable as per the above Table on the basis of the Annual Performance Report generated and submitted by CRC.

Attached: Annual Performance report generated report and submitted by CRC

If Final Outcome at point 10, is accepted, then BG shall be returned to the vendor. Failing to meet the acceptance at point 10 will lead to encashment of BG for the respective year.

Place: [insert place]

[sign here]
Signature
Name of Authorized Representative of OREDA: [insert name]
Designation: [insert designation]
Odisha Renewable Energy Development Agency
Seal:

1. No claim/ lien certificate

No claim/ lien certificate

(To be submitted on the letterhead of the Bidder)

Date: [DD MMM YYYY]
EOI no.: [insert EOI no.] dated [DD MMM YYYY]

We, the undersigned, certify that we are free and clear from any and all claims, liens, security interest, encumbrances, unpaid vendors'/ suppliers' lien or otherwise, arising out of or in connection to the performance of the Work Order no. [insert] dated [DD MMM YYYY]

Place: [insert place]

[sign here]
Signature
Name of Authorized Signatory: [insert name]
Designation: [insert designation]
Name of the Bidder: [insert Bidder's legal entity name]
Seal: [insert seal of the Bidder]

2. Appendix to SOW – CRC guidelines

1. Disclaimer

1. These guidelines meant for use of OREDA only.
2. These guidelines are prescribed for installation, Commissioning, Acceptance and Comprehensive Maintenance of renewable energy systems installed by/under OREDA only.
3. OREDA does neither recommend nor insist other organizations to follow these guidelines for the renewable energy systems developed by either by themselves or through any other organization other than OREDA.
4. OREDA reserves all the right to modify, amend or supplement these guidelines whenever such necessity arises.
5. Though adequate care has been taken for preparation of these guidelines the installation and maintenance details prescribed in this document are not the only and absolute prescriptions. Depending upon the on-site conditions, the installation/maintenance technician shall take his/her own well-judged decision while installing or maintaining a given RE system.
6. Though safety features have not been covered under these guidelines, Indian standard safety guidelines for construction work and electrical works must be followed by all involved in with installation and maintenance of RE systems under these guidelines.

2. Declaration

1. These guidelines will hereinafter be known as “General Guidelines for Installation and Maintenance of RE Systems under OREDA”
2. These guidelines shall be applicable to all distributed RE systems installed under the aegis of OREDA.
3. These guidelines shall be strictly followed by all vendors of OREDA.
4. These guidelines will also be strictly adhered to by all technicians and supervisory level officers of OREDA.
5. These guidelines will also constitute an integral part of all tenders of OREDA
6. The scoring system prescribed in these guidelines shall be applicable to all vendors of OREDA executing projects on behalf of OREDA

3. Intent behind framing these guidelines

1. These guidelines have been framed solely with the intention of improving the installation standards of RE systems and to extend the quality and timely maintenance services so as to minimize system downtime and guarantee customers’ satisfaction.

4. Context

1. The last few years have witnessed a tremendous rise in the number of RE installation particularly in remote, un-served and underserved parts of the state. In view of the absolute need of these installations to meet the basic requirements such as lighting, the supply of drinking water, irrigating farmlands, etc. it is imperative on the part of OREDA to ensure proper performance of the systems which largely depends on the quality of materials, standards of installation and the certainty and frequency of maintenance.
2. Ministry of New and Renewable Energy, GOI normally determines the quality and standards of the materials which are elaborately reiterated in the respective tender documents.
3. Project-specific installation procedures are often elaborated in the respective tender documents which the vendors are expected to follow meticulously. However, it has been observed that the vendors often do not adhere to these procedures which results in poor performance of the systems. To enable the vendors to follow the procedures meticulously a specific installation App has been developed by OREDA which will be shared with the vendors on their registered mobiles meant to be used by their designated Technicians. The App has been made in such a way that as a technician proceeds for installation of a certain system/device it opens up the step by step installation procedure for the given system/device which the technicians simply has to

follow and upload pictures wherever camera buttons have been provided. As a technician completes installation the entire installation report along with pictures will be ready on his mobile for submission to OREDA.

4. Renewable Energy systems are known for their low maintenance needs. Often this is misconceived as “no-maintenance” which results in non-performance of such high value and efficient systems. Thus, all RE systems must be maintained well.
5. Though the primary responsibility of maintenance of the systems has been vested in the concerned vendor the rising number of unresolved service requests at the CRC calls for some serious organizational oversight. Moreover, it is presumed that many customers are also not able to register their requests due to poor or no mobile connectivity, ignorance about CRC and its toll-free number, etc.
6. Keeping the above in view, OREDA during September2018 introduced a Scheduled Maintenance Regime through its Customer Relationship Centre so as to introduce periodicity and certainty in the maintenance services being extended by the vendors. Like installation, the scheduled maintenance has also been made a mobile application based where the technician responsible for maintenance of the system can step by step follow the prescribed procedure for scheduled maintenance and upload pictures wherever camera buttons have been provided. At the end of the maintenance procedure, a maintenance report can also be generated by the technicians.
7. This initiative is not only expected to increase the performance level of the installations but also greatly reduce service requests by customers.

5. Objectives:

The primary objectives of this new initiative are

1. Increase the economic life span of installations.
2. Ensuring better performance of RE systems.
3. Higher returns on investments.
4. Higher customer satisfaction
5. Better acceptance of decentralized RE based power systems
6. Increased response to climate change mitigation.

6. Stakeholders:

Ensuring proper performance of RE installations calls for the combined effort of all stakeholders such as Customers, Sponsors, PRIs, Vendors, Independent Service Organizations, OEMs, and OREDA.

1. **Customers**

   Customers are the ultimate users and custodians of RE systems/devices. They are required to own the systems irrespective of the systems being privately owned by them or a public property installed inside their premises. They should be responsible for the safety and security of the systems as well as day-to-day maintenance of the systems as prescribed in the users’ manual.

2. **Sponsors**

   Sponsors are the Government Departments/Organizations sponsoring the schemes/program under which the RE systems/devices are installed. Sponsors are responsible for availing and extending maintenance contracts and organizing funds for the same. Sponsors are to be kept informed about the maintenance activities as well as emergent situations that call for material and financial resources.

3. Vendors

Vendors are primarily responsible for supply, installation and commissioning of the RE systems/devices. They are also responsible for the effective maintenance of the systems for the first five years or as may be mentioned in the concerned tender. Vendors are required to extend scheduled maintenance services as well as on-call maintenance services to all systems installed by them. For extending such services smoothly they may establish their own service network or avail services of Independent Service Organizations. Vendors are also required to have back-to-back agreements with their OEMs for extending guarantee, warranty, the supply of spares, etc. Vendors shall work in close coordination with the customers, custodians, field uEOIs, respective technical divisions, and CRC of OREDA in order to deliver effective maintenance services.

4. OREDA

OREDA represented by its Technical Divisions, Field UEOIs, CRC is the most important stakeholders in respects of

i) Managing processes and providing oversight

j) Establishing principles and parameters for extending maintenance services

k) Setting up performance parameters

l) Monitoring, measuring and analyzing stakeholders' performance.

m) Working for performance improvement

n) Identifying time-bound and appropriate actions as well as working on the same

o) Developing internal preparedness to repair, re-installing systems beyond the scope of the vendors.

p) Developing contingency resources and plans to force majeure situations.

q) Recognizing and encouraging good performance

7. Process

The overall process is hinged on three distinct sub-processes. They are

1. Onboarding the project
2. Installation & Commissioning of the systems
3. Creation of system IDs and linking to CRM
4. Managing the R&M.

The efficiency of maintenance is largely dependent on the quality and regularity of step 1,2&3. The processes are as follows:

1. ONBOARDING:

Onboarding refers to the creation of the project-specific database comprising of the following details. Onboarding of each project is to be done by the concerned Division Head of OREDA.

r) Name of the scheme (Generic-Specific)

s) Name of the sponsors.

t) Details of sanction order indicating the quantity, cost, locations, etc.

u) Date of floating of tender

v) Date of finalization of tenders.

w) Vendor details (name, the quantity of work awarded, the total cost of the work, locations assigned)

x) Date of Issue of LOI

y) Details of survey report submitted by the vendor in response to LOI

z) Details of project execution schedule submitted by the vendor in response to LOI

aa) Date of issue of firm work order vendor wise

bb) Final date of completion of the project.

This would get populated onto the database in phases as the scheme progresses from conception to inception. Once a scheme is on-boarding the details are to be intimated to CRC for the creation of a new account.

2. PROJECT EXECUTION:

The vendor to whom a particular work has been assigned is responsible for the execution of the project. As soon as a project is on-boarded with the above details the same will appear on the dashboard of the concerned vendor(s). The vendor then has to assign the project to a specific technician(s) having registered mobile phones on which the installation apps have been loaded.

The technician will then be able to see his/her assigned projects on the app provided having details such as the name of the project, name of the customer, location details including GPS coordinates, the capacity of the project, etc. As the technician starts executing the project, he/she has to upload the following details as and when it happens

cc) Date of commencement

dd) Details of all hard wares

ee) Exact location of installation

ff) Complete step by step installation details including the picture as per the installation app.

gg) Date of commissioning the project

This would get populated onto the database in phases as the scheme progresses from conception to inception.

3. SUPERVISION:

District Level: As soon as the on-boarding is complete the Officer-in-charge of the District RE Cell can see the details on his dashboard. Similarly, he can see the subsequent processes carried out at the vendor and technician levels. At any point in time as may be required the Officer-in-charge of the District RE Cell can undertake filed visits and supervise the progress of the work, quality of work execution, etc.

Once a project is commissioned the Officer-in-charge of District RE Cell can make necessary checks and upload the Joint Commissioning Certificate on the App provided to him within a stipulated timeline.

HQR. Level: After getting the commissioning reports and necessary checks thereon the concerned division of OREDA will create the project/system ID after which the project/system will automatically get linked to the CRC which will mark the beginning of the processes at CRC such as Scheduled Maintenance and Corrective Maintenance.

8. R&M Management:

The R&M regime involves two types of efforts. The first is the Scheduled Maintenance Activities, which is done as a preventive action. It is expected that these periodic maintenances

will drastically reduce the incidents of breakdowns. This should be done at some periodicity and in each case, a list of activities must be done. The second is the Unscheduled Maintenance Activities which are of corrective nature. This means when any breakdown/ malfunction is detected, the appropriate corrective action needed can be iEOliated.

1. Scheduled (Preventive) Maintenance:

hh) A master maintenance schedule is to be drawn up for the organization covering each installation.

ii) This will be done by stratifying the districts into District Clusters based on logistical convenience.

jj) Each Cluster will be broken down into three geographical patches (comprising of Blocks/ GPs) called as Maintenance Cluster to evenly distribute the ticket load across each month within that Maintenance Cluster.

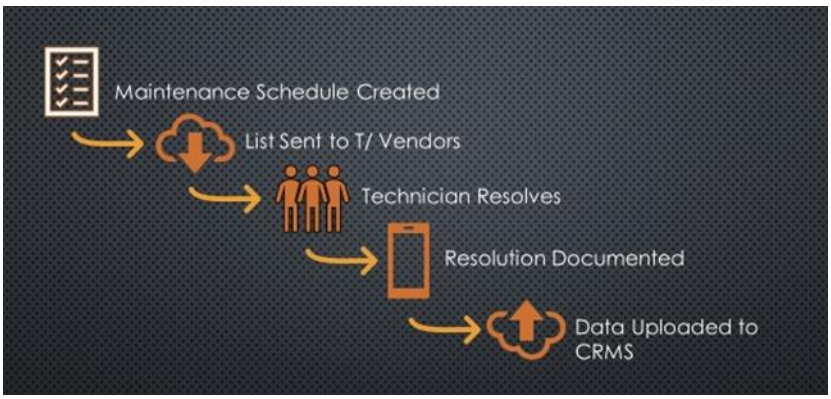
kk) The CRMS, well before the schedule, will fire a flurry of emails and SMS to the Vendors notifying about the list of installations they must cover in each of the Clusters within that Month. A ticket for each installation in the list will be automatically generated. It may be noted that though the list is sent in one list, separate emails will be sent for each ticket on which communication/ transactions have to be made by the Vendor

ll) It's the responsibility of the Vendors to track each case through their authorized technicians and report compliance throughout the month as soon as they cover the installations.

mm) The technicians/ SPOC of the vendor must share the documents/evidence required for the acceptance of resolution over e-mail in the same thread the ticket was raised. No resolution mail other than that thread will be accepted. The protocol of communication may get subsequently changed to improve operational efficiency.

nn) The CRC as soon as it receives the resolution mail, will cross verify the claim of resolution by the technicians and may close the ticket or return for rework.

oo) The CRMS at the end of the month will compute the performance of the ticket/ Vendor/ Scheme and release a scorecard.



2. Unscheduled (Corrective) Maintenance:

pp) Breakdown occurs at one of the installations.

qq) The customer calls the CRC to submit a service request.

rr) The agent at the CRC using the CRMS identifies the customer and registers a request called a ticket.

ss) Automatically a set of e-mails is fired to the Vendor, its Technician, Administering Dept. of the Scheme and OREDA.

tt) The CRMS tracks each ticket and follows up each case over e-mail and voice calls.

uu) After the lapse of certain days, the CRMS auto escalates it to the Nodal Officer/ Scheme Officer for action.

vv) The vendor/ Technician resolves the ticket at the field and intimates the CRC about it through the designated communication channel as per the protocol.

ww) CRC cross-verifies it with the commuEOIy/ customer and closes the ticket.

xx) CRMS measures performance.

9. Repair and Maintenance Regime:

1. Scheduled Maintenance:

The schedule maintenance regime will focus on the vendor's **certainty and regularity** of visit to the installations under him as his performance parameter. He is expected to comply with a minimum of 90% visit against the Scheduled Tickets within that Service Month.

yy) Activities under each category of Tickets:

The vendor is warranted to visit the installations and undertake a list of activities linked to that category of ticket. The ticket category can be of Quarterly, Half Yearly and Annual. To know the installation of a Class-specific and ticket Category-specific list of activities, kindly refer to Appendix Clause 13.3.

zz) Time Limit:

It's expected that the vendor must complete the activities over the list of installations designated for that maintenance month within that calendar month itself.

It may be noted that they can work on any day without any bias to the day being notified as a holiday or otherwise.

aaa) Route/ Sequence:

Each installation must be visited once in every quarter, half-yearly and yearly for different categories of activities.

To maintain a uniform gap between the visits every time, the vendor is expected to stick to an optimal sequence in a route.

The number of routes that the vendor identifies depends on how big the list and how many technicians are to be deployed.

Care must be taken so that all installations not only are resolved within a month but also are closed.

bbb) Score:

On successful completion of one ticket as per the service standard, the vendor will earn certain points, and for each default, it will earn a negative score which is designed to be a deterrent.

The scores are:

Visits	Activity Types	Earnings	Penalties
Visit - 1	Q1	3	-9
Visit - 2	Q2	3	-9
	H1	1	-3
Visit - 3	Q3	3	-9
Visit - 4	Q4	3	-9
	H2	1	-3
	A1	1	-3

2. Corrective Maintenance:

ccc) Service Standards:

While the Schedule Maintenance regime focuses on the vender's certainty and regularity of visit to the installation as his performance parameter, Corrective Maintenance Regime focuses on the Timeliness of the vendor to respond to a breakdown situation.

The vendor upon being notified of a breakdown situation shall have to complete his assessment within 2 days and complete the repair work within the next 5 days. All (100%) tickets must be resolved within the time limit given above. If the scope of repair/ replacement is found to be beyond the scope of Maintenance Contract (MC), then the vendor immediately after the field reconnaissance must report the same to the CRC.

iii. It is expected that at any point in time, none of the vendors would be having cases older than 7 days pending in their list.

iv. And, no vendor's installations under a scheme should show 'Non-Working' status of more than 2% of the installations.

v.

ddd) Methodology:

Corrective maintenance requires a different approach as against the scheduled maintenance methodology. While the scheduled maintenance is predictable, corrective maintenance requires a case-specific approach. The following are recommendations for the most efficient methodology. But the vendors are free to adopt their own if they are complying with the time limit.

eee) Reconnaissance:

Within 2 days of the ticket date.

- When a request of service is registered, the vendor as the first response must organize the collection of field level information about the nature of the problem.
- Based on that feedback from the field, the vendor must decide the following;
  - The genuineness of the request,
  - If the requirement of repair is beyond the scope of his MC,
  - If it is within his scope, then, he must arrange labor, spares, materials needed for the repair, and mobilize them to attend the breakdown at the spot.

This will help the vendor to resolve the request in one visit. This is more necessary as at times the villagers without ascertaining the owner of the installation, register a request in the CRC, and, as there is the possibility of multiple installations in one village and the data matches, the ticket is raised against a working installation.

fff) Repair:

Within 7 days of the ticket date.

vi. The authorized technicians of the vendor must move to the location with the resources to undertake the repair.

Upon completion of the repair, the installations must be tested in the presence of the customer/ custodian.

Requisite evidence and documentation must be completed by the technicians and immediate intimation need to be sent to the CRC.

ggg) How to handle repair beyond the scope of MC:

vii. At the reconnaissance stage, when the vendor realizes that the requirement is beyond the scope of MC, he must request closure giving appropriate reasons.

He must use the same communication channel as he would have used for resolution,

The CRC then would take it off the Vendor list and transfer it to the OREDA list.

OREDA will take this matter up with their principals for resolution.

hhh) Score:

viii. Each vendor at the start will be given a Credit account of 8760 hrs. (365 Days x 24 hrs.) for each of the installation he is responsible for maintenance. That will be known as the 'Total Achievable Uptime'.

When a request for service gets registered at the CRC the clock is started from the next day. The day the Vendor responds to a ticket informing successful resolution, the Clock stops on that day.

At the end of a period, the time taken for each ticket for a resolution, which is converted into hours gets deducted from the 'Total Attainable Uptime' of that Ticket.

And if the resolution time exceeds the set time of '7 Days', the system will treat those additional days with twice the score.

The system is so designed that the lesser the time is taken to resolve, the higher will be his Net Score. More he takes time to resolve; higher will be his penalty score which may erode his other good works.

10. Implementation:

1. **Training and Orientation:**

   OREDA will conduct orientation and training sessions for the Vendors and their technicians

2. **Helpdesk:**

   OREDA CRC will provide support to the field personnel of the vendors to acquaint themselves with various communication and process protocol.

3. **Performance Evaluation:**

   The following paragraphs explain the way OREDA will evaluate both the performances and how it will turn it into a composite score of performance. The Scheduled Maintenance activities have been given primacy over the Corrective Maintenance activities. While the Scheduled Maintenance is given 80% weightage in the composite score, Corrective Maintenance is given 20%.

4. **Computation of performance**

   Examples from the shared Excel sheets may be incorporated.

5. **Streamlined and timebound service**

i) Each district should have one individual ID and pass for monitoring all the installed asset for the respective district.

ii) The Assistant Directors should check the generated ticket and SM ticket for each and every asset of their jurisdiction every month and intimate the corresponding vendor if the ticket is not closed within 7-days.

iii) If a ticket is generated for an asset as well SM, then they should be communicated to the vendor, customer as well as the corresponding A.D., In-charge of the District through SMS as well as App. Issued by CRC.

iv) Every month the Assistant Directors will submit the report of the generated ticket and resolved ticket vendor wise within 10th to the Chief Executive Officer, OREDA for necessary review of the vendor in presence of CRC.

v) For continuous delay in resolving generated ticket for the consecutive 2- months, the same will be marked as negative remark and further course of action will be taken against the default vendor.

vi) Similarly, Scheduled Maintenance notification as scheduled to be sent to vendor, concern Assistant Directors.

vii) After resolution/ closure of tickets, notification message regarding closure of the ticket should be sent and communicated to vendor, beneficiary and the Assistant Director.

viii) At least one before and after, photographs to be uploaded in the CRC portal for resolving a generated ticket.

6. Rewards and Recognitions

OREDA will do everything under its might to support the good performance of the vendors as achieving very high uptime of its installation and good customer relationship is its prime organizational focus. It also will weed out non-performing vendors by penalizing them for their bad performance and blacklisting them for good.

OREDA will.

iii) Give preference to the high performing vendors in the upcoming tenders.

jjj) Institute Awards and Recognitions during important days of OREDA

kkk) Recover Liquidated Damages in the shape of penalties

lll) Blacklist vendors whose past performances are not at all good

End of Document