



**REC Power Development and  
Consultancy Limited**  
(A Government of India Enterprise)

Plot Number I-4, REC World Headquarters, D-  
Block, Sector-29, Gurugram – 122001,  
Haryana, India Website: [www.recpdcl.in](http://www.recpdcl.in)

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**Request for Proposal**

**For**

**Composite EPC for setting up  
of Grid Connected 1MW<sub>AC</sub>  
Ground Mounted Solar PV  
plant with arrangement of  
Land and STU Connectivity**

**Tender No.: RECDPCL/RE/Solar/1MW/01**

**Dated: 09-Dec-2024**

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**DISCLAIMER**

1. Though adequate care has been taken while preparing the tender document, the bidder(s) shall satisfy themselves that the document is complete in all respect. Intimation regarding any discrepancy shall be given to the office of Employer immediately. If no intimation is received from any bidder within 10 (Ten) days from the date of issuance of Tender documents, it shall be considered that the document is complete in all respect and has been received/ acknowledged by the bidder(s).
  
2. REC Power Development Corporation of India Ltd (RECPDCL) reserves the right to modify, amend or supplement this document.
  
3. While this tender document has been prepared in good faith, neither RECPDCL nor their employees or advisors make any representation or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this document, even if any loss or damage is caused by any act or omission on their part.
  
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Place: Gurugram,  
Date: 09-Dec-2024

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# SECTION - I

  

# INVITATION FOR BIDS (IFB)

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**(DOMESTIC COMPETITIVE BIDDING)**

**(SINGLE STAGE TWO ENVELOPE BIDDING FOLLOWED BY E-REVERSE AUCTION) UNDER E-TENDERING**

**INVITATION FOR BIDS (IFB) FOR**

**COMPOSITE EPC FOR SETTING UP OF GRID CONNECTED 1 MW GROUND MOUNTED SOLAR PV PLANT WITH ARRANGEMENT OF LAND AND STU CONNECTIVITY**

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## 1. INTRODUCTION

- 1.1. REC Power Development and Consultancy Limited (RECPDCL), is a wholly owned subsidiary of REC Limited, a "Maharatna" Enterprise under the Ministry of Power, Government of India. The existing key services offered by RECPDCL include coordination of bid processes for Inter-State and Intra-State transmission projects, coordination of bid processes for flexibility in generation schemes, engagement as Project Implementation Agency (PIA) for Smart Metering projects, PIA services for Distribution Infrastructure projects, Project Management Consultancy (PMC) for various Government of India Schemes such as RDSS, DDUGJY, IPDS, and Saubhagya. Beyond the core services, RECPDCL is gearing for venturing into the Renewable Energy sector through diverse business models. Hence RECPDCL is actively considering investment in brownfield renewable energy projects.
  - 1.2. The selection of the Contractor for the "Design, Engineering, Supply, Construction, Erection, Testing & Commissioning of 1 MW (AC) Ground mounted Solar PV Project at Haryana including 5 Years Plant O&M" will be carried out by RECPDCL incorporated under the Companies Act, 2013, having its Registered Office at Core-4, SCOPE complex, 7, Lodhi Road, New Delhi-110003 (hereinafter referred to as 'RECPDCL' or EMPLOYER or OWNER). For the purpose of all procurement activities related to the said works, RECPDCL shall be referred to as 'RECPDCL or Employer or Owner'.
  - 1.3. RECPDCL, therefore, invites bids from eligible bidders to participate in the tender for Design, Engineering, Supply, Construction, Erection, Testing & Commissioning of 1 MW (AC) Ground mounted Solar PV Project with land and evacuation anywhere in Haryana, having 5 Years Plant O&M as per the aforementioned details.
2. The complete Bidding Documents are available at REC/e-wizard portal <https://rec.ewizard.in>, as well as on RECPDCL's website <https://www.recpdcl.in> and REC website <https://www.recindia.nic.in>. However, for the purpose of participation, the official copy of the bidding documents shall only be downloaded from RECPDCL's e-tendering portal at <https://rec.ewizard.in>, as per the provisions available therein. Accordingly, the online bid also has to be uploaded by the respective bidders at <https://rec.ewizard.in> only & no other mode of participation is permitted for this tender document other than REC's e-wizard portal.
  3. Interested bidders have to necessarily register themselves on the portal <https://rec.ewizard.in> to participate in the bidding under this invitation for bids. It shall be the sole responsibility of the interested bidders to get themselves registered at the aforesaid portal for which they are required to complete the registration formalities. All required documents and formalities for registering on E-Wizard are mentioned in the subsequent bidding documents. They may obtain further information regarding this IFB from the corporate office of RECPDCL at the address given on the Bid Information Sheet from 10:00 hours to 17:00 hours on all working days till the last date of the Bid Submission. For proper uploading of the bids on the portal namely <https://rec.ewizard.in> (hereinafter referred to as the 'portal'), it shall be the sole responsibility of the bidders to apprise themselves adequately regarding all the relevant procedures and provisions as detailed in the portal as well as by contacting REC/e-wizard portal <https://rec.ewizard.in>, as and when required, for which contact details are also mentioned on the Bid Information Sheet. The EMPLOYER in no case shall be responsible for any issues related to timely or properly uploading/ submission of the bid in accordance with the relevant provisions of Section II - ITB of the Bidding Documents.

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4. A Single Stage Two Envelope Bidding Procedure followed by e-Reverse Auction will be adopted and will be processed as detailed in the Bidding Documents. Bidding will be conducted through the competitive bidding procedures as per the provisions of ITB/ BDS and the contract shall be executed as per the provisions of the Contract. It shall be noted that the respective rights of the Employer and the Bidder/ Contractor shall be governed by this Bidding Documents and Contract signed between the Owner and the Contractor..
5. Bidder shall submit bid proposal along with non-refundable Tender Processing Fees, Earnest Money Deposit (EMD) if applicable/ Bid Securing Declaration complete in all respect as per the Bid Information Sheet. Techno-Commercial bids will be opened as per the Bid Information Sheet in offline/ online presence of authorised representatives of bidders who wish to be present offline/ online. Bid proposals received without the prescribed Tender Processing Fees and Earnest Money Deposit (EMD, if applicable) or Bid Securing Declaration will be rejected. In the event of any date indicated is a declared Holiday, the next working day shall become operative for the respective purpose mentioned herein.
6. Tender documents which include Eligibility Criteria, Technical Specifications, various Conditions of Contract, Formats etc. can be downloaded from REC/e-wizard portal <https://rec.ewizard.in>, as well as on at <https://www.recpdcl.in> .It is mandatory to download official copy of Tender Document from REC/e-wizard Portal to participate in the Tender. Any amendment(s)/ corrigendum(s)/ clarification(s) with respect to this Tender shall be uploaded on REC/e-wizard site. The Bidder should regularly check for any Amendment(s)/ Corrigendum(s)/ Clarification(s) on the above mentioned REC/e-wizard site. The same may also be uploaded on RECPDCL website <http://www.recpdcl.in> also. However, in case of any discrepancy, the information available on e-wizard portal shall prevail.
7. EMD/Bid Securing Declaration shall be enclosed in a sealed envelope and shall be submitted in the office of EMPLOYER (offline) whose mailing address is mentioned in the Bid Information Sheet
8. Performance Securities as per this tender document shall be furnished by the successful bidder after issuance of Notification of Award (NOA)/ Letter of Intent (LOI)/ Letter of Award (LOA) by the Owner
9. The detailed Qualifying Requirements (QR) are given in the section, “Annexure to BDS”.
10. The EMPLOYER shall conduct e-Reverse Auction (e-RA), as per provisions of Instructions to Bidders (ITB) of Tender documents.
11. EMPLOYER/ Owner reserves the right to cancel/ withdraw this invitation for bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision.

**INTERPRETATIONS**

1. Words comprising the singular shall include the plural & vice versa.
2. An applicable law shall be construed as reference to such applicable law including its amendments or re-enactments from time to time.
3. A time of day shall save as otherwise provided in any agreement or document be construed as a reference to Indian Standard Time.
4. Different parts of this Tender Document are to be taken as mutually explanatory and supplementary to each other and if there is any differences between or among the parts of this Tender Document, they shall be interpreted in a harmonious manner so as to give effect to each part.

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The table of contents and any headings or sub headings in the Tender Document has been inserted for case of reference only & shall not affect the interpretation of this document.

**BID INFORMATION SHEET**

The brief details of the tender are as under:

<b>(A)</b>	<b>NAME OF WORK/BRIEF SCOPE OF WORK/ JOB</b>	<p><b>I. Land Related Works</b></p> <ul style="list-style-type: none"> <li>• Arrangement of Government/private Land (approx. 5 Acres) in the state of Haryana on <b>leasehold</b> basis near State Transmission Utility (STU) substation.</li> <li>• The distance from proposed land to State Transmission Utility (STU) substation shall be maximum distance of 10 km. The lease period shall be a minimum of 29 years 11 months.</li> <li>• Necessary approach till State Transmission Utility (STU) substation by self or through State machinery.</li> <li>• Topography Survey for Land Parcels and any cutting / Filling with 95% compaction as per standard Proctor density test, to maintain an average slope of 10% for Solar Project Land for installation of Module Mounting Structure (MMS). The slope of land would preferably be in one direction for at least 100m length in N-S Direction.</li> <li>• Fencing of the offered Land including entry / exit gate and security cabin for Solar PV Project.</li> <li>• RoW of Transmission line from Project site to State Transmission Utility (STU) substation.</li> </ul> <p><b>II. EPC Related Works</b></p> <p>Design &amp; engineering, procurement &amp; supply of equipment and materials, testing at manufacturers works, multi – level inspections, packing and forwarding, supply, receipt, unloading and storage at site, associated civil works, services, permits, licenses, installation and incidentals, insurance at all stages, erection, testing and commissioning of 1 MW(AC) Grid connected ground mounted Solar PV Project including Power Evacuation and STUS transmission line and performance demonstration with associated equipment and materials on turnkey basis along with 5 (Five) years comprehensive operation and maintenance from the date of commissioning or Operational Acceptance, whichever is later.</p> <p>1.1 Solar Modules, Module mounting structures and fasteners. Installation, Erection, Testing and Commissioning of Modules along with demonstration of the performance parameters.</p>
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		<p>1.2 All power conditioning systems including junction boxes, Inverters/ PCU, DC and AC circuit breaker(s).</p> <p>1.3 All associated electrical works and equipment required for interfacing line/ cable (i.e., transformer(s) – power and auxiliary, breakers, isolators, lightning arrestor(s), LT/other panels, protection system, cables, metering etc., but not limited to) as per technical specifications.</p> <p>1.4 Design, supply, erection, testing &amp; commissioning defined in scope of work/ TS as per project requirement and associated switchgear equipment and metering equipment as per technical specification and state regulations.</p> <p>1.5 All associated civil works, including design and Engineering, for: Earthwork for Site grading, cutting, filling, levelling &amp; compacting, internal Roads, Storm water drainage in the requisite project land as required for development of this Solar PV Power Plant</p> <p>1.6 Construction of Passage for Cleaning of Solar PV Project</p> <p>1.7 Construction of rainwater drainage, if required</p> <p>1.8 Setting up of a comprehensive Fire Protection system as per the Hazardous area classification for the site</p> <p>1.9 Supply of mandatory spares &amp; special tools and tackles</p> <p>1.10 Demonstration of performance of the plant as per the requirement specified in the bidding documents.</p> <p>1.11 Comprehensive operation &amp; maintenance of the Solar PV Project for 5 (Five) years as mentioned in detailed scope of work from the date of commissioning or Operational Acceptance, whichever is later, as detailed in technical specification, including supply and storage of all spare parts, consumables, repairs/ replacement of any defective equipment etc.</p> <p>1.12 Obtaining all associated statutory and regulatory compliances and approvals for successful construction, commissioning and operation of plant.</p> <p>1.13 The detailed scope of work is given in Section VII: Scope of Work, specifications and Drawings of this bidding documents.</p> <p>1.14 Geotech Investigation for Grid Substation and Transmission System only as required for Design of Foundations.</p> <p>1.15 Arrangement of Power transmission line connectivity with State Transmission Utility (STU) substation in location.</p> <p>1.16 Design, Engineering, Supply, Erection, Testing &amp; Commissioning of:</p> <p style="margin-left: 20px;">a. Pooling substation (33/11 kV or as per quoted capacity) with Tie Transformers (33/11 kV -suitable quantity and rating in line with CEA standard specifications) and associated SAS and Protection.</p> <p style="margin-left: 20px;">b. Pooling Switchgear for quoted capacity.</p>
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		<p>c. Associated Civil work for substation including Control Room Building and Pooling switchgear building</p> <p>1.17 Design and Construction of High Voltage (HV) Transmission Line from Pooling substation till State Transmission Utility (STU) substation as per technical specifications and relevant standards including arranging for the “Right of Way” of transmission line.</p> <p>1.18 Design and construction of terminal bay (AIS/GIS as applicable) at State Transmission Utility (STU) substation end.</p> <p>1.19 Telemetry system for data communication as per specifications.</p> <p>1.20 Installation of Common Power Plant Controller (Main and Sub-PPCs) and Grid Compliance Study for Solar plant capacity associated with above Pooling Substation.</p> <p>1.21 Supply and Installation of various Monitoring associated with Tie Transformers.</p> <p>1.22 Supply of mandatory spares.</p> <p>1.23 O&amp;M of Pooling substation and associated equipment, High Voltage (HV) Transmission Line and terminal bay at State Transmission Utility (STU) substation end for a period of 5 years from the date of Project Commissioning.</p>
(B)	TENDER NO. & DATE	RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024
(C)	SOURCE OF FUNDS	Owner as defined in the Bid Data Sheets (BDS) intends to finance the package through domestic funding and own resources.
(D)	TYPE OF TENDER	“Single Stage Two Envelope “online Bidding system followed by e-Reverse Auction.
(E)	BIDDERS ELIGIBLE FOR BIDDING	It’s a “Domestic Competitive Bidding” and hence this bid is open only for bidders registered within the Owner’s country.
(F)	COMPLETION/ CONTRACT PERIOD	As mentioned in Special Conditions of Contract (SCC).
(G)	COST OF BIDDING DOCUMENTS	Free of cost
(H)	TENDER PROCESSING FEE	Rs. 5000/- +GST
(I)	EARNEST MONEY DEPOSIT (EMD)	INR 5,10,000/- (Indian Rupees Five Lakh Ten Thousand only). Validity of 180 days from the technical bid opening date
(J)	CONTRACT PERFORMANCE SECURITY	10% of the total Contract Value as mentioned in SCC
(K)	DATE, TIME & VENUE OF PRE- BID MEETING & SITE VISIT	<b>Pre-Bid Meeting 15:30 HRS (IST) on 19-Dec-2024</b> Through online and link shall be uploaded in the RECPDCL website.
(L)	OFFLINE & ONLINE BID-SUBMISSION DEADLINE	<b>Online :03-Jan-2025 up to 15:30 HRS (IST)</b> <b>Offline :08-Jan-2025 up to 15:30 HRS (IST)</b>

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(M)	OFFLINE & ONLINE BID OPENING	03-Jan-2025, 1600 HRS onwards
(N)	FINANCIAL BID OPENING	To be intimated subsequent to the shortlisting of Techno Commercial Bids
(O)	QUERIES CONTACT DETAILS	Shri Krishna Chaitanya, Manager, REC Power Development and Consultancy Limited, Plot Number 1-4, REC World Headquarters, D-Block, Sector-29, Gurugram – 122001, Haryana, India Website: <a href="http://www.recpdcl.in">www.recpdcl.in</a>  E mail: <a href="mailto:rediv@recpdcl.in">rediv@recpdcl.in</a> Phone: 9940461546
(Q)	CONTACT DETAILS OF E-wizard	E –wizard: 1. Help desk No – 011-49606060, email - <a href="mailto:eprochelpdesk.101@gmail.com">eprochelpdesk.101@gmail.com</a> 2. Sh. Birendra- 8448288988, email - <a href="mailto:eprochelpdesk.21@gmail.com">eprochelpdesk.21@gmail.com</a>

1. Bids must be submitted strictly in accordance with Clause no. 11 of ITB depending upon Type of Tender as mentioned at Clause no. (D) of Bid Information Sheet. The Invitation for Bid( IFB )is an integral and inseparable part of the Tender document.
2. Bidder(s) are advised to bid strictly as per terms and conditions of the tender documents and not to stipulate any deviations/ exceptions.
3. Any bidder, who meets the Qualifying Requirement and wishes to quote against this tender, may download the complete bidding document along with its amendment(s) if any from e-wizard Portal of REC (<https://rec.ewizard.in>) and submit their Bid complete in all respect as per terms & conditions of Tender Document on or before the due date of bid submission.
4. No Manual / Hard Copy of the Bid shall be acceptable.
5. Clarification(s)/ Corrigendum(s) if any shall also be available on above referred websites.
6. Owner will release NOA/ LOI/ LOA/ CA for LSTK (Lump Sum Turn Key)/ EPC (Engineering, Procurement & Commissioning) to the successful bidder. The NOA/ LOI/ LOA/ CA for LSTK/ EPC job shall be awarded in following respective parts as mentioned briefly below: -
  - i. First Contract (Turnkey Land & EPC (Supply & Service)): For providing land along with connectivity at STU, Ex Works Supply of materials including mandatory spares and any other supplies specified in the Tender Documents under the scope of Supply comprising of all services i.e., including Transportation and Insurance of all Equipment's till site, Unloading of PV Modules at Site Supplied by the Owner, Storage, Handling at Site, Civil Works, Design, engineering, Erection, Installation, Testing and Commissioning of complete Solar PV Power Plant including Performance Testing in respect of all the Equipment's supplied under the scope of Supply and any other services specified in the Contract Documents.

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- ii. Second Contract (O&M Part): For providing Comprehensive operation & maintenance of the Solar PV plant for 5 (Five) years from the date of Operational Acceptance, as detailed in technical specification including supply and storage of all spare parts, consumables, repairs/ replacement of any defective equipment etc.
7. However, the above-mentioned contract award methodology may be modified/ changed based on specific project requirements and upon sole discretion of Owner.

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# SECTION - II

# INSTRUCTION TO BIDDERS (ITB)

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## Preamble

This part (Section - II) of the Tender Documents provides the information necessary for bidders to prepare responsive bids, in accordance with the requirements of the EMPLOYER/ Owner. It also provides information on bid submission and uploading the bid on portal <https://rec.ewizard.in>, bid opening, evaluation and on contract award. This Section (Section - II) contains provisions that are to be used unchanged unless Section - III (Bid Data Sheets) and Section - V (Special Conditions of Contract), which consists of provisions that supplement, amend, or specify in detail, information or requirements included in ITB and that are specific to each procurement, states otherwise.

However, provisions governing the performance of the Contractor, payments under the contract or matters affecting the risks, rights and obligations of the parties under the contract are not included in this section but instead under Section - IV (General Conditions of Contract) and/ or Section - V (Special Conditions of Contract).

Bidders may note that the respective rights of the EMPLOYER/ Owner and Bidders/ Contractors shall be governed by the Tender Documents and Contracts signed between the Owner and the Contractor. The provisions of Tender Documents shall always prevail over any other documents in case of contradiction.

Further in all matters arising out of the provisions of this Tender document, the laws of the Union of India shall be the governing laws and the courts at New Delhi shall have exclusive jurisdiction to entertain any issue/dispute arising out of this tender document.

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**[A] -GENERAL**

1. SCOPE OF BID

- 1.1. The EMPLOYER, wishes to receive Bids as described in the Bidding documents/ Tender documents issued by EMPLOYER.
- 1.2. SCOPE OF BID: The scope of work/ Services shall be as defined in the Tender documents.
- 1.3. The successful bidder shall complete the entire scope of work within the period stated in Section-V, Special Conditions of Contract.
- 1.4. Day' means 'Calendar Day' and 'Singular' also means 'Plural'.

2. ELIGIBLE BIDDERS

- 2.1. The Bidder shall not be under a declaration of ineligibility by EMPLOYER for Corrupt/ Fraudulent/ Collusive/ Coercive practices, as defined in "Instructions to Bidders [ITB], Clause no. 39" (Action in case Corrupt/ Fraudulent/ Collusive/ Coercive Practices).
- 2.2. The Bidder (either individually or as a consortium or any of the participating members of the Consortium) shall not have been debarred by EMPLOYER/ Owner/ Ministry of New & Renewable Energy (MNRE) or any other ministries and / or any other Government Department, Agencies or CPSUs from future bidding due to "poor performance" or "corrupt and fraudulent practices" or any other reason in the past.

If the tender documents were issued inadvertently/ downloaded, offers submitted by such bidders shall not be considered for opening/ evaluation/ Award and will be returned to such bidders.

It is the sole responsibility of the Bidder to have informed RECPDCL about any change in status of the declaration (if any) prior to award of contract, the same has to be informed promptly to EMPLOYER by the bidder.

It shall be the sole responsibility of the bidder to inform EMPLOYER in case the bidder is debarred from bidding as specified in this tender document. Concealment of the facts shall tantamount to misrepresentation of facts and shall lead to action against such Bidders as per clause no. 39 of ITB.

- 2.3. The Bidder should not be under any liquidation court, receivership or similar proceedings on the due date of submission of bid.

In case there is any change in status of the declaration prior to award of contract, the same has to be promptly informed to EMPLOYER by the bidder.

It shall be the sole responsibility of the bidder to inform EMPLOYER in case the bidder is under any liquidation court, receivership or similar proceedings on due date of submission of bid and during the course of finalization of the tender. Concealment of the facts shall tantamount to misrepresentation of facts and shall lead to action against such Bidders as per clause no. 39 of ITB.

- 2.4. Bidder shall not be affiliated with an entity:

- (i) that has provided consulting services related to the work of the EMPLOYER/ Owner during the preparatory stages of the work or of the project of which the works/ services forms a part of or
- (ii) that has been hired (proposed to be hired) by the EMPLOYER/ Owner as an Engineer/ Consultant for the contract.

- 2.5. Neither the entity [appointed as the Project Management Consultant (EMPLOYER)/Consultancies for a contract] nor its affiliates/ JV's/ Subsidiaries shall be allowed to participate in the tendering process.

- 2.6. Pursuant to qualification criteria set forth in the bidding document, the Bidder shall furnish all necessary supporting documentary evidence to establish Bidder's claim of meeting qualification criteria as mentioned in the Annexure to BDS.

3. BIDS FROM CONSORTIUM/ JOINT VENTURE

- 3.1 Unless otherwise specified in the Bid Data sheet (BDS), Bids from Consortium/ Joint Venture are allowed. However, the eligibility criteria along with other terms and conditions (as mentioned in clause no. 1.4 of Annexure to BDS) shall be complied upon.

4. BIDS FROM CONSORTIUM/ JOINT VENTURE

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4.1 Unless otherwise specified in the Bid Data sheet (BDS), a Bidder shall submit only 'one [01] Bid' in the same Bidding Process. A Bidder who submits or participates in more than 'one [01] Bid' will cause all the proposals in which the Bidder has participated to be disqualified.

5. COST OF BIDDING & TENDER PROCESSING FEE

5.1 COST OF BIDDING

The Bidder shall bear all costs associated with the preparation and submission of the Bid including but not limited to bank charges, all courier charges including taxes & duties etc. incurred thereof. Further, EMPLOYER/ Owner will in no case, be responsible or liable for these costs, regardless of the outcome of the bidding process.

5.2 TENDER PROCESSING FEE (NON-REFUNDABLE)

A non- refundable Tender Processing Fee, if applicable, is to be submitted in the form of 'either through NEFT/ RTGS transfer in the account of RECPDCL or Demand Draft/ Banker's Cheque in favour of "REC Power Development and Consultancy Limited" payable at New Delhi. The Tender Processing Fee is to be submitted along with the bid for the amount as mentioned in the Bid Information Sheet attached under Section - I (Invitation for Bids, IFB). Bids submitted without payment of requisite Tender Processing Fee will be treated as non-responsive and shall be liable for rejection

5.3 Deleted.

5.4 In case of any discrepancy/ non-submission of either offline or online bid documents by the bidder, the tendering processing fee will be deemed as bidder's consent for participation in the bidding process. The tender processing fee shall be retained by EMPLOYER and shall not be returned under any circumstances. No plea in this regard shall be entertained by EMPLOYER/ Owner. However, EMD, if applicable will also be returned in this case.

5.5 In the event of the tender being cancelled at any stage, the tender processing fee will be refunded to the concerned bidders without any interest charges within 30 days from the date of notification of cancellation of tender. No plea in this regard shall be entertained by the EMPLOYER/ Owner. EMD, if applicable will also be returned in this case.

6. SITE VISIT

6.1 The Bidder is advised to visit and examine the site of works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a Contract for the required job. The costs of visiting the site shall be borne by the Bidder.

6.2 The Bidder or any of its personnel or agents shall be granted permission by the EMPLOYER/ Owner to enter upon its premises and land/Area for the purpose of such visits, but only upon the express conditions that the Bidder, its personnel and agents will release and indemnify the EMPLOYER/ Owner and its personnel, agents from and against all liabilities in respect thereof, and will be responsible for death or injury, loss or damage to property, and any other loss, damage, costs, and expenses incurred as a result of inspection.

6.3 The Bidder shall not be entitled to hold any claim against EMPLOYER/ Owner for non- compliance due to lack of any kind of pre-requisite information as it is the sole responsibility of the Bidder to obtain all the necessary information with regard to site, surrounding, working conditions, weather etc. on its own before submission of the bid.

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**[B] BIDDING DOCUMENTS**

**7. CONTENTS OF TENDER DOCUMENTS**

7.1 The contents of Tender Documents are those stated below, and should be read in conjunction with any 'Addendum/ Corrigendum' issued in accordance with "ITB: Clause-9":

Section-I	:	Invitation for Bids [IFB]
Section-II	:	Instructions to Bidders [ITB]
Section-III	:	Bid Data Sheets [BDS] Annexure to Bid Data Sheets [Qualifying Requirements]
Section-IV	:	General Conditions of Contract [GCC]
Section-V	:	Special Conditions of Contract [SCC]
Section-VI	:	Sample Forms and Formats
Section-VII	:	Scope of Work & Technical Specifications
Section-VIII	:	Schedule of Rates [SOR]/ Price Schedule [PS]/ Format for Price Bid

7.2 The Bidder is expected to examine all instructions, forms, terms & conditions in the Tender Documents. The entire Tender Documents together with all its amendments, clarifications and attachments thereto, shall be considered to be read, understood and accepted by the Bidders. Failure to furnish all information required by the Tender Documents or submission of a Bid not substantially responsive to the Tender Documents in every respect will be at Bidder's risk and may result in the rejection of his Bid. However, EMPLOYER at its sole discretion may seek clarifications from the Bidders to adjudge the exact content and facts of the Tender Documents.

**8. CLARIFICATION OF TENDER DOCUMENTS**

8.1 A prospective Bidder requiring any clarification(s) of the Tender Documents may notify EMPLOYER in writing by E-mail or at EMPLOYER's mailing address indicated in the Bid Information Sheet no later than 02 (Two) working days after the pre-bid meeting (in cases where pre-bid meeting is scheduled) or 15 (Fifteen) days prior to the bid closing date (in cases where pre-bid meeting is not held). EMPLOYER reserves the right to ignore the bidders request for clarification if received beyond the aforesaid period. EMPLOYER may respond in writing to the request for clarification. EMPLOYER's response including an explanation of the query, but without identifying the source of the query will be uploaded on REC's e-wizard portal <https://rec.ewizard.in> and/ or EMPLOYER's website [www.recpdcl.in](http://www.recpdcl.in).

8.2 Any clarification or information required by the Bidder but same not received by the EMPLOYER at clause 8.1 above is liable to be considered as "no clarification/ information required".

8.3 Clarifications sought by the bidders are to be mandatorily submitted in the RECPDCL provided format only provided along with the Tender document. Pre-Bid queries submitted in any other format will not be considered.

**9. AMENDMENT OF TENDER DOCUMENTS**

9.1 At any time prior to the 'Bid Due Date', EMPLOYER may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Tender Documents by addenda/ corrigendum.

9.2 Any addendum/ corrigendum thus issued shall be part of the Tender Documents and shall be hosted on ETS Portal of REC's e-wizard portal <https://rec.ewizard.in> and/ or EMPLOYER's website [www.recpdcl.in](http://www.recpdcl.in). Bidders have to take into account all such addendum/ corrigendum before submitting their bid.

9.3 The EMPLOYER, if considered necessary, may extend the date of submissions of Bid in order to allow the Bidders a reasonable time to furnish their most competitive bid taking into account the amendment issued thereof.

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**[C]-PREPARATION OF BIDS**

10. LANGUAGE OF BID:

The bid prepared by the bidder and all correspondence/ drawings and documents relating to the bid exchanged by bidder and EMPLOYER shall be written in English language alone. Any printed literature furnished by the bidder may be written in another language as long as it is accompanied by an ENGLISH translation duly authenticated by the Chamber of Commerce/ Certified Translator of bidder’s country, in which case, for the purpose of interpretation of the bid, the ENGLISH translation shall govern.

11. DOCUMENTS COMPRISING THE BID

The bid shall be submitted by the Bidder under “Single Stage - Two Envelope” procedure of bidding. Under this procedure, the bid submitted by the Bidder in two envelopes - First Envelope (also referred to as Techno - Commercial Part) and Second Envelope (also referred to as Price Part) shall comprise of the following documents:

I. Offline Documents

Offline documents of the bid shall comprise of following documents to be submitted in sealed envelope, as part of First Envelope. The envelope shall bear {the name of Tender, the Tender No. and the words ‘DO NOT OPEN BEFORE’ (due date & time)}.

Contact Persons Name: Shri Mukul Agarwal, General Manager (Renewable Energy and Business Development)

- (a) Original Non-Refundable Tender Processing Fee as per clause no. 05 of ITB
- (b) Original Non-Refundable Cost of Tender Document, if applicable
- (c) 'Covering Letter' on Bidder's 'Letterhead' (in Original) clearly specifying the enclosed contents, as per 'Form F-0'
- (d) EMD, in original as per Clause 16 of ITB as per 'Form F-2 'or as prescribed.
- (f) Power of Attorney for authorized signatory in non-judicial stamp paper (as per 'Form F-11')
- (g) Copy of Board Resolution
- (h) The Pass-Phrase to decrypt the relevant Bid-Parts (for both Techno-Commercial and Financial) in separate sealed envelopes before the start date and time of the Tender Opening Event (TOE)

**Bidder shall also upload the scanned copies of all the above-mentioned original documents during online Bid Submission as a part of First envelope.**

**“Bidder should explicitly note that no offline documents are to be submitted as a part of Second envelope”.**

II. Online Documents/Soft Copy

Online documents/soft copy of the bid shall comprise of following documents to be uploaded on the REC’s e-wizard portal <https://rec.ewizard.in> as per provisions therein.

II (a) As part of First Envelope

- (a) The Electronic Form of the bid for First Envelope (Techno-Commercial), as available on the REC’s e-wizard portal <https://rec.ewizard.in>, shall be duly filled.
- (b) Scanned copies of all the above-mentioned original documents during online Bid Submission as a part of First envelope and Bid Form for first envelope.
- (c) Certificate of Incorporation
- (d) 'Bidder's General Information', as per 'Form F-1'.
- (e) 'No Deviation Confirmation', as per 'Form F-3'.
- (f) 'Bidder's Declaration regarding Banning, Liquidation etc.', as per 'Form F-4'
- (g) 'Declaration regarding the procurement of Solar Inverters from class I local suppliers, as per 'Form F-5'
- (h) 'Bidders Experience as per 'Form F-6'

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- (i) Format of Chartered Accountant certificate for financial capability of the bidder as per 'Form F-7'
- (j) 'E-Banking Format as per 'Form F-8'
- (k) 'Shareholding Certificate' as per 'Form F-10'
- (l) 'Format for Cyber Security Agreement' as per 'Form F-12'
- (m) 'Integrity Pact Format' as per 'Form F-13'
- (n) "FORMAT OF PAYMENT ON ORDER INSTRUMENT TO BE ISSUED BY IREDA/REC/PFC (IN LIEU OF BG TOWARDS EMD)" as per 'Form F-14'
- (o) "FORMAT OF PAYMENT ON ORDER INSTRUMENT TO BE ISSUED BY IREDA/REC/PFC (IN LIEU OF BG TOWARDS PBG)" as per 'Form F-15'
- (p) "Undertaking regarding confirmation on inspection of Module under Contractor Scope" as per 'Form F-16'
- (q) Form of Undertaking by the Bidder and the Firm as per 'Form F-30' (if applicable)
- (r) Documents in accordance with the "Qualifying Requirements (QR)" establishing the qualification
- (s) Document showing annual turnover for the financial years as required in Qualifying Requirements (QR) such as annual reports, profit and loss account, net worth etc. along with information as sought in enclosed Format F-16
- (t) Tender Document. (Only First and Last Pages of Original Tender Document duly sealed and signed/ digitally signed and all pages of amendments to Tender Documents duly sealed and signed/ digitally signed by the Authorized Signatory).

**II (b) As part of Second Envelope**

- (a) The Electronic Form of the bid for Second Envelope (Price - Part), as available on the ISN-ETS portal, shall be duly filled. "Termed as ELECTRONIC FORM".
- (b) Main Price Bid comprising of Schedule No 1 to 4 of the Price Schedule (available in Section - VIII, SOR), duly completed, sealed and signed/ digitally signed shall be uploaded. "Termed as MAIN BID".

**12 SCHEDULE OF RATES (SOR)/ PRICE SCHEDULE (PS)/ BID PRICES**

12.1 Unless stated otherwise in the Tender Documents, the Contract shall be for the whole works as described in Tender Documents, based on the rates and prices submitted by the Bidder and accepted by the EMPLOYER/ Owner. The prices quoted by the Bidders should indicate clearly the Goods & Service Tax (GST) components as also mentioned under the SOR.

12.2 Prices must be filled in format for "Schedule of Rates [SOR]/ Price Schedule [PS]/ Bid Prices" enclosed as part of Tender documents under Section - VIII. If quoted in separate typed sheets, such bids may be rejected.

12.3 Bidder shall quote for all the items of "SOR/ PS" after careful analysis of cost involved for the performance of the completed item considering all parts of the Tender Document. In case any activity though specifically not covered in description of item under "SOR/ PS" but is required to complete the works as per Specifications, Scope of Work/ Service, Standards, "GCC", "SCC" or any other part of Bidding Document, the prices quoted shall deemed to be inclusive of cost incurred for such activity.

12.4 All Goods & Service Tax (GST) components [applicable for both Centre and state] payable by the Contractor under the Contract, or for any other cause, shall be mentioned as per the SOR formats Schedule Nos 1-5.

12.5 Prices quoted by the Bidder, shall remain FIRM and Fixed and valid until completion of the Contract and will not be subject to variation on any account.

12.6 In case of any variation (positive/ negative) in existing rates of taxes/ duties/ levies or a new tax/ duty/ levy is introduced or any existing tax/ duty/ levy is abolished or application of any Tax in the course of the performance of this Contract, which will/ may impact the overall pricing in connection with performance of the Contract, an equitable adjustment of the Contract Price shall be made to factor any such change by addition to the Contract Price or deduction therefrom, as the case may be. All these adjustments would be carried out by considering the base price of taxes equivalent to the amount mentioned under taxes and duties column of the SOR/ PS.

The term Change in Law shall refer to the occurrence of any of the following events pertaining to this project only after the last date of the bid submission, including (i) the enactment of any new law; or (ii) an amendment, modification or repeal of an existing law; or (iii) any change in the rates of any Taxes including any duties and cess or introduction of any new tax made applicable for setting up the project.

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However, Change in Law shall not include (i) any change in taxes on corporate income or (ii) any change in any withholding tax on income or dividends distributed to the shareholders of the Contractor, or (iii) any change on account of regulatory measures by the Appropriate Commission.

12.7 The Bidder shall quote the prices in 'figures' & words. There should not be any discrepancy between the prices indicated in figures and the price indicated in words. In case of any discrepancy, the same shall be dealt as per clause no. 30 of ITB.

12.8 Bidder need to submit the detailed break-up of Goods & Service Tax (GST) (applicable for both Central and State) in the SOR formats viz Schedule Nos 1-5. This data is required to ascertain the

- (a) Computation of taxes assumed at the time of bidding.
- (b) The total impact due to revision in applicable tax rate or introduction of new tax, if any.

Bidders are required to ascertain the correctness of amount related to Goods & Service Tax (GST) as mentioned in the SOR/ PS as on the date of techno-commercial bid submission as it will impact the Price assessment part at the time of evaluation of price bid.

### 13 Goods & Service Tax (GST)

Contractor shall mandatorily obtain the registration under GST Law at Central level and/or in respective State as may be required. Further, Contractor shall mandatorily file returns under GST before their due date & comply with the requirements of the law within timelines before releasing the payment to the Contractor. Owner shall not be responsible for any delay in payment release to the contractor in case the GST compliance is not fulfilled from the contractor side in any manner.

Contractor shall be responsible to comply with all the requirements of applicable provisions of GST. Contractor has to mandatorily get registered under GST at Central and relevant State(s). Contractor shall file all the returns on timely basis and upload all the Invoices and acceptance thereof as may be required under the provisions of GST. In case, it is found that Owner is not able to take Input Tax Credit (ITC) benefit of the taxes due to any fault of the Contractor, Owner shall be constrained to deduct the amount from the payments to be made to the Contractor or recover the same in any other manner.

13.1 Bidders are required to submit a copy of the GST Registration Certificate or GST provisional certificate while submitting the bids wherever GST tax is applicable.

13.2 The responsibility of payment of GST lies with the contractor only. Contractor providing taxable service shall issue an Invoice, a Bill or as the case may be, a Challan which is signed, serially numbered and in accordance with rule GST Law. The invoice shall also contain the following:

- (a) Name, Address & Registration No. of such Person/ Contractor
- (b) Name & Address of the Person/ Contractor receiving Taxable Service
- (c) Description, Classification & Value of Taxable Service provided
- (d) GST Amount, if any.
- (e) HSN code of the Goods/Services.

Payments to contractor for claiming GST amount will be made provided the above formalities are fulfilled. Further, EMPLOYER/ Owner may seek copies of challan and certificate from Chartered Accountant for deposit of GST collected from EMPLOYER/ Owner.

13.3 In case CBIT (Central Board of Indirect Taxes and Customs) brings to the notice of EMPLOYER/ Owner that the contractor has not remitted the amount towards GST collected from EMPLOYER/ Owner to the government exchequer, then, that contractor may be debarred from bidding in future tenders of EMPLOYER/ Owner for given period as per the sole discretion of EMPLOYER/ Owner.

13.4 In case of statutory variation in GST during entire period of the Contract, the Contractor shall submit a copy of the 'Government Notification' to evidence the date of revision. Claim for payment of GST / Statutory variation in GST, should be raised within two [02] months from the date of issue of 'Government Notification' for payment of differential (in %)

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GST, otherwise claim in respect of above shall not be entertained for payment of arrears. The following may also be noted: -

a) Any increase in the rate of Non-ITC based GST beyond the contractual completion period shall be to contractor's account whereas any decrease in the rate shall be passed on to the EMPLOYER/ Owner.

13.5 Owner will reimburse the GST to the Contractor at actuals against submission of ITC based invoices issued in accordance with GST rules. In case of any variation in the executed quantities, the amount on which the GST is applicable shall be modified in same proportion.

13.6 Owner will reimburse the GST to the Contractor at actuals against documentary evidence subject to the ceiling amount of GST as quoted by the bidder, subject to any statutory variations. In case of any variation in the executed quantities (If directed and/ or certified by the Engineer-In-Charge) the ceiling amount on which GST is applicable will be modified on pro-rata basis.

13.7 Contractor shall ensure timely submission of correct invoice(s) with all required supporting document(s) so to enable Owner to avail Input Tax Credit (ITC) (If applicable)

**14 BID CURRENCIES:**

Bidders must submit bid in the currency as mentioned Bid Data Sheet.

**15 BID VALIDITY**

15.1 Bids shall be kept valid for period specified in BDS from the final 'Bid Opening Date'. A Bid valid for a shorter period may be rejected by EMPLOYER as 'non-responsive'.

15.2 In exceptional circumstances, prior to expiry of the original 'Bid Validity Period', the EMPLOYER may request the Bidders to extend the 'Period of Bid Validity' for a specified additional period. The request and the responses thereto shall be made in writing or by email. A Bidder may refuse the request without forfeiture of his 'EMD, if applicable'. A Bidder agreeing to the request will not be required or permitted to modify his Bid, but will be required to extend the validity of its 'EMD, if applicable' for the period of the extension and in accordance with "ITB: Clause-16" in all respects.

Note: In case of extension(s) of last due date of the Bid submission, the latest extension issued shall be considered as the final due date of Bid submission and accordingly the Bid validity should be calculated and sufficed. The validity of the Bid need to be revised by respective bidders, in case the bids are already submitted prior to the last due date of the initial Tender submission deadline.

**16 EARNEST MONEY DEPOSIT (EMD):**

16.1 The applicability/Non-applicability of Earnest Money Deposit (EMD) is specified under BDS.

16.2 The Bids must be accompanied with 'Earnest Money Deposit (EMD)' in the form of either through NEFT/ RTGS transfer in the account of RECPDCL or 'Demand Draft' or 'Banker's Cheque' [in favour of REC Power Development and Consultancy Limited, New Delhi payable at New Delhi] or 'Bank Guarantee' as per the format given in Form F -2 of the bidding documents. Bidders shall ensure that EMD, having a validity of at least 30 (Thirty) Days beyond the validity of the bid, must accompany the Bid in the format(s) made available in the Tender Document. In case of any extension in validity of bid, the EMD shall be extended suitably. The EMD shall be submitted in Indian Rupees only.

16.3 The 'EMD' is required to protect EMPLOYER/ Owner against the risk of Bidder's conduct, which would warrant the EMD's forfeiture, pursuant to "ITB: Clause-16.8".

16.4 EMPLOYER/ Owner shall not be liable to pay any Bank charges, commission or interest etc. on the amount of 'EMD'. In case 'EMD' is in the form of a 'Bank Guarantee', the same shall be from any scheduled Bank as specified in the List of Banks enclosed at Form F-9, Section-VI of Tender documents or a branch of an International Bank situated in India and registered with 'Reserve Bank of India' as Scheduled Foreign Bank. However, in case of 'Bank Guarantee' from Banks other than the Nationalized Indian Banks, the Bank must be commercial bank having net worth in excess of INR 500 Crores (Indian Rupees Five Hundred Crores Only).

16.5 Bid not accompanied with required amount of EMD shall be liable for rejection.

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16.6 'Earnest Money Deposit' of all the unsuccessful Bidders disqualified at the stage of Techno- Commercial evaluation, e-RA shortlisting or during/after e-RA process will be discharged/ returned as promptly as possible, but not later than '30 [thirty] days' of their respective disqualification.

16.7 The successful bidder's (L1 bidder) 'Earnest Money Deposit' will be discharged upon the Bidder's signing the 'Contract Agreement' and furnishing the 'Performance Security'.

16.8 Notwithstanding anything contained herein, the 'EMD' may also be forfeited in any of the following cases:

- (a) If a Bidder withdraws or varies his Bid during the 'Period of Bid Validity'
- (b) If a Bidder has indulged in corrupt/ fraudulent/ collusive/ coercive practice
- (c) Violates any other condition, mentioned elsewhere in the tender document including deviations or conditional bid.
- (d) In the case of a successful Bidder, if the Bidder fails to:
  - (i) Acceptance of the NOA/ LOI/ LOA.
  - (ii) To furnish "Performance Security.
  - (iii) To accept 'arithmetical corrections' as per provision of the clause 30 of ITB.

16.9 In case EMD is in the form of 'Bank Guarantee', the same must indicate the Bid Document No and the Work for which the Bidder is quoting. This is essential to have proper correlation at a later date. The 'EMD' should be in the form provided at 'Form F-2'.

**Note:** In case of extension(s) of last due date of the Tender submission, the latest extension issued shall be considered as the final due date of Tender submission and accordingly the Earnest Money Deposit validity and Bid validity should be calculated and sufficed. The validity of the submitted EMD and bid validity need to be revised by respective bidders, in case the bids are already submitted prior to the last due date of the initial Tender submission deadline.

**17 PRE-BID MEETING**

17.1 The Bidder(s) or his designated representative are invited to attend a "Pre-Bid Meeting" which will be held through online mode as specified in Bid Information Sheet under Section - I, Invitation for Bids, IFB.

17.2 Purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

17.3 Text of the questions raised and the responses given, together with any responses prepared after the meeting, will be uploaded on RECPDCL & REC's E-Wizard portal <https://rec.ewizard.in> against the Tender. Any modification of the Contents of Tender Documents listed in "ITB: Clause-7.1", that may become necessary as a result of the Pre-Bid Meeting shall be made by the EMPLOYER exclusively through the issue of an Addendum/ Corrigendum pursuant to "ITB: Clause-9", and not through the minutes of the Pre-Bid Meeting.

17.4 Non-attendance of the Pre-Bid Meeting will not be a cause for disqualification of Bidder.

**18 SIGNING OF BID/TENDER DOCUMENT**

18.1 The First and Last Pages of tender documents including amendments, clarifications if any shall be typed or written in indelible ink [in the case of copies, photocopies are also acceptable] and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder (as per POA) before uploading at ISN-ETS online portal. The name and position held by each person signing, must be typed or printed below the signature.

**19 ZERO DEVIATION AND REJECTION CRITERIA**

19.1 ZERO DEVIATION: Deviation to terms and conditions of Tender Documents may lead to rejection of bid. EMPLOYER/ Owner will accept bids based on terms & conditions of Tender Documents only. Bidder may note EMPLOYER/ Owner will determine the substantial responsiveness of each bid to the Tender Documents pursuant to provision contained in clause 29 of ITB. For purpose of this, a substantially responsive bid is one which conforms to all terms and conditions of the Tender Documents without deviations or reservations. EMPLOYER's/ Owner's determination of a bid's responsiveness is based on the content of the bid itself. EMPLOYER/ Owner reserves the right to raise technical and/ or commercial query(ies), if required. The response(s) to the same shall be in writing, and no change in the price(s) or substance of the bids shall be sought, offered or permitted. The substance of the bid includes but not limited to prices, completion, scope, technical specifications, etc. Bidders are requested to not to take any deviation.

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19.2 REJECTION CRITERIA: Notwithstanding the above, deviation to the following clauses of Tender document shall lead to summarily rejection of Bid:

- (a) Eligibility Criteria including General, Technical and Financial Qualifying Requirements
- (b) Firm Price
- (c) Tender Processing Fees and Earnest Money Deposit
- (d) Tender Document Fees, if applicable
- (e) Specifications & Scope of Work
- (f) Schedule of Rates (SOR)/ Price Schedule (PS)
- (g) Duration/ Period of Contract/ Completion schedule
- (h) Period of Validity of Bid
- (i) Warrantee/Guarantee/ Defect Liability Period
- (j) Arbitration/ Resolution of Dispute/ Jurisdiction of Court
- (k) Force Majeure & Applicable Laws
- (l) Any other condition specifically mentioned in the tender document elsewhere that non-compliance of the clause lead to rejection of bid.

Note: Further, it is once again reminded not to mention any condition in the Bid which is contradictory to the terms and conditions of Tender document.

20 e-PAYMENT:

Owner has initiated payments to Suppliers and Contractors electronically, and to facilitate the payments electronically through 'e-banking'. The successful bidder should give the details of his bank account as per the bank mandate form enclosed at Form F-8 in Section-VI, Sample Forms and Formats of the Tender documents.

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**[D]-SUBMISSION OF BIDS**

**21 SUBMISSION, SEALING AND MARKING OF BIDS**

- 21.1 Bids shall be submitted through e-tender mode in the manner specified elsewhere in tender document.
- 21.2 Offline documents (Specific documents only) as mentioned in clause no. 11.I of Section - II, Instructions to Bidders (ITB) of the Tender document shall be submitted in a Sealed Covering Envelope. The Covering Envelope shall have the following Sticker.

Offline Tender Document for “Setting up Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity”	
Tender Document No.	Tender No.: RECPDCL/RE/1MW/01 dated: XX.XX.XX
Last Date of Submission	XX. XX. XX
Bids Submitted by	(Enter Full name and address of the Bidder) _____ _____ _____
Authorized Signatory	(Signature of the Authorized Signatory) (Name of the Authorized Signatory) (Stamp of the Bidder)
Bid Submitted to	REC Power Development and Consultancy Limited, Plot Number 1-4, REC World Headquarters, D-Block, Sector-29, Gurugram – 122001, Haryana, India Website: www.recpdcl.in

- 21.3 All the bids shall be addressed to the EMPLOYER at address specified in the Bid Information Sheet in Section - I, Invitation for Bids (IFB).
- 21.4 Bids submitted under the name of AGENT/ CONSULTANT/ REPRESENTATIVE/ RETAINER/ ASSOCIATE etc. on behalf of a bidder/ affiliate shall not be accepted.

**22 DEADLINES FOR SUBMISSION OF BIDS**

- 22.1 The bids must be submitted through e-tender mode not later than the date and time specified in the Bid Information Sheet in Section - I, Invitation for Bids (IFB).
- 22.2 The offline documents of required specific documents must be submitted through courier/ registered post/ by hand not later than the date and time specified in the Bid Information Sheet in Section - I, Invitation for Bids (IFB)/BDS
- 22.3 EMPLOYER/ Owner may, in exceptional circumstances and at its discretion, extend the deadline for submission of Bids (clause 9 of ITB refers). In which case all rights and obligations of EMPLOYER/ Owner and the Bidders, previously subject to the original deadline will thereafter be subject to the deadline as extended. Notice for extension of bid submission date will be uploaded on REC’s e-wizard portal <https://rec.ewizard.in> and/ or EMPLOYER’s website [www.recpdcl.in](http://www.recpdcl.in).

**23 LATE BIDS**

- 23.1 Any bids received after the notified date and time of closing of tenders will be treated as late bids.
- 23.2 E-tendering system shall close immediately after the deadline for submission of bid and no bids can be submitted thereafter.
- 23.3 Unsolicited Bids or Bids received to address other than one specifically stipulated in the tender document will not be considered for evaluation/ opening/ award if not received to the specified destination within stipulated date & time.

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**24      MODIFICATION AND WITHDRAWAL OF BIDS**

24.1      Modification and withdrawal of bids shall be as follows: -

The bidder may withdraw or modify its bid after bid submission but before the due date and time for submission as per tender document with the due written consent from the authorized signatory of the bidder.

24.2      The modification shall also be prepared, sealed, marked and dispatched in accordance with the provision of the clause 21 of ITB, with the outer and inner envelopes additionally marked modification or withdrawal as appropriate. A withdrawal notice may also be sent by e-mail or fax but followed by a signed confirmation copy post not later than the deadline for submission of bids. No bid shall be modified/ withdrawn after the deadline for submission of bids.

24.3      No bid shall be allowed to be withdrawn/ modified/ substituted in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the bidder on the Bid Form. Withdrawal/ Modification/ Substitution of a bid during this interval shall result in the forfeiture of bidder’s EMD, if applicable pursuant to clause 16 of ITB and rejection of bid.

24.4      The latest bid hence submitted shall be considered for evaluation and all other bids shall be considered to be unconditionally withdrawn.

24.5      In case after price bid opening the lowest evaluated bidder (L1) is not awarded the job for any mistake committed by him in bidding or withdrawal of bid or modification of bid or varying any term in regard thereof leading to re-tendering, EMPLOYER shall forfeit EMD, if applicable paid by the bidder and such bidders shall be debarred from participation in re-tendering of the same job(s)/ item(s). Further, such bidder will be debarred for a given period as decided by EMPLOYER/ Owner after following the due procedure.

**25      EMPLOYER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS**

EMPLOYER/ Owner reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids, at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligations to inform the affected Bidder or Bidders of the ground for EMPLOYER's/ Owner’s action. However, Bidder if so desire may seek the reason (in writing) for rejection of their Bid to which EMPLOYER/ Owner shall respond quickly.

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**[E]- BID OPENING AND EVALUATION**

**26 BID OPENING**

**26.1 Technical Bid Opening:**

As the case may be, EMPLOYER will open bids, in the presence of bidders’ designated representatives who choose to attend, at date, time and location stipulated in the BDS. The bidders’ representatives, who are present shall sign a bid opening register evidencing their attendance. However the presence of bidder(s) during technical bid opening is subjective and will depend on case to case basis against the sole discretion of EMPLOYER/ Owner. As it’s an online bidding system, Bidder’s attendance during the Techno-commercial Bid opening in EMPLOYER’s premises is not envisaged, as the same may be observed by the respective bidders from their online login credentials of the e-tendering portal.

**26.2 Priced Bid Opening:**

26.2.1 EMPLOYER will open the price bids of those bidders who meet the qualification requirement and whose bids are determined to be technically and commercially responsive.

26.2.2 The price bids of those bidders who were not found to be techno-commercially responsive shall not be opened.

26.2.3 As it’s an online bidding system, Bidder’s attendance during the Price Bid opening in EMPLOYER’s premises is not envisaged, as the same may be observed by the respective bidders from their online login credentials of the e-tendering portal. EMPLOYER may also intimate the Techno commercial qualified bidders through mails for the opening of price bids.

**27 CONFIDENTIALITY**

Information relating to the examination, clarification, evaluation, and comparison of Bids, and recommendations for the award of a Contract, shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the EMPLOYER's/ Owner’s processing of Bids or award decisions may result in the rejection of the Bidder's Bid and action shall be initiated as per procedure in this regard.

**28 CONTACTING THE EMPLOYER/ OWNER**

28.1 From the time of Bid opening to the time of award of Contract, if any Bidder wishes to contact the EMPLOYER/ Owner on any matter related to the Bid, it should do so in writing. Information relating to the examination, clarification, evaluation & recommendation for award shall not be disclosed.

28.2 Any effort by the Bidder to influence the EMPLOYER/ Owner in the EMPLOYER's 'Bid Evaluation', 'Bid Comparison', or 'Contract Award' decisions may result in the rejection of the offer/Bid and action shall be initiated as per procedure in this regard.

**29 EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS**

29.1 The EMPLOYER’s/Owner’s determination of a bid’s responsiveness is based on the content of the bid only. Prior to the detailed evaluation of Bids, the EMPLOYER will determine whether each Bid: -

- (a) Meets the "Bid Evaluation Criteria" of the Bidding Documents;
- (b) Is accompanied by the required 'Earnest Money Deposit' and 'Tender Processing Fees', if applicable
- (c) Is substantially responsive to the requirements of the Tender Documents; and
- (d) Provides any clarification and/ or substantiation that the EMPLOYER/ Owner may require to determine responsiveness pursuant to "ITB: Clause-29.2"

29.2 A substantially responsive Bid is one which conforms to all the terms, conditions and specifications of the Tender Documents without any deviations or reservations or omissions for this purpose EMPLOYER defines the foregoing terms below: -

- (a) "Deviation" is departure from the requirement specified in the tender documents.
- (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirement in the tender documents.
- (c) "Omission" is the failure to submit part or all of the information or documentation required in the tender document.

29.3 Void.

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29.4 The EMPLOYER shall examine all aspects of the bid to confirm that all requirements have been met without any deviation, reservation or omission.

29.5 If a Bid is not substantially responsive, it may be rejected by the EMPLOYER and may not subsequently be made responsive by correction or withdrawal of the deviation, reservation or omission.

**30 CORRECTION OF ERRORS**

30.1 If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity specified by the EMPLOYER, or between subtotals and the total price, the unit or subtotal price shall prevail, and the quantity and the total price shall be corrected. However, in case of items quoted without indicating any quantity or the items for which the quantities are to be estimated by the Bidder, the total price quoted against such items shall prevail. If there is a discrepancy between words and figures, the amount in words will prevail.

The prices of all such item(s) against which the Bidder has not quoted rates/ amount (viz., items left blank or against which ‘ - ’ is indicated) in the Price Schedules will be deemed to have been included in other item(s).

The subtotal, total price or the total bid price to be identified in Bid Form for this purpose, irrespective of the discrepancy between the amounts for the same indicated in words or figures shall be rectified in line with the procedure explained above.

The Bidder should ensure that the prices furnished in various price schedules are consistent with each other. In case of any inconsistency in the prices furnished in the specified price schedules to be identified in Bid Form for this purpose, the EMPLOYER shall be entitled to consider the highest price for that particular line item for the purpose of evaluation and for the purpose of award of the Contract use the lowest of the prices in these schedules.

30.2 The amount stated in the bid will be adjusted by the EMPLOYER in accordance with the above procedure for the correction of errors. If the bidder does not accept the corrected amount of bid, its bid will be rejected.

**31 CONVERSION TO SINGLE CURRENCY FOR COMPARISON OF BIDS**

All bids submitted must be in the currency specified at clause 14 of ITB.

**32 EVALUATION OF BIDS & E REVERSE AUCTION**

Bid shall be evaluated as per evaluation criteria mentioned below on the total project cost including GST. The EMPLOYER shall only use the criteria and methodology indicated in the Tender documents. No other criteria/ methodology shall be permitted.

**32.1 Evaluation of Techno - Commercial Part (First Envelope)**

The EMPLOYER will carry out a detailed evaluation of the bids of the qualified bidders in order to determine whether the technical aspects are in accordance with the requirements set forth in the Bidding Documents. In order to reach such a determination, the EMPLOYER will examine the information supplied by the bidders, pursuant to ITB Clause 11, and other requirements in the Bidding Documents, taking into account the following factors:

- (a) Overall completeness and compliance with the Technical Specifications of the bid. The bid that does not meet minimum acceptable standards of completeness, consistency and detail may be rejected for non-responsiveness.
- (b) compliance with the time schedule
- (c) Any other relevant technical factors that the EMPLOYER/ Owner deems necessary or prudent to take into consideration.
- (d) Any deviations to the commercial and contractual provisions stipulated in the Tender Documents.
- (e) Details furnished by the bidder in response to the requirements specified in the Tender Documents.

**32.2 Opening of Second Envelope by EMPLOYER**

The Second Envelope i.e., Price Part of only those Bidders shall be opened who are determined as having submitted substantially responsive bids and are ascertained to be qualified to satisfactorily perform the Contract, pursuant to ITB Clause 32.1. In case the bid/offer is rejected, pursuant to ITB Clause 32.1 the Second Envelope submitted by such bidders shall be sent to archive unopened and the EMD, if applicable shall be returned as per the Tender provisions.

The prices and details as filled up in Electronic Form by the bidder and opened during the bid opening and recorded in the Bid Opening Statement would not be construed to determine the relative ranking amongst the Bidders, or the successful

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Bidder, and would not confer any right or claim whatsoever on any Bidder. The successful Bidder (also referred to as the L1 Bidder) shall be determined as per the provisions of this Section - II and considered for award of contract as provided in ITB.

**32.3 Evaluation of Financial Part (Second Envelope)**

32.3.1 The EMPLOYER will examine the Price Part (Second Envelopes) to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed/digitally signed, and whether the bids are generally in order.

32.3.2 The Price Part containing any deviations and omissions from the contractual and commercial conditions and the Technical Specifications which have not been identified in the First Envelope are liable to be rejected.

32.3.3 Arithmetical errors will be rectified in line with Clause no. 30 of ITB.

32.3.5 The comparison shall also include the impact of Goods & Service Tax (GST) in line with the provisions of the Tender Documents.

32.3.6 The EMPLOYER's comparison will also include the costs resulting from application of the evaluation procedures described below:

- a) The Evaluated Bid Value (EBV) shall be calculated using the following method:
  - i. Design, Supply and Installation (DSI) or EPC Price i.e., Total sum of Schedule Nos 1 & 2 including:
    - Ex Works basis Supply of Plant and Mandatory Spare Parts Supplied from within the EMPLOYER's Country on EXW basis (i.e. including GST) as per Schedule No 1/SOR 1, Plus
    - Freight, Design, Civil & Installation and Other Services including GST/Taxation as per Schedule No 2/SOR 2, Plus
  - ii. NPV of O&M for the total O&M period in years, as mentioned in the tender document i.e., Schedule No 3/SOR 3 including
    - Net Present Value (NPV) of O&M Price including GST/Taxation for the total O&M period for the plant facilities to be calculated at a discounting rate as per Price Schedule No 3/SOR 3.
  - iii. NPV of Land lease rental, as mentioned in the tender document i.e., Schedule No 4/SOR 4

**Discounting Rate for NPV calculation considered is 10%**

**Evaluated Bid Value (EBV), as given under Schedule No 5/SOR 5 = [sum of (i), (ii) and (iii)]/Guaranteed Generation in kWhr.**

Total cost of EPC (in Rs. )=X1

NPV of total O&M cost for 5 Years (in Rs.)+NPV of Land lease rental= X2

Guaranteed Annual Generation by EPC player= X3 (kWh or Unit)

The effective Tariff of each bidder shall be  $X=(X1+ X2)/ X3$ . (Rs./ Unit)

Bidder with lowest 'X' values will be shortlisted for e-RA based on the following criteria:  
 In case of single bidder, the decision of selection of bidder at the discretion of RECPDCL or the tender may get Scrapped.  
 In case of single bidder, the decision of selection of bidder at the discretion of RECPDCL or the tender may get Scrapped.  
 In case no. of bidders are Two or more, all will be eligible for e-Reverse Auction. However, RECPDCL reserves its right to restrict the number of bidders for e-RA in case of number of bidders more and elimination will be based on Highest Value.  
 Base rate for e-RA is lowest 'X' value.

- b) Different Schedule details are as follows:
  - Schedule No. 1: Ex Works basis Supply of Plant and Mandatory Spare Parts Supplied from Within the EMPLOYER's Country on EXW basis (i.e., including GST)
  - Schedule No. 2: Freight, Design, Civil & Installation and Other Services including GST/Taxation

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Schedule No. 3: Net Present Value (NPV) of O&M Price including GST/Taxation for the total O&M period for the plant facilities to be calculated at a given discounting rate

Schedule No. 4: Net Present Value (NPV) of Land charges on Lease rental

Schedule No. 5: Grand Summary (Schedule Nos.1 to 4)

The terms EXW etc., shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce, 38, Cours Albert 1er, 75008, Paris, France

### 32.4 Evaluation of Price Bid

#### 32.4.1 Following factors shall be considered for evaluation of Price Bids:

- (a) Evaluated Bid Values (EBV) for all the Bidders shall be compared to determine the lowest Evaluated Bid Value (EBV) as given under Schedule No- 5 Format of Schedule of Rates & the lowest (L1) evaluated Bid as such, will be selected for the Notification of Award (NOA) subject to the successful bidder selected after E-Ra (Clause 32.4.2).
- (b) The mentioned Total Evaluated Bid Value will be considered up to 2 decimal places only.
- (c) Bidder with the Total lowest EBV shall be L-1, Bidder with Second lowest EBV shall be L- 2 & so on subject to the successful bidder selected after E-Ra (Clause 32.4.2)
- (d) The Total Evaluated Bid Value shall be inclusive of Goods & Service Tax (GST) as quoted by the bidder. The award shall be placed Inclusive of GST with taxation bifurcation separately indicated as submitted by the successful bidder in the SOR format.
- (e) Billing Break-up (BBU):  
For each item of SOR 1 & 2, the BBU shall be prepared in the same SOR format (Item name, UoM, Quantity, unit Ex Works price, GST, Total price etc) and the sum of all billing break-up item prices shall be equivalent to the each respective SORs item price with discounted rate of e-Reverse auction (If applicable). However, in case of any variation in the line item prices during BBQ stage the approval of the Owner with due justification will be obtained, keeping the overall price of the Contract constant.

The Contractor would be required to provide detailed Bill of Quantity (BOQ) at the BBQ stage and HSN code of the respective goods/services post award during the design approval phase. This will be used by the Owner at the time of payment to the Contractor. Accordingly, bidders should diligently quote the GST component in the bid.

Owner shall reimburse the amount of GST as per the rates mentioned by Contractor in the detailed BOQ. In case of any statutory variation in GST during the currency of the Contract, same will be reimbursed to the Contractor subject to the treatment provided under clause No 51 of the GCC of the Bidding document, only in respect of the items/quantity which have been mentioned by the Contractor in the detailed BOQ.

In case of imported Equipment/items purchased from third party (Bought-Out Items) are supplied to the EMPLOYER/Owner in execution of the Project, the price of such Goods shall be inclusive of all cost as well as any duties paid/payable in relation to import/purchase of such goods (viz., customs duties, GST & levies etc.) considering and taking into account the ITC as may be available under the applicable laws including GST.

#### 32.4.2 Procedure for e- Reverse Auction (e-RA):

1. The e-auctioning shall be conducted on REC's e-wizard portal <https://rec.ewizard.in>. E- Auctioning shall be carried out on the day as intimated by RECPDCL to the eligible bidders.
2. After financial bid evaluation, the bidders shall be shortlisted in the ascending order of price bid quoted. In case no. of bidders ranging from 2 to 4, all will be eligible for e-Reverse Auction. In case no. of bidders are more than 4, H1 Bidder will be eliminated and rest all will be eligible for e-Reverse Auction. If the price bid quoted is same for two or more bidders, then all the bidders with same price bid shall be considered of equal rank/ standing in the order.

In case of substantially low response by the bidders & the total no of responsive bids to be less than 02 (Two), Owner/EMPLOYER reserves the sole discretion & all rights of proceeding/Non-proceeding with e-RA, against the management approval.

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Evaluated Bid Values (EBV) for all the Bidders shall be compared to determine the lowest Evaluated Bid Value (EBV) as given under Schedule No- 4 Format of Schedule of Rates. Further, the lowest (L1) evaluated Bid as such, will be selected for the Notification of Award (NOA) subject to the successful bidder selected after E-Ra (Clause 32.4.2).

- At least Two (2) days prior to e-RA, an advance intimation regarding the date and time of the e- RA will be sent by email to all bidders whose technical & financial bids have been opened and found to be qualified. However, from this advance intimation it shall not be construed by the bidders that they have been shortlisted for e-RA. Further at least two hours before the schedule start time of e-Auctioning, a system generated email for invitation for e-Auctioning will be sent to all those bidders only who have been shortlisted based on the criteria mentioned.
- Shortlisted bidders for e-Auctioning will be able to login into the ISN website of auctioning 15 minutes before the start time of e-auctioning.
- At the start of e-auctioning process, the bid along with the list of short-listed bidders shall be displayed with their pseudo names as their first round bid along with the NPV value of O&M quotation per year submitted and calculated as per SOR. The auctioning shall be on both the EPC price and NPV value of the O&M quoted by the bidder.

The minimum decrement step for e-Auctioning is in the multiples of **Rs. 0.01/- (INR One Paise only) in EBV**. At the end of the e-RA, the final discount offered by the bidder, in the form of price reduction so offered on EBV, shall be applied proportionately to all of the SOR Line items price (EPC Price + NPV of O&M price) quoted by the bidder initially in the financial bid. Accordingly, the revised reduced price of all of the SOR line items of the EPC & NPV of O&M will be derived. This proportionate price reduction will be applicable on both the EPC price & NPV value of O&M price, on which the e-RA has been actually conducted.

- **While applying the price reduction obtained after e-RA, all the SOR line items of the Schedule Nos 1 & 2 / SOR 1 & 2 (DSI Price of Supply & Service or the EPC price) can be straight away reduced by applying the % reduction factor uniformly on all the line items of Schedule Nos 1 & 2 / SOR 1 & 2. Same way, the NPV value of each year line item of O&M value under Schedule No 3/SOR – 3, can also be straight away reduced by applying the % reduction factor uniformly on all the line items of Schedule No 3/SOR– 3. However, as the reduced line items so arrived will be the NPV values of each year O&M value, so for the purpose of award, absolute values of each year O&M price line item wise will then be back calculated by dividing the finally arrived (After applying % reduction factor post e-RA) yearly reduced NPV values by the respective year “Discounting Rate for NPV calculation” & thereby, the absolute value of O&M price will be calculated on yearly basis. The award will be placed on the absolute value of O&M price including GST only and not on NPV of O&M price. NPV values are considered for the purpose of price bids evaluation only.**
- L2, L3, L4.... LN Bidders have to mandatorily apply their decrements suitably so as to beat the L1 price in the first go itself, else system will not accept their respective Bids. However, at no stage, increase in EBV will be permissible.
- During E- Auctioning, no revision in total price for which a bidder is considered qualified after evaluation of Technical Bid is allowed.
- The initial auctioning period will be of one (01) hour with a provision of auto extension by eight minutes from the scheduled/ extended closing time if any fresh bid is received in last eight minutes of auctioning period or extended auctioning period. If no valid bid is received during last eight minutes of auctioning period or extended auctioning period, then the e-auctioning process will get closed.

3. Following information will be displayed in the bidder’s bidding window:

- First round EBV price as their start price initially and thereafter last quoted EPC & NPV of O&M Price.
- The auction will be conducted on the total sum of EPC & NPV of O&M price.
- The list of last quoted EBV price (i.e. last Bid Value) of all bidders with their pseudo Identities and their time of quote.

4. Selection of Successful Bidders

Post E-Ra, the bidders shall be selected in the ascending order with lowest quoted Evaluated Bid value (EPC + NPV of O&M price) (being L1).

a. The final price will be arrived by adding the EPC price and the NPV of O&M price (as a result of e-auctioning process)

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- b. The bidder with lowest Evaluated Bid value (EBV) at the end of E-Auctioning will be considered L1.
- c. In case of tie in the final EBV after E-Ra, (i.e. the sum of their last quoted discounted EPC price and the NPV of O&M price), among two or more bidders being the same at the end of e- Reverse Auction, they will be considered in the chronological order of their last bid with preference to the bidder who has quoted his last bid earlier than others.
- d. In the above case, if the time of quote also become exactly same among the bidders at a tie, then the ranking among these bidders shall be done as follow:
  - The bidder who has quoted lowest EBV in their Price BID before commencement of e- Auction shall be considered as L-1.
  - If there is also a tie among any of these bidders, then L-1 will be the bidder who has the highest average annual turnover as per the documents submitted as a part of their bid.
- 5. At the end of selection process, a Notification of Award (NOA) will be issued to the successful bidder (L1).
- 6. In all cases, RECPDCL's decision regarding selection of bidder through E-Auctioning or even annulment of tendering process shall be final and binding on all participating bidders.

**32.4.3 Other Instructions**

- For further instructions, the vendor should visit the home-page of the REC's e-wizard portal <https://rec.ewizard.in> and go to the User-Guidance Centre.
- The help information provided through 'ETS User-Guidance Centre' is available in three categories:
  - Users intending to Register / First-Time Users, Logged-in users of Buyer organizations, and Logged-in users of Supplier organizations. Various links (including links for User Manuals) are provided under each of the three categories.
  - Important Note: It is strongly recommended that all authorized users of Supplier organizations should thoroughly peruse the information provided under the relevant links, and take appropriate action. This will prevent hiccups, and minimize teething problems during the use of ETS.

33 DELETED

34 DELETED

**[F]- NOTIFICATION OF AWARD/ LETTER OF INTENT/ CONTRACT AGREEMENT**

**35 AWARD**

Subject to "ITB: Clause-29", Owner will award the Contract to the successful Bidder whose Bid has been determined to be substantially responsive and has been determined as the lowest provided that bidders, is determined to be qualified to satisfactorily perform the Contract.

**36 NOTIFICATION OF AWARD/ LETTER OF INTENT/ LETTER OF ALLOCATION**

36.1 Prior to the expiry of 'Period of Bid Validity', Owner will notify the successful bidder in writing, in the form of "Notification of Award (NOA)"/ "Letter of Intent (LOI)"/ "Letter of Allocation (LOA)" through e-mail/ courier/ registered post, that his Bid has been accepted. The acceptance of the notification of award will constitute the formation of the Contract.

36.2 Contract Period shall commence from the date of "Notification of Award"/ "Letter of Intent"/ "Letter of Allocation" or as mentioned in the Notification of Award/ Letter of Intent/ Letter of Allocation. The "Notification of Award"/ "Letter of Intent"/ "Letter of Allocation" will constitute the formation of a Contract, until the Contract has been effected pursuant to signing of Contract as per "ITB: Clause-37".

36.3 The "Notification of Award (NOA)"/ "Letter of Intent (LOI)"/ "Letter of Allocation (LOA)" shall be issued to successful bidder in duplicate. The successful bidder is required to return its duplicate copy duly signed and stamped on each page within 07 days of its issuance including all the Appendix, Annexures as a token of acceptance.

36.4 In case the successful bidder fails to acknowledge the acceptance of "Notification of Award (NOA)"/ "Letter of Intent (LOI)"/ "Letter of Allocation (LOA)" as mentioned above vide clause no. 36.3, same will be treated as a case of non-responsiveness & default and EMPLOYER/Owner may take suitable action to get the project successfully executed.

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36.5 In case of Non-responsive/Non acceptance to the Notification of Award (NOA) or non-submission of timely Performance Security by the successful bidder, RECPDCL at its sole discretion may take appropriate actions with the forfeiture of EMD, if applicable & may annul the entire Tendering process at its sole discretion.

**37 SIGNING OF CONTRACT AGREEMENT**

37.1 Within 30 (Thirty) days of the release of Notification of Award (NOA) by the owner, the successful Bidder/ Contractor shall be required to execute the 'Contract Agreement' with Owner on a 'non-judicial stamp paper' of appropriate value [cost of the 'stamp-paper' shall be borne by the successful Bidder/ Contractor] and of 'state' specified in Bidding Data Sheet (BDS).

37.2 In case the successful bidder fails to execute the 'Contract Agreement' as mentioned above vide clause no. 37.1, same will be treated as a case of non-responsiveness & default and EMPLOYER/ Owner may take suitable action to get the project successfully executed. Same shall constitute sufficient grounds for the forfeiture of EMD, if applicable.

37.3 In case of Non-responsive/Non-acceptance to the NOA or CA or non-submission of timely Performance Security by the successful bidder, RECPDCL at its sole discretion may take appropriate actions with the forfeiture of EMD, if applicable & may annul the entire Tendering process at its sole discretion.

38. VOID

**39 PROCEDURE FOR ACTION IN CASE CORRUPT/ FRAUDULENT/ COLLUSIVE/ COERCIVE PRACTICES**

39.1 Procedure for action in case Corrupt/ Fraudulent/ Collusive/ Coercive Practices is enclosed at Annexure-I along with this ITB document.

39.2 Annexure-I deliberates in detail the all consequences pertaining to clause no. 39.

**39.3 NON-APPLICABILITY OF ARBITRATION CLAUSE IN CASE OF BANNING OF VENDORS/ SUPPLIERS/ CONTRACTORS/ BIDDERS/ CONSULTANTS INDULGED IN FRAUDULENT/ COERCIVE PRACTICES**

Notwithstanding anything contained contrary in GCC and other "CONTRACT DOCUMENTS", in case it is found that the Vendors/ Suppliers/ Contractors/ Bidders/ Consultants indulged in fraudulent/ coercive practices at the time of bidding, during execution of the contract etc., and/ or on other grounds as mentioned in EMPLOYER's/ Owner's "Procedure for action in case Corrupt/ Fraudulent/ Collusive/ Coercive Practices" (Annexure-I), the contractor/ bidder shall be banned (in terms of aforesaid procedure) from the date of issuance of such order by EMPLOYER/ Owner, to such Vendors/ Suppliers/ Contractors/ Bidders/ Consultants.

The Vendor/ Supplier/ Contractor/ Bidder/ Consultant understands and agrees that in such cases where Vendor/ Supplier/ Contractor/ Bidder/ Consultant has been banned (in terms of aforesaid procedure) from the date of issuance of such order by EMPLOYER/ Owner, such decision of EMPLOYER/ Owner shall be final and binding on such Vendor/ Supplier/ Contractor/ Bidder/ Consultant and the 'Arbitration clause' in the GCC and other "CONTRACTDOCUMENTS" shall not be applicable for any consequential issue/ dispute arising in the matter.

40 VOID

41 VOID

**42 RISK OF REJECTION**

Any Conditional Bid will straight away run into risk of rejection.

**43 INCOME TAX & CORPORATE TAX**

43.1 Income tax deduction shall be made from all payments made to the contractor as per the rules and regulations in force and in accordance with the Income Tax Act prevailing from time to time.

43.2 Corporate Tax liability, if any, shall be to the contractor's account.

43.3 TDS under GST as may be applicable shall be deducted as per law of Government of India in vogue.

**43.4 MENTIONING OF PAN NO. IN INVOICE/ BILL**

As per CBDT Notification No. 95/2015 dated 30.12.2015, mentioning of PAN no. is mandatory for procurement of goods/ services/ works/ consultancy services exceeding INR 2 Lacs per transaction.

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Accordingly, supplier/ contractor/ service provider/ consultant should mention their PAN no. in their invoice/ bill for any transaction exceeding INR 2 Lacs. As provided in the notification, in case supplier/ contractor/ service provider/ consultant do not have PAN no., they have to submit declaration in Form 60 along with invoice/ bill for each transaction.

Payment of supplier/ contractor / service provider/ consultant shall be processed only after fulfilment of above requirement

===== X =====

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**PROCEDURE FOR ACTION IN CASE CORRUPT/ FRAUDULENT/ COLLUSIVE/ COERCIVE PRACTICES**

A Definitions:

A.1 “Corrupt Practice” means the offering, giving, receiving or soliciting, directly or indirectly, anything of value to improperly influence the actions in selection process or in contract execution.

“Corrupt Practice” also includes any omission for misrepresentation that may mislead or attempt to mislead so that financial or other benefit may be obtained or an obligation avoided.

A.2 “Fraudulent Practice” means and include any act or omission committed by an agency/entity or with his connivance or by his agent by misrepresenting/ submitting false documents and/ or false information or concealment of facts or to deceive in order to influence a selection process or during execution of contract/ order.

A.3 “Collusive Practice amongst bidders (prior to or after bid submission)” means a scheme or arrangement designed to establish bid prices at artificial non-competitive levels and to deprive the EMPLOYER of the benefits of free and open competition.

A.4 “Coercive practice” means impairing or harming or threatening to impair or harm directly or indirectly, any agency or its property to influence the improperly actions of an agency, obstruction of any investigation or auditing of a procurement process.

A.5 “Vendor/ Supplier/ Contractor/ Consultant/ Bidder” is herein after referred as “Agency” has the same meaning for the purpose of these guidelines, which includes an individual or person, a company, a cooperative society, a hindu undivided family and an association or body of persons, whether incorporated or not, engaged in trade or business.

A.6 “Competent Authority” shall mean the authority, who is competent to take final decision for Suspension of business dealing with an Agency/ (ies) and Banning of business dealings with Agency/ (ies) and shall be the “Committee” concerned.

A.7 “Allied Agency” All concerns which come within the sphere of effective influence of the debarred agencies shall be treated as allied agencies. In determining this, the following factors may be taken into consideration.

- a. Whether the management is common;
- b. Majority interest in the management is held by the partners or directors of banned/ suspended agency;
- c. Substantial or majority shares are owned by the banned/ suspended agency and by virtue of this it has a controlling voice.
- d. Directly or indirectly controls or is controlled by or is under common control with another bidder.
- e. All successor agencies will also be considered as allied agencies.

The term “banning of agency”, “Suspension”, “black listing”, etc. convey the same meaning as of “debarment”.

A.8 “Investigating Agency” shall mean any department or unit of EMPLOYER/ Owner investigating into the conduct of Agency/ party and shall include the Vigilance Department of the EMPLOYER/ Owner, Central Bureau of Investigation, State Police or any other agency set up by the Central or state government having power to investigate.

A.9 “Prohibited practices”

- (a) Making offer, solicitation or acceptance of bribe, reward or gift or any material benefit, either directly or indirectly, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process.
- (b) Any omission or misrepresentation that may mislead or attempt to mislead so that financial or other benefit may be obtained, or an obligation avoided.
- (c) Any collusion, bid rigging or anticompetitive behaviour that may impair the transparency, fairness, and the progress of the procurement process.
- (d) Improper use of information provided by the procuring entity to the bidder with an intent to gain unfair advantage in the procurement process or for personal gain.
- (e) Any financial or business transactions between the bidder and any official of the procuring entity related to tender or execution process of contract, which can affect the decision of the procuring entity directly or indirectly.
- (f) Any coercion or any threat to impair or harm, directly or indirectly, any party or its property to influence the procurement process.
- (g) Obstruction of any investigation or auditing of a procurement process.
- (h) Making false declaration or providing false information for participation in a tender process or to secure a contract.

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**B Actions against bidder(s) indulging in corrupt /fraudulent/ collusive/ coercive practice**

**B.1 Irregularities noticed during the evaluation of the bids:**

If it is observed during bidding process/ bids evaluation stage that a bidder has indulged in corrupt/ fraudulent/ collusive/ coercive practice, the bid of such Bidder (s) shall be rejected and its Earnest Money Deposit (EMD, if applicable) shall be forfeited.

Further, such agency shall be banned for future business with EMPLOYER/ Owner for a period specified in para B 2.2 below from the date of issue of banning order.

**B.2 Irregularities noticed after award of contract**

**(i) During execution of contract:**

If an agency, is found to have indulged in corrupt/ fraudulent/ collusive/ coercive practices, during execution of contract, the agency shall be banned for future business with EMPLOYER/ Owner for a period specified in para B 2.2 below from the date of issue of banning order.

The concerned order(s)/ contract(s) where corrupt/ fraudulent/ collusive practices are observed, shall be suspended with immediate effect by Engineer-in-Charge (EIC)/ EMPLOYER/ Owner whereby the supply/ work/ service and payment etc. will be suspended. The action shall be initiated for putting the agency on banning list.

After conclusion of process, the order(s)/ contract(s) where it is concluded that such irregularities have been committed shall be terminated and Contract Performance Security submitted by agency against such order(s)/ contract(s) shall also be forfeited. The amount that may have become due to the contractor on account of work already executed by him shall be payable to the contractor and this amount shall be subject to adjustment against any amounts due from the contractor under the terms of the contract.

No risk and cost provision will be enforced in such cases.

**(ii) After execution of contract and during Defect liability period (DLP)/ Warranty/ Guarantee Period:**

If an agency is found to have indulged in corrupt/ fraudulent/ collusive/ coercive practices, after execution of contract and during DLP/ Warranty/ Guarantee Period/O&M Period, the agency shall be banned for future business with EMPLOYER/ Owner for a period specified in para B 2.2 below from the date of issue of banning order.

Further, the Contract Performance Security submitted by agency against such order(s)/ contract(s) shall be forfeited.

**(iii) After expiry of Defect liability period (DLP)/ Warranty/ Guarantee Period**

If an agency is found to have indulged in corrupt/ fraudulent/ collusive/ coercive practices, after expiry of Defect liability period (DLP)/ Warranty/ Guarantee Period, the agency shall be banned for future business with EMPLOYER/ Owner for a period specified in para B 2.2 below from the date of issue of banning order.

**B.2.2 Period of Banning**

Banning period shall be reckoned from the date of issuance of banning order and shall be for a period as may be decided by the EMPLOYER/ Owner based on specific case basis. However, minimum period of ban shall be 06 (Six) months from the date of issuance of banning order.

In exceptional cases where the act of vendor/ contractor is a threat to the National Security, the banning shall be for indefinite period.

**C Effect of banning on other ongoing contracts/ tenders**

C.1 If an agency is banned, such agency shall not be considered in ongoing tenders/ future tenders.

C.2 However, if such an agency is already executing other order(s)/ contract(s) where no corrupt/ fraudulent/ collusive/ coercive practice is found, the agency shall be allowed to continue till its completion without any further increase in scope except those incidental to original scope mentioned in the contract.

C.3 If an agency is banned during tendering and irregularity is found in the case under process:

C.3.1 After issue of the enquiry/ bid/ tender but before opening of Technical bid, the bid submitted by the agency shall be ignored.

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C.3.2 After opening Technical bid but before opening the Price bid, the Price bid of the agency shall not be opened and EMD, if applicable submitted by the agency shall be returned to the agency.

C.3.3 After opening of price bid, EMD, if applicable made by the agency shall be returned; the offer/Bid of the agency shall be ignored & will not be further evaluated. If the agency is put on banning list for fraud/ mis-appropriation of facts committed in the same tender/ other tender where errant agency emerges as the lowest (L1), then such tender shall also be cancelled and re-invited.

**D. Procedure for Suspension of Bidder**

**D.1 Initiation of Suspension**

Action for suspension business dealing with any agency/(ies) shall be initiated by C&P Department when

- (i) Vigilance Department based on the fact of the case gathered during investigation by them recommend for specific immediate action against the agency.
- (ii) Vigilance Department based on the input from investigating agency, forward for specific immediate action against the agency.
- (iii) Non-performance of Vendor/ Supplier/ Contractor/ Consultant leading to termination of Contract/ Order.

**D.2 Suspension Procedure:**

D.2.1 The order of suspension would operate initially for a period not more than six months and is to be communicated to the agency and also to Vigilance Department. Period of suspension can be extended with the approval of the Competent Authority by one month at a time with a ceiling of six months pending a conclusive decision to put the agency on banning list.

D.2.2 During the period of suspension, no new business dealing may be held with the agency.

D.2.3 Period of suspension shall be accounted for in the final order passed for banning of business with the agency.

D.2.4 The decision regarding suspension of business dealings should also be communicated to the agency.

D.2.5 If a prima-facie, case is made out that the agency is guilty on the grounds which can result in banning of business dealings, proposal for issuance of suspension order and show cause notice shall be put up to the Competent Authority. The suspension order and show cause notice must include that (i) the agency is put on suspension list and (ii) why action should not be taken for banning the agency for future business from EMPLOYER/ Owner.

The competent authority to approve the suspension will be same as that for according approval for banning.

**D.3 Effect of Suspension of business:**

Effect of suspension on other on-going/ future tenders will be as under:

D.3.1 No enquiry/ bid/ tender shall be entertained from an agency as long as the name of agency appears in the Suspension List.

D.3.2 If an agency is put on the Suspension List during tendering:

D.3.2.1 After issue of the enquiry/ bid/ tender but before opening of Technical bid, the bid submitted by the agency shall be ignored.

D.3.2.2 After opening Technical bid but before opening the Price bid, the Price bid of the agency shall not be opened and EMD, if applicable submitted by the agency shall be returned to the agency.

D.3.3 The existing contract(s)/ order(s) under execution shall continue.

D.3.4 Tenders invited for procurement of goods, works and services shall have provision that the bidder shall submit a undertaking to the effect that (i) neither the bidder themselves nor their allied agency/(ies) are on banning list of EMPLOYER/ Owner or the Ministry of New & Renewable Energy (ii) bidder is not banned by any Government Department/ Public Sector.

**E Debarment of Firms from Bidding**

- i. A bidder shall be debarred if he has been convicted of an offence-
  - a. Under the Prevention of Corruption Act, 1988: or

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- b. The Indian penal Code or any other law for the time being in force, for causing any loss of life or property or causing a threat to public health as part of execution of a public procurement contract
- ii. A bidder debarred under sub- section (i) or any successor of the bidder shall not be eligible to participate process of any procuring entity for a period not exceeding Three years commencing from the date of debarment. Department of Commerce (DGS&D) will maintain such list which also be displayed on the website of DGS&D as well as Central Public procurement Portal.
- iii. A Procuring entity may debar a bidder or any of its successors, from participating in any procurement process undertaken by it, for a period not exceeding two years, if it determines that the bidder has breached the code of integrity. The Ministry/ Department will maintain such list which will also be displayed on their website.
- iv. The bidder shall not be debarred unless such bidder has been given a reasonable opportunity to represent against such debarment.

**Annexure-II**

**ADDENDUM TO INSTRUCTIONS TO BIDDERS (INSTRUCTION FOR PARTICIPATION IN E- TENDER)**

1. An incomplete and/or ambiguous and/or conditional and/or late response is liable to be ignored/ summarily rejected.
2. The Applicant must attest the original tender document with authorized signature and stamp as an acceptance of the TENDER terms and conditions and submit the same along with the Eol response.
3. The submission and opening of Applications will be through e-tendering process. Tender document can be downloaded from the website rec.ewizard.in or from e-tender link given in RECPDCL Website, viz. www.recpdcl.in or from Govt. e-procurement portal (CPP) viz. www.eprocure.gov.in

**Note:**

a) To participate in the Eol, it is mandatory for the applicants to have user ID and password. For this purpose, the Applicant has to register itself with RECPDCL through e-Procurement website given above. Please also note that the Applicant has to obtain digital signature token for applying in the tender. In this connection, vendor may also obtain the same from E-Wizard. The steps to be followed for the registration process are given below:

**Step 1: Registration Process:** Website address: <https://rec.ewizard.in>

Click on "Live Tender" to see (view and download) all the tender notifications and corrigendum"s.

Click on "Bidder Enrollment" Hyperlink and get your User Id and Password.

(Certain special chars like ~ ` „ # \$ % & \* ! ( ) ; \ / ? " : < > + - { } [ ] are not allowed in the Company id or any key attributes).

Once you fill all the details asked by "Bidder Enrollment" form and obtain your password, contact the Office of E-Wizard to enable your User ID. Mail Registration acknowledgement to helpdesk email [epochelpdesk.101@gmail.com](mailto:epochelpdesk.101@gmail.com) , [epochelpdesk.100@gmail.com](mailto:epochelpdesk.100@gmail.com).

After this, vendor can key in their User Id and Password and get successful entry in to the application. It will take 24 working hours to activate the account.

**STEP 2: Participation**

Bidder should login with his USER ID and PASSWORD. After Successful entry into the application click on Tenders "Published Tender" to see the tender. By clicking on hyperlink "Published Tender" you can see the latest tenders which are floated and other details relevant to tender. On this screen (Published Tender) you will find various gifs on the left-hand side. Click on "View Tender Document" and see all the documents attached. Please download these documents and go through them. Once you have gone through the entire tender document and you wish to participate in the tender click on "Mark as Interested" gif. And then click on "OK". Now once you have requested for tender documents click on "Interested Tender" stage. You can see the status as "Form Received". Submit your bids.

**Note: -**

1. We will send you forms (Technical bid sheets). You will get excel file along with other documents. Firstly, you need to download this document by clicking on hyperlink "Click here to Download Empty Document." Then Save the file with the same file name

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2. You should not change the file name of any Excel file.
3. You should only key in the values in Yellow cells only.

**STEP 3: Submission**

All supporting documents could be uploaded using “Click here to Other Documents” link provided below. Please don’t change the name of the file as system will not accept any other file name.

Steps for uploading the additional documents (supporting documents) to your account.

1. In the left hand menu click on My Documents, general document page will appear
2. Click on upload new file Button for upload document, upload sheet will appear
3. Select the file to be uploaded, enter the description and attachment name.
4. Click on Sign & Upload
5. Repeat step 2 and 3 for uploading new files to change the description and attachment name for the uploaded file use Update existing file button

**Note:** This is for altering the description and attachment name only

**Section 1.03 Attachment of general document to a particular tender**

Go to tender Documents screen of that particular tender

1. Go to Click here to Other Documents –Additional documents can be optionally uploaded Other Document Summary sheet will appear.
2. In Other Document Summary screen select the file you want to attach and make necessary changes for Tender Stage and click Attach file button.
3. If you need to attach any new files for the tender follow Steps for uploading the Additional documents.

Other details could be scanned and uploaded but ensure that it is smaller in size (i.e. < 5 MB for Fast Uploading of Document). (only.doc, .jpg,.gif,.xls, .bmp, .pdf.)

The server time will be displayed at the right hand side of the page please follow this time, and all the actions i.e;( Submitting, Opening etc.,) takes place according to this time only.

**Note:** You will see all the red colored links changing to Green color, when you have uploaded.

**List of Offline Documents to be submitted:**

Offline documents of the bid shall comprise of following documents/ programmed file- Attachments to be submitted in sealed envelope, as part of First Envelope. **The envelope shall bear {the name of Tender, the Tender No. and the words ‘DO NOT OPEN BEFORE’ (due date & time)}.**

**Contact Persons Name: Shri Mukul Agarwal, GM (RE & BD)**

- (a) Original Non-Refundable Tender Processing Fee as per clause no. 05 of ITB
- (b) Original Non-Refundable Cost of Tender Document
- (c) 'Covering Letter' on Bidder's 'Letterhead' (in Original) clearly specifying the enclosed contents, as per 'Form F-0'
- (d) EMD, in original as per Clause 16 of ITB as per 'Form F-2' or as prescribed.
- (f) Power of Attorney for authorized signatory in non-judicial stamp paper (as per 'Form F-11')
- (g) Copy of Board Resolution

**“Bidder shall also upload the scanned copies of all the above-mentioned original documents during online Bid Submission as a part of First envelope.”**

**“Bidder should explicitly note that no offline documents are to be submitted as a part of Second envelope”.**

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**List of Online Documents/Soft Copy to be submitted:**

Online documents/Soft copy of the bid shall comprise of following documents to be uploaded on the REC’s e-wizard portal <https://rec.ewizard.in> as per provisions therein.

**A. As part of First Envelope**

- I. Scanned copies of all the above-mentioned original documents during online Bid Submission as a part of First envelope and Bid Form for first envelope
- II. Certificate of Incorporation
- III. 'Bidder's General Information', as per 'Form F-1'.
- IV. 'No Deviation Confirmation', as per 'Form F-3'
- V. 'Bidder's Declaration regarding Banning, Liquidation etc.', as per 'Form F-4'
- VI. 'Declaration regarding the procurement of Solar Inverters from class I local suppliers, as per 'Form F-5'
- VII. 'Bidders Experience as per 'Form F-6'
- VIII. Format of Chartered Accountant certificate for financial capability of the bidder as per 'Form F-7'
- IX. 'E-Banking Format as per 'Form F-8'
- X. 'Shareholding Certificate' as per 'Form F-10'
- XI. 'Format for Cyber Security Agreement' as per 'Form F-12'
- XII. 'Integrity Pact Format' as per 'Form F-13'
- XIII. "FORMAT OF PAYMENT ON ORDER INSTRUMENT TO BE ISSUED BY IREDA/REC/PFC (IN LIEU OF BG TOWARDS EMD)" as per 'Form F-14'
- XIV. "FORMAT OF PAYMENT ON ORDER INSTRUMENT TO BE ISSUED BY IREDA/REC/PFC (IN LIEU OF BG TOWARDS PBG)" as per 'Form F-15'
- XV. "Undertaking regarding confirmation on inspection of Module under Contractor Scope" as per 'Form F-16'
- XVI. Form of Undertaking by the Bidder and the Firm as per 'Form F-30' (if applicable)
- XVII. Documents in accordance with the "Qualifying Requirements (QR)" establishing the qualification
- XVIII. Document showing annual turnover for the financial years as required in Qualifying Requirements (QR) such as annual reports, profit and loss account, net worth etc. along with information as sought in enclosed Format F-16
- XIX. Tender Document. (Only First and Last Pages of Tender Document duly sealed and signed/ digitally signed and all pages of amendments to Tender Documents duly sealed and signed/ digitally signed by the Authorized Signatory).
- XX. "Undertaking related to ESG" as per "Form F-31"

**B. Price bid as per SOR**

**STEP 4: Acknowledgement**

Once you submit the tender you will get the submitted token number, submitted date and submitted time. Take the print of that sheet then click on "OK". Then the status will change to submitted.

**STEP 5: OPENING**

After the tender is opened at the stipulated date and time, the award details can be accessed in the OPENED/AWARDED stage. To view the opened tenders click on the "Opened Tender" link then click on icon to view your competitors bid sheets who participated with you and who are not disqualified. Note:

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1. If you do not get the submitted status and token number, contact tendering authority well in advance. RECPDCL is not responsible for tenders not submitted properly. Vendors are requested to undergo training and get their doubts clarified well in advance.

2. If any queries please contact RECPDCL Office and if required, personal training would be given. Please feel free to contact if you have any clarifications regarding E-Tendering.

b) Steps for application for Digital Signature from E-Wizard are given below:

- Download the Application Form from the website <http://www.e-wizard.com/REC>. Follow the instructions as provided.
- In case of assistance please contact the person under contact us

c) To aid applicants the detailed applicant manual on submission of EoI is annexed to this tender document

NOTE: The Applicants are advised to obtain digital signature (Level 3) and register themselves at [www.ewizard.com/REC](http://www.ewizard.com/REC) well in advance. Please note that RECPDCL does not own any responsibility in case any Applicant(s) fail(s) to apply due to non-possession/ non-registration/ compatibility issue of Digital Signature with the application.

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# **SECTION- III**

# **BID DATA SHEETS**

# **(BDS)**

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## BID DATA SHEETS (BDS)

The following bid specific data for setting up 1 MW Ground Mounted Solar PV plant with arrangement of Land and ISTS Connectivity.

Sl. No.	ITB Clause Ref. No.	Bid Data Details
1.	<b>SCOPE OF BID (ITB 1.1)</b>	<p><b>The Employer/Owner is:</b>                      REC Power Development Consultancy of India Limited,                      Plot Number 1-4, REC World Headquarters, D-Block, Sector-29, Gurugram – 122001, Haryana,                      India Website: www.recpdcl.in</p> <p>Kind Attn.: General Manager, Renewable Energy Division                      E-mail: rediv@recpdcl.in</p>
2.	<b>BIDS FROM CONSORTIUM/ JOINT VENTURE (ITB 3.0)</b>	Bids from Consortium/ Joint Venture are ALLOWED
3.	<b>NUMBER OF BIDS PER BIDDER (ITB 4.0)</b>	only 'one [01] Bid'
4.	<b>SITE VISIT (ITB 6)</b>	<p><u>Add the following to the existing clause:</u></p> <p>Not applicable as site has to be proposed by Bidder</p>
5.	<b>BID CURRENCIES (ITB 14)</b>	Indian Rupees (INR)
6.	<b>BID VALIDITY (ITB 15.1)</b>	<p><u>Replace the existing clause by the following:</u></p> <p>The bid validity period shall be 240 (Two hundred and forty Days) from the date of opening of Techno- Commercial Bid (Envelope-I).</p>
7.	<b>EMD (ITB 16)</b>	<p><u>Add the following to the existing clause:</u></p> <p><b><u>16.10 Payment on Order Instrument (POI) against EMD:</u></b></p> <p>As an alternative to submission of EMD, the bidder also has an option to submit a letter of undertaking issued by either of the following three organizations, viz. (i) Indian Renewable Development agency Limited (IREDA) or (ii) Power Finance Corporation Limited or (iii) REC Limited. This Letter of Undertaking shall be issued as “Payment on Order Instrument” (POI), wherein the POI issuing organization undertakes to pay in all scenarios under which the EMD would be liable to be encashed by Employer/Owner within the provisions of tender. This instrument would have to be furnished as per Format 14 of the tender document, within the timelines, for the amount and validity period as per the clause above.</p>

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Sl. No.	ITB Clause Ref. No.	Bid Data Details
		The term “Bank Guarantee (BG) towards/against EMD” occurring in the entire tender document shall be read as “e- PBG/Bank Guarantee (BG)/ Payment on Order Instrument (POI) towards/ against EMD”.
8.	ZERO DEVIATION & REJECTION CRITERIA (ITB 19.1 &19.2)	Clause No 19.1, Zero deviation & Clause No 19.2, Rejection Criteria should be read in conjunction to each other & both clauses points mentioned should complement each other.
9.	DEADLINE FOR SUBMISSION OF BIDS (ITB 22.2)	<b>Add following to the existing clause:</b> <b><u>For hard copies of bid submission purpose, the address of the RECPDCL is:</u></b> Kind Attn.: General Manager, Renewable Energy Division REC Power Development Consultancy of India Limited, Plot Number 1-4, REC World Headquarters, D-Block, Sector-29, Gurugram – 122001, Haryana, India Website: www.recpdcl.in E-mail: rediv@recpdcl.in
10.	BID OPENING (ITB 26.1)	<b>Add following to the existing clause:</b> The bid opening shall take place at: Kind Attn.: Shri Mukul Agarwal, General Manager (RE & BD) REC Power Development Consultancy of India Limited, Plot Number 1-4, REC World Headquarters, 2 <sup>nd</sup> Floor, D-Block, Sector-29, Gurugram – 122001, Haryana, E-mail: - <a href="mailto:rediv@recpdcl.in">rediv@recpdcl.in</a>
11.	AWARD (ITB 35)	<b>Replace the existing clause by the following:</b> Subject to "ITB: Clause-29", RECPDCL will award the Contract Agreement (CA) for complete Project to the successful Bidder, whose Bid has been determined to be substantially responsive and has been determined as the lowest (L1) provided that bidder is determined to be qualified to satisfactorily perform the Contract technically.
12.	NOTIFICATION OF AWARD/ LETTER OF INTENT/ LETTER OF ALLOCATION (ITB 36.1)	<b>Add following to the existing clause:</b> Prior to the expiry of 'Period of Bid Validity', RECPDCL will notify the successful bidder in writing, in the form of "Notification of Award (NOA)"/ "Letter of Intent (LOI)"/ "Letter of Allocation (LOA)" for complete sites through e-mail/ courier/ registered post, that his Bid has been accepted. The notification of award will constitute the formation of the Contract
13.	SIGNING OF CONTRACT AGREEMENT (ITB 37.1)	<b>Add following to the existing clause</b> State of which stamp paper is required for Contract Agreement: New Delhi/ Gurugram

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# ANNEXURE

# TO BID DATA SHEET

# (BDS)

# QUALIFYING

# REQUIREMENTS

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## QUALIFYING REQUIREMENTS (QR)

Qualification of the bidder(s) will be based on their meeting the minimum eligibility criteria specified below regarding the Bidder's General Standards, Technical Experience and Financial eligibility as demonstrated by the Bidder's responses in the corresponding Bid documents. The bid can be submitted by an individual Company or by a Joint Venture/Consortium of not more than 03 (Three) companies. (Specific requirements for Joint Ventures/Consortium are given below).

### 1.1 GENERAL ELIGIBILITY CONDITIONS

The bidder should be an Indian company registered in India meeting the technical and financial eligibility requirement (s) as set forth in this section. Further, Government owned Enterprises registered and incorporated in India are also allowed to participate in this tender. However, the bidders against whom sanction/debarment/blacklisting for conducting business is imposed by Government of India, are not allowed to participate. The subsidiary of a foreign company, which is registered in India under Companies Act, 2013 prior to the bid submission deadline, is also eligible to participate.

In case of registered Companies, the copies of Certificate of Incorporation (Col), Article of Association (AoA), and Memorandum of Association (AoA) shall be provided along with the bid documents.

It shall be the sole responsibility of the bidder to inform Owner in case the bidder is debarred from bidding by any organisation. Concealment of the facts shall tantamount to misrepresentation of facts and shall lead to action against such Bidders.

The Bidder should not be under any liquidation court receivership or similar proceedings on the due date of submission of bid.

The Bid Processing Fees and EMD are exempted for MSME bidders registered under NSIC/ DIC/ Udyog Aadhaar Category only

Limited Liability Partnerships, Proprietorships, Partnerships, NGOs, Charitable Trusts, and Educational Societies are not allowed to participate in the bidding process (either individually or in Joint Venture/ Consortium).

As the Proprietorships, Partnerships, NGOs, Charitable Trusts, Educational Societies in any form are not allowed to participate in the tendering process, hence any such firm/entity having MSME status is also not eligible to participate in the bidding process (either individually or in Joint Venture/ Consortium).

### 1.2 TECHNICAL ELIGIBILITY CONDITIONS

Bidders can participate meeting Technical Eligibility criteria as mentioned below:

IA. Experience of having successfully completed similar works during last 7 years ending last day of month previous to the one in which / bids are invited should be either of the following:

1. Three similar completed works with capacity of at least 400 kW(AC) each.

or

2. Two similar completed works with capacity of at least 500 kW(AC) each

or

3. One similar completed work with capacity of at least 800 kW(AC).

Here Similar Works means – Design, Supply, Installation and commissioning of Ground mounted Grid Connected Solar Photovoltaic system.

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

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bid in support of bidder's claim of meeting the qualification requirement as mentioned above. Bidder shall also submit a certificate of successful completion and operation from the Owner.

### 1.3 FINANCIAL ELIGIBILITY CONDITIONS

The Minimum Average Annual Turnover (MAAT) of the bidder in the last three financial years (i.e. FY 2021-22, 2022-23 & 2023-24) should be INR 4,20,00,000/- (Indian Rupees Four Crore Twenty Lakh only ). MAAT shall mean Revenue from Operations as incorporated in the profit & loss account excluding other income, e.g. sale of fixed assets. A summarized sheet of average turnover, certified by a practicing Chartered Accountant/Statutory Auditor should be compulsorily enclosed along with corresponding annual accounts.

AND

The net worth for the last financial year should be positive. "Net Worth" of the Bidder shall be calculated as per the Companies Act, 2013.

- 1.3.1 For participation as an EPC Bidder under Route I: In case the bidder is a subsidiary of a holding company, the Financial eligibility criteria referred to in clause 1.3 above, shall be of that subsidiary company only (i.e. excluding its holding company).
- 1.3.2 The Bidder will provide a copy each of audited annual report of previous three financial years for ascertaining their turnover and Net Worth for the purpose of verification.
- 1.3.3 The derivation of Net Worth" of the Bidder shall be calculated as per Company Act 2013.
- 1.3.4 Other income (as per the Companies Act, 2013 including amendment/ clarifications), shall not be considered for arriving at annual turnover.
- 1.3.5 A scanned copy of Certificate of Incorporation of the Bidder shall be furnished in the bid (through online mode).
- 1.3.6 Bidders shall furnish documentary evidence as per the prescribed format (online as well as offline), duly certified by the Authorized Signatory and the Statutory Auditor / Practicing Chartered Accountant of the Bidding Company in support of their financial eligibility.

Bidders shall furnish documentary evidence as per the prescribed format (online as well as offline), duly certified by the Authorized Signatory and the Statutory Auditor / Practicing

- (i) Details of Financial capability of Bidder" as per format F-16 duly signed and stamped by a Chartered Accountant (format attached).
- (ii) Audited financial results i.e. Annual Report including Audited Balance Sheet and Profit & Loss Account Statement for immediate three preceding financial years to meet the above Financial Eligibility Criteria. In case of tenders having the submission deadline up to 30th September of the relevant financial year and audited financial results of immediate 3 preceding financial years being not available, the bidder has an option to submit the audited financial results of three years immediately prior to applicable financial year. In case the bid submission deadline is after 30th September of the relevant financial year, bidder has to compulsorily submit the audited financial results of immediately preceding three financial years.

### 1.4 JOINT VENTURE & CONSORTIUM CONDITIONS:

In case the bid is submitted by a Joint venture (JV) or Consortium of two or more companies as partners, they must meet the following requirements: -

- 1.4.1 The Lead partner/member of the JV/Consortium shall meet individually 100% of Technical Eligibility Conditions given at para 1.2 above.

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- 1.4.2 There can be a maximum of 03 (Three) partners/members in a JV/Consortium. The Lead partner/member of the JV/Consortium shall meet individually not less than 50% of minimum Financial Eligibility Conditions (MAAT & Working Capital) given at para 1.3 above. However, all the JV/Consortium partners/members must meet collectively 100% Financial Eligibility Conditions given at para 1.3 above. Herein, apart from the Lead partner/member, a minimum of 25% Financial eligibility should be met individually by all other partners/members of the JV/Consortium.
- 1.4.3 In the case of a joint venture/Consortium, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV/Consortium shall nominate the Lead partner/Member of the JV/Consortium who shall have the authority to conduct all business for and on behalf of any and all the members of the JV/Consortium during the Bidding process and, in the event the JV/Consortium is awarded the Contract, during contract execution.
- 1.4.4 A firm that is a Bidder (either individually or as a JV/Consortium member) shall not participate as a Bidder or as JV/Consortium member in more than one Bid. Such participation shall result in the disqualification of all Bids in which the firm is involved. However, this does not limit the participation of a Bidder as subcontractor in another Bid or of a firm as a subcontractor in more than one Bid.
- 1.4.5 The Bid Securing Declaration & Performance Security (In case of award) of a JV/Consortium shall be in the name of the JV/Consortium that submits the Bid. If the JV/Consortium has not been legally constituted into a legally enforceable JV/Consortium at the time of bidding, the Bid Securing Declaration shall be in the names of all the members of the JV/Consortium & not in the name of "only lead bidder". The Bid Securing Declaration shall be executed in the names of all the members of the JV/Consortium.
- 1.4.6 Similarly, in case of the award, the Performance Security, to be submitted by a JV/Consortium shall be in the name of the JV/Consortium that has been awarded the NOA/Contract Agreement. If the JV/Consortium has not been legally constituted into a legally enforceable JV/Consortium, the Performance Security shall be in the names of all the partners/members of the JV/Consortium & not in the name of "only lead bidder". The Performance Security Bank Guarantee shall be executed in the names of all the partners/members of the JV/Consortium.
- 1.4.7 In the case that the Bidder is a JV/Consortium, the Bid shall be signed by the authorized representative of the Lead partner/member of the JV/Consortium on behalf of the JV/Consortium, and so as to be legally binding on all the partners/members as evidenced by a power of attorney signed by their legally authorized representatives.
- 1.4.8 The joint venture/Consortium agreement should indicate precisely the responsibility of all partners/members of JV/Consortium in respect of planning, design, manufacturing, supply, installation, commissioning and training. All members of JV/Consortium should have active participation in execution during the currency of the Contract. The composition or the constitution of the JV/Consortium shall not be varied/modified subsequently without prior approval of the Employer/Owner.
- 1.4.9 The Joint Venture/Consortium must collectively satisfy the Criteria of clauses 1.2 & 1.3 above for which purpose, the relevant figure of average annual turnover and liquid assets/ credit facilities for each of the partners of the JV/Consortium shall be added together to arrive at total eligibility of the Joint Venture/Consortium. The net worth of each Partner of JV/Consortium should be positive.
- 1.4.10 A Joint Venture (JV), may or may not be incorporated as a Registered Company.
- 1.4.11 A Joint Venture (JV), if incorporated as a Registered Company, is required to submit Bid Securing Declaration and Performance Security (In case of award) in the name of Joint Venture only.
- 1.4.12 A JV is required to submit Form of Undertaking by the JV Partners (F - 17) and Form of Power of Attorney (F - 17A) as per prescribed formats enclosed in Section - VI (Sample Forms and Formats). A Consortium is required to submit Form of Undertaking by the Consortium Partners (F - 18) and Form of Power of Attorney (F - 18A) as per prescribed formats enclosed in Section - VI (Sample Forms and Formats).

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1.4.13 JV/ Consortium is also required to declare detailed scope of work to be executed by each partner/member of JV.

1.4.14 The Employer may assess the capacity and capability of the bidder, to ascertain that the bidder can successfully execute the scope of work covered under the package within stipulated completion period. This assessment shall inter-alia include (i) document verification, (ii) bidder's facilities visit, (iii) details of works executed, works in hand, anticipated in future & the balance capacity available for the present scope of work, (iv) details of plant and machinery, testing facilities, design capabilities, manpower and financial resources, (v) details of quality systems in place, (vi) past experience and performance, (vii) customer feedback, (viii) banker's feedback etc.

"Lead Partner/Member of the JV/Consortium" appearing anywhere in the QR shall be read as "Lead Partner of the JV/Consortium"

Note: For MSE/Startups, GoI guidelines shall be followed.

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# SECTION - IV

## GENERAL CONDITIONS OF CONTRACT (GCC)

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**Preamble**

This Section (Section - IV) of the Bidding Documents [named as General Conditions of Contract (GCC)] provides the performance of the Contractor, payments under the contract or matters affecting the risks, rights and obligations of the parties under the contract. This Section contains provisions that are to be used unchanged unless Section - V [named as Special Conditions of Contract (SCC)] states otherwise as any changes in GCC or any complementary information that may be needed has been shown in SCC. If there is a conflict between the provisions of Section-IV & Section - V, the provisions of Section - V shall prevail. Bidders may note that the respective rights of the RECPDCL/ SPD / Owner and Bidders/ Contractors shall be governed by this Tender Documents and Contracts (to be) signed between the RECPDCL/SPD / Owner and the Contractor. The provisions of this Tender Documents shall always prevail over any other documents in case of contradiction. Further in all matters arising out of the provisions of this Section - IV and the Section - V of the Tender Documents, the laws of the Union of India shall be the governing laws and courts of New Delhi shall have the exclusive jurisdiction to entertain any issue/dispute arising out of this Tender Document.

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[A] DEFINITIONS

1. Definition of Terms:

1.1 In this TENDER (as here-in-after defined) the following words and expressions shall have the meaning hereby assigned to them except where the context otherwise required.

1.1.1 Deleted.

1.1.2 AFFILIATE shall mean a company that either directly or indirectly

a. controls or

b. is controlled by or

c. is under common control with a Bidding Company

"Control" means ownership, directly or indirectly, of more than 50% (fifty percent) of the voting shares of such company or right to appoint majority directors.

1.1.3 AFFECTED PARTY means Owner or the Contractor whose performance has been affected by an event of Force Majeure

1.1.4 APPLICABLE LAW means any statute, law, regulation, ordinance, notification, rule, regulation, judgment, order, decree, bye-law, approval, directive, guideline, policy, requirement or other governmental restriction or any similar form of decision of, or determination by, or any interpretation or administration having the force of law in the Republic of India and the State Government, by any Government Authority or instrumentality thereof, which is in effect as of the date of this Tender Document or during the implementation of Contract .

1.1.5 APPROVED shall mean approved in writing including subsequent written confirmation of previous verbal approval and "APPROVAL" means approval in writing including as aforesaid.

1.1.6.Deleted

1.1.7 ARBITRATOR means the person or persons appointed as Arbitrator in accordance with Clause 100 of the GCC and shall mean an include the arbitral tribunal, as the context may require.

1.1.8 B.I.S. means specifications of Bureau of Indian Standards (BIS).

1.1.9 BID means the Techno Commercial proposal together with Price Bid submitted by the Bidder along with all documents/ credentials/ attachments/ annexure etc., in response to the Tender, in accordance with the terms and conditions hereof.

1.1.10 BIDDER means Bidding Company submitting the Bid. Any reference to the Bidder includes Bidding Company including its successors, executors and permitted assigns as the context may require.

1.1.11 CEA means the Central Electricity Authority.

1.1.12 CHARTERED ACCOUNTANT means 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

1.1.13 COLLABORATOR means the firms/ corporations who has provided technological support to the manufacturer for the detailed Design/establishing production line for the specific Equipment.

1.1.14 COMPANY means a body incorporated in India under the Indian Companies Act, 1956 or Companies Act, 2013 including any amendment thereto.

1.1.15 CONTRACT shall mean the agreement between the Owner and the Contractor for the execution of the works including therein all Contract Documents.

1.1.16 CONTRACTOR means the person or the persons, Company or Corporation whose Tender has been accepted by the RECPDCL/SPD /Owner and includes the Contractor's legal representatives his/ her successors and permitted assigns.

1.1.17 CONTRACT DOCUMENTS mean collectively the Tender Documents, Designs, Drawings, Specification, Schedule of Quantities and Rates, Notification of Award/ Letter of Intent/ Letter of Acceptance and agreed variations if any, and such other documents constituting the Tender and acceptance thereof.

1.1.18 CONTRACTOR'S EQUIPMENT means all plant, facilities, equipment, machinery, tools, apparatus, appliances or things of every kind required in or for installation, completion and maintenance of Facilities that are to be provided by the Contractor, but does not include Plant and Equipment, or other things intended to form or forming part of the Facilities.

1.1.19 CONTRACT PRICE/CONTRACT VALUE/PROJECT VALUE means the firm value of the final quoted price, as a result of e- RA (if applicable), by the successful bidder specified in its financial proposal as the sum of individual contract value of Supply & Services (Supply of goods, F&I, Design, installation, Civil Works etc.) as mentioned under the different work heads specified in the financial proposal including all the applicable taxes/ Goods & Service taxes.

1.1.20 CONTRACTOR'S REPRESENTATIVE means any person nominated by the Contractor and approved by the RECPDCL/SPD to perform the duties delegated by the Contractor.

1.1.21 CONSULTANT means Techno-Commercial experts who are the consulting engineer to the RECPDCL/SPD / Owner for this project.

1.1.22 COMMISSIONING means a project shall be considered commissioned if all equipment as per rated capacity, mentioned under the scope of contract, has been installed and energy has flown into grid.

1.1.23 COMPLETION OF FACILITIES means that the Facilities (or a specific part thereof where specific parts are specified in the SCC) have been completed operationally and structurally and put in a tight and clean condition, and that all work in respect of Pre-commissioning of the Facilities or such specific part thereof has been completed; and Commissioning along with Operational Acceptance has been attained as per Technical Specifications.

1.1.24 CHANGE ORDER means an order given in writing by the Engineer-in-Charge/Project Manager to effect additions to or deletion from and alteration in the works.

1.1.25 DAY means a day of 24 hours from midnight to midnight irrespective of the number of hours worked in that day.

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1.1.26 DEFECT LIABILITY PERIOD in relation to scope of work means 12 (Twelve) months from the date of Operational Acceptance during which the Contractor stands responsible for rectifying all defects/ rejection that may appear in the works executed by the Contractor in pursuance of the Contract and includes warranties against Manufacturing/ Fabrication/ Erection/ Construction defects covering all materials plants, equipment, components and the like supplied by the Contractor, works executed against workmanship defects.

1.1.27 DEVELOPER means an entity who has either executed or got executed the work/ project as owner of solar projects.

1.1.28 DRAWINGS shall include maps, plans and tracings, supporting documents, specifications or prints or sketches thereof with any modifications approved in writing by the Engineer-in-Charge/Project Manager and such other drawing as may, from time to time, be furnished by the Contractor.

1.1.29 EARNEST MONEY DEPOSIT (EMD) means the unconditional and irrevocable Tender Security in the form of Demand Draft/ Banker's Cheque/ Bank Guarantee to be submitted along with the Bid by the Bidder as prescribed in the Tender document.

1.1.30 EMPLOYER means the Company/ Corporation/ Government Entity, named in the BDS/ SCC, who is responsible for getting the Project/Facilities implemented.

1.1.31 ENGINEER-IN-CHARGE (EIC)/PROJECT MANAGER shall mean the person designated from time to time by RECPDCL/SPD and shall include those who are expressly authorized by him to act for and on his behalf for operation of this Contract.

1.1.32 EFFECTIVE DATE means the date of issuance of Notification of Award/ Letter of Intent/Letter of Award (LOA) from which the Time for Completion shall be determined or any other specific date as provided in the Notice to Proceed (NTP), in case the NTP is applicable.

1.1.33 FACILITIES mean the Plant and Machinery required for Solar PV Project to be supplied and installed, as well as all the installation services including all infrastructure as mentioned in scope of works to be carried out by the Contractor under the Contract.

1.1.34 FINAL ACCEPTANCE/FINAL COMPLETION means acceptance of Facilities by RECPDCL/SPD at the end of one year from the date of Operational Acceptance and upon demonstration of minimum annual parameters as specified in the technical specifications and completion of works under the punch list which certifies the Contractor's fulfilment of the Contract in respect of Functional and Plant Performance Guarantees of the Facilities.

1.1.35 GUARANTEE TEST(S) means the test(s) specified in the Technical Specifications to be carried out to ascertain whether the Facilities or a specified part thereof is able to attain the Functional Guarantees specified in the Technical Specifications during/ after successful Commissioning followed by Trial - Operation.

1.1.36 GOODS & SERVICE TAX (GST) means 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.

1.1.37 IEC means specifications of International Electro-Technical Commission.

1.1.38 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 structural and construction materials required), installation including civil and allied works etc., testing, pre-commissioning, commissioning, operations, maintenance, the provision of operations and maintenance manuals, training of Owner's Personnel etc..

1.1.39 MWp means Mega-Watt Peak.

1.1.40 MWh means Mega-Watt Hour.

1.1.41 kWh shall mean Kilo-Watt-hour.

1.1.42 LANGUAGE FOR DRAWINGS AND INSTRUCTION All the drawings, titles, notes, instruction, dimensions, etc. shall be in English Language only.

1.1.43 MNRE means Ministry of New and Renewable Energy, Government of India.

1.1.44 MOBILIZATION shall mean establishment of sufficiently adequate infrastructure by the Contractor at Site comprising of construction equipment, aids, tools tackles including setting of site offices with facilities such as power, water, communication etc. establishing manpower organization comprising of Resident Engineers, Supervising Personnel and an adequate strength of skilled, semi-skilled and un-skilled workers, who with the so established infrastructure shall be in a position to commence execution of work at site(s), in accordance with the agreed Time Schedule of Completion of Work. Mobilization shall be considered to have been achieved, if the Contractor is able to establish infrastructure as per Time Schedule, where so warranted in accordance with agreed schedule of work implementation to the satisfaction of Engineer-in-Charge/Project Manager.

1.1.45 NET-WORTH shall have same meaning as defined in Company Act 2013 and amendment, if any.

1.1.46 NOTICE IN WRITING OR WRITTEN NOTICE shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received by the addressee) by email/registered post to the latest known private or business address or registered office of the addressee and shall be deemed to have been received in the ordinary course of post it would have been delivered.

1.1.47 NOTIFICATION OF AWARD (NOA)/LETTER OF INTENT (LOI)/LETTER OF AWARD (LOA) means the official notice issued vide letter/ e-mail by the RECPDCL/SPD /Owner notifying the Contractor that his bid has been awarded.

1.1.48 NTP means Notice to Proceed subsequent to the placement of LOA/NOA/LOI. NTP will be issued by the owner within a maximum time frame of 90 days from the date of LOA/NOA/LOI, failing which the LOA/NOA/LO shall stand withdrawn without

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- creating any further liability on either party. In such case EMD/PBG, as applicable submitted by the contractor shall be released.
- 1.1.49 OPERATIONAL ACCEPTANCE means the acceptance of the Plant Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts) by the EMPLOYER/Owner, which certifies the Contractor's fulfilment of the Contract in respect of meeting Plant Functional and Performance Guarantees of the Facilities and completion of works.
- 1.1.50 O & M means comprehensive Operation & Maintenance of Commissioned Project/ Work/ Facilities under the contract.
- 1.1.51 OWNER means the Company/ Corporation/ Government Entity, named in the BDS/ SCC, who has decided to set up the Facilities under his ownership at his designated location and shall include the legal successors or permitted assigns of the Owner.
- 1.1.52 PARENT COMPANY means a company that holds more than Fifty Percent (50%) of the paid-up equity capital directly or indirectly in the Bidding Company as the case may be.
- 1.1.53 PLANT AND EQUIPMENT means permanent plant, equipment, machinery, apparatus, articles and things of all kinds to be provided and incorporated in the Facilities by the Contractor under the Contract (including the spare parts to be supplied by the Contractor) but does not include Contractor's Equipment.
- 1.1.54 PRE-COMMISSIONING means the testing, checking and other requirements specified in the Technical Specifications that are to be carried out by the Contractor in preparation for Commissioning.
- 1.1.55 SCC means the Special Conditions of Contract.
- 1.1.56 Deleted
- 1.1.57 SITE means the land and other places upon which the Facilities are to be installed, and such other land or places as specified in the SCC of the Contract as forming part of the Site.
- 1.1.58 SPECIFICATION shall mean all directions the various Technical Specifications, provisions attached and referred to the Tender Documents which pertain to the method and manner of performing the work or works to the quantities and qualities of the work or works and the materials to be furnished under the Contract for the work or works, as may be amplified or modified by the EMPLOYER or Engineer-in-Charge/Project Manager during the performance of Contract in order to provide the unforeseen conditions or in the best interests of the work or works. It shall also include the latest edition of relevant Standard Specifications including all addenda/ corrigenda published before entering into Contract.
- 1.1.59 SUB-CONTRACTOR including vendors, means any person to whom execution of any part of the Facilities, including preparation of any design or supply of any Plant and Equipment, is subcontracted directly or indirectly by the Contractor, and includes its legal successors or permitted assigns.
- 1.1.60 TEMPORARY WORKS shall mean all temporary works of every kind required in or about the execution, completion or maintenance of site works.
- 1.1.61 TENDER/TENDER DOCUMENT/ BIDDING DOCUMENT means the entire set of documents vide which EMPLOYER invite bids for Projects/ Works/ Facilities that are submitted within a finite deadline by the Bidder.
- 1.1.62 TIME FOR COMPLETION means the time within which Completion of Facilities is to be attained in accordance with the specifications, as a whole (or of a part of the Facilities where a separate Time for Completion of such part has been prescribed) as specified in the SCC of the tender document.
- 1.1.63 WEEK means a period of any consecutive seven days.
- 1.1.64 WORKING DAY means any day which is not declared to be holiday or rest day by the EMPLOYER/ Owner.

Additional definitions:

1. Bid Data Sheets: Specific details in the bidding documents that outline the terms and requirements of the bid process.
2. Bid Evaluation Criteria: The criteria used to assess and score the submitted bids.
3. Bid Form: The standardized document used by bidders to submit their offer.
4. Bid Submission: The process by which bidders submit their proposals for a project.
5. Bidder/Contractor: The company or entity submitting a bid to perform the work and take on the contract responsibilities.
6. Bidding: The process of submitting offers or proposals in response to a solicitation.
7. Bidding Documents: The set of documents provided to bidders, containing all information and requirements needed to submit a bid.
8. Commissioning: The process of ensuring that the systems or equipment are set up, tested, and ready for operation.
9. Conditions: The general and special terms that govern the project or contract, including timelines, quality, and other stipulations.
10. Contract: A formal agreement between parties, outlining the terms and conditions of the project.
11. Contract Performance Security: A guarantee (often in the form of a bank guarantee) to ensure the contractor meets their obligations.
12. Contract Value: The total financial value of the contract for the Solar PV plant.
13. Defect Liability Period (DLP): A specified period after the completion of the project during which the contractor is responsible for fixing any defects or issues.
14. Domestic Competitive Bidding: A bidding process restricted to domestic contractors or companies.
15. Drawings and Specifications: Detailed technical drawings and descriptions that outline the design and requirements of the project.
16. Earthwork: The excavation, movement, and management of soil and other materials for construction purposes.
17. Earnest Money Deposit (EMD): A deposit made by a bidder as a guarantee of serious intent to follow through with the bid.
18. Eligibility Criteria: The requirements a bidder must meet to be considered eligible to participate in the bidding

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process.

19. EOI/RFP/Tender: Expression of Interest/Request for Proposal/Tender, documents used to invite interest or proposals from potential contractors.
20. e-Reverse Auction (e-RA): A type of online auction where the price of a bid is reduced in real-time as suppliers compete.
21. Forex: Foreign exchange, referring to currency exchange rates and transactions.
22. Geotech Investigation: The process of studying the soil and geological conditions at the project site to ensure the foundation is suitable for construction.
23. Grid Compliance: Ensuring that the project meets the regulatory and technical standards required for connection to the electricity grid.
24. Grid Connected: Refers to a system or project that is connected to the electricity grid, enabling power to flow into the grid.
25. Hazardous Area: Areas where the risk of fire, explosion, or other hazards exists due to the presence of flammable materials or chemicals.
26. Holiday: A non-working day, often specified in contracts as part of time calculations or project schedules.
27. HRS (IST): Hours (Indian Standard Time), the time zone used in India for all project-related activities.
28. Instructions to Bidders (ITB): A document providing detailed instructions to bidders on how to prepare and submit their bids.
29. Non-responsive/Non-acceptance: Refers to bids that fail to meet the required criteria and are therefore rejected.
30. Notification of Award (NOA)/ Letter of Intent (LOI)/ Letter of Award (LOA): Documents issued by the employer to inform the successful bidder of their selection.
31. Operational Acceptance: The point in time when the project or facility is considered operational and meets the contract specifications for use.
32. Order Instrument: A document confirming the official order or award of the contract.
33. Storage and Handling: Responsibilities regarding the storage and handling of materials at the project site.
34. Parent Company/Affiliate: The company that has a controlling interest in or is connected to the bidding or contracting company.
35. PCU, DC, and AC Circuit Breaker(s): Power Conditioning Unit (PCU), Direct Current (DC) and Alternating Current (AC) circuit breakers are devices used in electrical systems to control the flow of electricity.
36. Performance Bank Guarantee: A financial guarantee issued by a bank to ensure the contractor fulfills their contractual obligations.
37. Performance Testing: The process of testing the project or equipment to verify it meets the required performance standards.
38. Pooling: A method of aggregating or grouping resources, often used in energy projects to consolidate power output.
39. Power Plant Controller: The system or individual responsible for managing and controlling the operations of a power plant.
40. PR Test: Performance ratio of the power output from solar power plant.
41. Project Area: The geographical location or site where the project is being carried out.
42. Project Capacities: The production or operational capacity of the project, typically measured in output, e.g., megawatts for power plants.
43. Project Management Consultant: An external consultant responsible for overseeing and managing the project.
44. Qualifying Requirements (QR): Specific conditions that bidders must meet to qualify for participation in the bid process.
45. REC(Renewable Energy Certificate): A certificate issued to energy producers for generating renewable energy.
46. RFP/Tender: Request for Proposal/Tender, a document issued to solicit proposals for a project.
47. Right of Way (RoW): A legal right to pass over land or property, often related to the installation of infrastructure like transmission lines.
48. Risk and Cost Analysis: The process of identifying, assessing, and managing risks and the associated costs in a project.
49. Site: The physical location where the project will be implemented or constructed.
50. Special Conditions of Contract (SCC): Additional clauses or terms that modify or add to the general conditions of a contract.
51. Suspension List: A list of bidders or contractors who are temporarily or permanently disqualified from participating in future bids.
52. Technical Bid: The portion of the bid that outlines the technical aspects of the proposed solution.
53. Technical Specifications (TS): Detailed requirements and standards for the materials, equipment, and workmanship in a project.
54. Tender Document and/ or Contract Agreement: The official documents that define the terms and conditions of the tender and the contract.
55. Time Schedule & Progress Reporting: The process of outlining the project timeline and regularly reporting on the progress of the project.
56. Transmission Line: High-voltage lines used to transport electricity from Solar PV power plants to substation
57. Transportation and Insurance: The cost and management of transporting materials and providing insurance coverage

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during transit.

58. Ultimate Parent Company: The ultimate controlling entity or organization that owns or controls the company executing the project.

59. Unloading of PV Modules: The process of receiving and unloading photovoltaic modules (solar panels) at the project site.

[B] GENERAL INFORMATIONS

2. General Information

2.1.a Location of Site

The proposed location of Project site(s) is/ are defined in the Scope of work under Technical specifications & also defined under the SCC.

2.1.b Access by Road

Contractor, if necessary, shall build other temporary access roads to the actual site of construction for his own work at his own cost. The Contractor shall be required to permit the use of the roads so constructed by him for vehicles of any other parties who may be engaged on the project site. The Contractor shall also facilitate the construction of any permanent roads should the construction thereof starts while he is engaged on this work. He shall make allowance in his Tender for any inconvenience he anticipates on such account. Non-availability of access roads, railway siding and railway wagons for the use of the Contractor shall in no case condone any delay in the execution of work nor be the cause for any claim for compensation against the EMPLOYER/ Owner.

2.2 Scope of Work

The scope of work is defined in the Section - VII, Scope of Work and Technical Specifications (TS) of the Tender document. In addition, the Contractor shall provide all necessary materials, equipment, labour etc. for the execution and maintenance of the work till completion unless otherwise mentioned in the Tender Document.

2.3 Construction Water Supply

Contractor will have to make his own arrangements for supply of water to his labour camps and for works. The water quality should be suitable for use in civil construction work. All pumping installations, pipe network and distribution system will have to be carried out by the Contractor at his own risk and cost. Alternatively, the EMPLOYER/ Owner at his discretion may endeavor to provide water to the Contractor at the EMPLOYER's/ Owner's source of supply provided the Contractor makes his own arrangement for the water meter which shall be in custody of the EMPLOYER/ Owner and other pipe networks from source of supply, so as not to interfere with the layout and progress of the other construction works. In such case, a separate accounting shall be maintained for billing purpose on monthly basis. However, the Owner does not guarantee the supply of water and this does not relieve the Contractor of his responsibility in making his own arrangement and for the timely completion of the various works as stipulated.

2.4 Construction Power Supply

2.4.1 Contractor has to arrange for the construction power supply of their own. However, subject to availability, RECPDCL/SPD / Owner may provide access to the nearest available point in his location for supply power at only one point, from where the Contractor will make his own arrangement for temporary distribution through a temporary energy meter (sealed by EMPLOYER/ Owner). All the works will be done as per the applicable regulations with information to the Engineer-in-Charge/Project Manager. The temporary line will be removed forthwith after the completion of work or if there is any hindrance caused to the other works due to the alignment of these lines, the Contractor will re-route or remove the temporary lines at his own cost. The Contractor at his own cost will also provide suitable electric meters, fuses, switches, etc. for purposes of payment to the EMPLOYER/ Owner which should be in the custody and control of the EMPLOYER/ Owner. The cost of power supply shall be payable to the EMPLOYER/ Owner by the Contractor. The EMPLOYER/ Owner shall not, however, guarantee the supply of electricity nor have any liability in respect thereof. No claim for compensation for any failure or short supply of electricity will be admissible.

2.4.2 It shall be the responsibility of the Contractor to provide and maintain the complete installation on the load side of the supply with due regard to safety requirement at site. All cabling, equipment, installations etc. shall comply in all respects with the latest statutory requirements and safety provisions i.e., as per the Central/ State Electricity Acts and Rules etc. The Contractor will ensure that his equipment and Electrical Wiring etc., are installed, modified, maintained by a licensed Electrician/ Supervisor.

2.4.3 At all times, IEA regulations shall be followed failing which the EMPLOYER/ Owner has a right to disconnect the power supply without any reference to the Contractor. No claim shall be entertained for such disconnection. Power supply will be reconnected only after production of fresh certificate from authorized electrical supervisors.

2.4.4 The EMPLOYER/ Owner is not liable for any loss or damage to the Contractor's equipment as a result of variation in voltage or frequency or interruption in power supply or other loss to the Contractor arising therefrom.

2.4.5 The Contractor will have to provide and install his own lights and power meters which will be governed as per Central/ State /UT Government Electricity Rules.

2.4.6 In case of damage of any of the EMPLOYER's/ Owner's equipment on account of fault, intentional or unintentional on the part of the Contractor, the EMPLOYER/ Owner reserves the right to recover the cost of such damage from the Contractor's bill.

2.5 Land for Contractor's Field Office, Godown and Workshop

The EMPLOYER/ Owner will, at his own discretion and convenience and for the duration of the execution of the work make available near the site, land for construction of Contractor's Temporary Field Office, godowns, workshops and assembly yard required for the execution of the Contract. The Contractor shall at his own cost construct all these temporary buildings and provide suitable water supply and sanitary arrangement. On completion of the works undertaken by the Contractor, he shall

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remove all temporary works erected by him and have the Site cleaned as directed by Engineer-in-Charge/Project Manager. If the Contractor shall fail to comply with these requirements, the EMPLOYER/Owner may, at the expenses of the Contractor remove such surplus and rubbish materials and dispose off the same as he deems fit and get the site cleared as aforesaid; and Contractor shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such surplus materials disposed off as aforesaid. But the EMPLOYER/ Owner reserves the right to ask the Contractor any time during the pendency of the Contract to vacate the land by giving 07 (Seven) day notice on security reasons or on national interest or otherwise. The Contractor shall put up temporary structures as required by them for their office, fabrication shop and construction stores only in the area allocated to them on the project site by the EMPLOYER/ Owner or his authorized representative. No tea stalls/ canteens should be put up or allowed to be put up by any Contractor in the allotted land or complex area without written permission of the EMPLOYER/ Owner. No unauthorized buildings, constructions or structures should be put up by the Contractor anywhere on the project site. For uninterrupted fabrication work, the Contractor shall put up temporary covered structures at his cost within Area in the location allocated to them in the project site by the EMPLOYER/ Owner or his authorized representative. No person except for authorized watchman shall be allowed to stay in the plant area/ Contractor's area after completion of the day's job without prior written intimation to Engineer-in-Charge/Project Manager.

2.6 Land for Residential Accommodation

No Land shall be made available for residential accommodation for staff and labour of Contractor.

[C] ADDITIONAL GENERAL INSTRUCTIONS TO BIDDERS

3. Documents

3.1 Corrections and Erasures: All correction(s) and alteration(s) in the entries of Tender document shall be signed in full by the bidder with date. No erasure or over writing is permissible.

3.2 Witness: Witness and sureties shall be persons of status and property and their names, occupation and address shall be stated below their signature.

3.3 Details of Experience: The bidder should furnish, along with his Tender, details of previous experience in having successfully completed in the recent past works of this nature, together with the names of EMPLOYERs/ Owners, location of sites and value of Contract, date of commencement and completion of work, delays if any, reasons of delay and other details along with documentary evidence(s).

3.4 Liability of Government of India: It is expressly understood and agreed by and between bidder or/ Contractor and EMPLOYER/ Owner that, EMPLOYER/ Owner is entering into this agreement solely on its own behalf. In particular, it is expressly understood and agreed that the Government of India has no liabilities, obligations or rights hereunder. It is expressly understood and agreed that EMPLOYER/ Owner is an independent legal entity with power and authority to enter into Contracts solely on its own behalf under the applicable Laws of India and general principles of contract law. It is further understood and agreed that the Government of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the Contract. Accordingly, bidder/ Contractor hereby expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Government of India arising out of this Contract and covenants not to sue to Government of India as to any manner, claim, cause of action or thing whatsoever arising of or under this agreement.

4. Transfer of Tender Documents

4.1 Transfer of Tender Documents purchased by one intending bidder to another is not permissible.

5. Right of EMPLOYER/Owner to Accept or Reject Tender

5.1 The right to accept the Tender will rest with the EMPLOYER/ Owner. The EMPLOYER/ Owner, however, does not bind himself to accept the lowest Tender, and reserves to itself the authority to reject any or all the Tenders received without assigning any reason whatsoever. At the option of the EMPLOYER/ Owner, the work for which the Tender had been invited, may be awarded to one Contractor or split between more than one bidders, in which case the award will be made for only that part of the work, in respect of which the bid has been accepted. The quoted rates should hold good for such eventualities. Tenders in which any of the particulars and prescribed information are missing or are incomplete in any respect and/ or the prescribed conditions are not fulfilled are liable to be rejected. The Tender containing uncalled for remarks or any additional conditions are liable to be rejected. Canvassing in connection with Tenders is strictly prohibited and Tenders submitted by the Tenderers who resort to canvassing will be liable to rejection.

6. Time Schedule & Progress Reporting

6.1 The work shall be executed strictly as per the Time Schedule specified in Section- V, Special Conditions of Contract (SCC). The period of construction given in Time Schedule includes the time required for mobilization as well as testing, rectifications if any, retesting and completion in all respects to the entire satisfaction of the Engineer-in- Charge.

6.2 A joint program of execution of the work will be prepared by the Contractor based on priority requirement of this project & submitted to the Engineer in charge. This program will take into account the time of completion mentioned above and the time allowed for the priority works by the Engineer-in- Charge.

6.3 Monthly/ Weekly construction program will be drawn up by the Engineer-in- Charge jointly with the Contractor, based on availability of work fronts and the joint construction program as per above. The Contractor shall scrupulously adhere to these targets/ programs by deploying adequate personnel, construction tools and tackles and he shall also supply himself all materials of his scope of supply in good time to achieve the targets/ programs. In all matters concerning the extent of targets set out in the weekly and monthly programs and the degree of achievements the decision of the Engineer-in- Charge will be final and binding on the Contractor.

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6.4 The Contractor shall monitor progress of all the activities specified in the work schedule referred in GCC above and submit the progress report to the Project Manager as per the Contract Co-ordination procedure.

6.6 If at any time the Contractor's actual progress falls behind the scheduled program, or it becomes apparent that it will so fall behind, the Contractor shall, at the request of the EMPLOYER or the Project Manager/ EIC, prepare and submit to the Project Manager/ EIC a revised program, taking into account the prevailing circumstances, and shall notify the Project Manager/ EIC, of the steps being taken to expedite progress so as to attain Completion of Facilities within the Time for Completion. If any extension thereof entitled under GCC, or any extended period as may otherwise be agreed upon between the EMPLOYER and the Contractor, Contractor shall submit the revised plan for completion of Facility accordingly.

6.7 Maintenance of Records of Progress Review Meeting

The Contractor shall be required to attend all site progress review meetings organized by the 'Project Manager/ EIC' or his authorized representative. The deliberations in the meetings shall inter-alia include the program, progress of work (including details of manpower, material, tools and plants deployed by the Contractor vis-à-vis agreed schedule), inputs to be provided by EMPLOYER, delays, if any and recovery program, specific hindrances to work and work instructions by EMPLOYER. The minutes of the meetings shall be recorded with the 'Project Manager/ EIC' or his authorized representative.

7. Conflict of Interest and Bidder's Responsibility

7.1 A bidder shall not have a Conflict of Interest. All bidders found to have Conflict of Interest shall be disqualified. A bidder may be considered to have a Conflict of Interest with one or more parties in this bidding process, if:

- (a) They have a controlling partner in common; or
- (b) They receive or have received any direct or indirect subsidy from any of them; or
- (c) They have the same legal representative for the purposes of this bid; or
- (d) They have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another bidder, or influence the decision of the EMPLOYER/ Owner regarding this bidding process; or
- (e) A bidder submits more than one bid in this bidding process, either individually [including bid submitted as an agent/ authorized representative on behalf of one or more bidders or through license- licensor route, wherever permitted as per the provision of the Qualification Requirement for the bidders in the Annexure to Bid Data Sheet (BDS)] or as a partner in a Joint Venture/ Consortium, except for alternative offers permitted under Tender. This will result in the disqualification of all such bids; or
- (f) A bidder or any of its Affiliates participated as a consultant in the preparation of the Design or Technical Specification or Detailed Project Report (DPR) of the Plant and Installation of services\*/ goods and related services\*\* that are the subject of the bid; or
- (g) A bidder or any of its Affiliate has been hired (or is proposed to be hired) by the EMPLOYER/ Owner as a Project Manager for the Contract Unquote: \* Applicable for Supply & Installation Contracts \*\* Applicable for Supply & Supply cum Supervision of Installation Contracts

7.2 The intending bidder shall be deemed to have visited the Site and familiarized himself before submitting the Tender. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the works in strict conformity with the Drawings and Specifications or for any delay in performance.

8. Retired Government or Company Officers

8.1 No Engineer of Gazetted rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the States/ UT/ Central Government or of the EMPLOYER/ Owner is allowed to work as a Contractor for a period of two years after his retirement from Government Service, or from the employment of the EMPLOYER/ Owner. The Contract, if awarded, is liable to be cancelled if either the Contractor or any of his employees is found at any time to be such a person, who has not obtained the permission of the State/ Central Government before submission of Tender, or engagement in the Contractor's service as the case may be.

9. Representatives and Field Management & Controlling

9.1 Project Manager / Engineer- In -Charge (EIC): If the Project Manager/ EIC is not named in the Contract, then within seven (7) days of the Effective Date, the EMPLOYER shall appoint and notify the Contractor in writing of the name of the Project Manager/ EIC. The EMPLOYER may from time to time appoint some other person as the Project Manager/ EIC in place of the person previously so appointed and shall give a notice of the name of such other person to the Contractor without delay. The EMPLOYER shall take reasonable care, unless unavoidable to see that no such appointment is made at such a time or in such a manner as to impede the progress of work on the Facilities. The Project Manager/EIC shall represent and act for the EMPLOYER at all times during the currency of the Contract. All notices, instructions, information and other communications given by the Contractor to the EMPLOYER under the Contract shall be given to the Project Manager/ EIC, except as herein otherwise provided.

9.2 Contractor's Representative & Construction Manager If the Contractor's Representative is not named in the Contract, then within seven (07) days of the Effective Date, the Contractor shall appoint the Contractor's Representative and shall request the EMPLOYER in writing. If the EMPLOYER objects to the appointment within seven (07) days giving the reason therefor, then the Contractor shall appoint a replacement within seven (07) days of such objection, and the foregoing provisions of this GCC shall apply thereto.

9.3 The Contractor's Representative shall represent and act for the Contractor at all times during the tenure of the Contract and shall give to the Project Manager/ EIC all the Contractor's notices, instructions, information and all other communications under the Contract.

9.4 All notices, instructions, information and all other communications given by the Owner/ EMPLOYER or the Project Manager/ EIC to the Contractor under the Contract shall be given to the Contractor's Representative or, in its absence, its deputy, except as herein otherwise provided.

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9.5 The Contractor shall not revoke the appointment of the Contractor's Representative without the EMPLOYER consent, which shall not be unreasonably withheld. If the EMPLOYER consents thereto, the Contractor shall appoint some other person as the Contractor's Representative, pursuant to the procedure set out in GCC Clauses.

9.6 The Contractor's Representative may, subject to the approval of the EMPLOYER (which shall not be unreasonably withheld), 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. Any such delegation or revocation shall be subject to a prior notice 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 Project Manager/EIC.

9.7 Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with this GCC Clause shall be deemed to be an act or exercise by the Contractor's Representative.

9.8 Notwithstanding anything stated in GCC Clause above, for the purpose of execution of contract, the EMPLOYER and the Contractor shall finalize and agree to a Contract Co-ordination Procedure and all the communication under the Contract shall be in accordance with such Contract Co-ordination Procedure.

9.9 From the commencement of installation of the Facilities at the Site until Final Acceptance, the Contractor's Representative shall appoint a suitable person as the construction manager (hereinafter referred to as "the Construction Manager"). The Construction Manager shall supervise all work done at the Site by the Contractor and shall be present at the Site throughout normal working hours except when on leave, sick or absent for reasons connected with the proper Performance of the Contract. Whenever the Construction Manager is absent from the Site, a suitable person shall be appointed to act as his or her deputy.

9.10 The EMPLOYER may object to any Contractor's representative or person employed by the Contractor in the execution of the Contract who, in the reasonable opinion of the EMPLOYER, may behave inappropriately, may be in-competent or negligent, or may commit a serious breach of the Site regulations and safety.

9.11 If any representative or person employed by the Contractor is removed in accordance with GCC Clause above, the Contractor shall, where required, promptly appoint a replacement. The Engineers-in-Charge/Project Manager may also authorize his representatives to assist in performing his duties and functions.

9.12 Void

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

10. Note to Schedule of Rates

10.1 The Schedule of Rates should be read in conjunction with Section- VIII of the Tender documents.

10.2 The bidder shall be deemed to have studied the Drawings (if any), Specifications and details of work to be done within Time Schedule and to have acquainted himself of the condition prevailing at site

10.3 Rates must be filled in the Schedule of Rates of Original Tender Documents. If quoted in separate typed sheets no variation in item description or specification shall be accepted.

11. Policy for Bids under Consideration

11.1 Only those bids which are complete in all respects and are strictly in accordance with the Terms and Conditions and Technical Specifications of Tender Document, shall be considered for evaluation. Such Tenders shall be deemed to be under consideration immediately after opening of Tender and until such time an official intimation of acceptance/ rejection of Tender is made by EMPLOYER/Owner to the Bidder.

11.2 Zero Deviation: Bidders to note that this is a Zero Deviation Tender. EMPLOYER will appreciate submission of bids based on the terms and conditions in the enclosed General Conditions of Contract (GCC), Special Conditions of Contract (SCC), Instructions to Bidders (ITB), Scope of Work, technical specifications etc. to avoid wastage of time and money in seeking clarifications on technical/ commercial aspects of the bids. Bidder may note that no technical and commercial clarifications will be sought for after the receipt of the bids. In case of any deviation/ nonconformity observed in the bid, it will be liable for rejection.

12. Clarification of Tender Document

12.1 Verbal clarification and information given by EMPLOYER/Owner or its representatives shall not in any way be binding on EMPLOYER/Owner.

13. Local Conditions

13.1 The site is being offered to the bidders for Project on "as is where is" basis assuming that bidders have acquainted themselves appropriately with all the local site conditions & no plea will be entertained before/after the award of contract on this. It will be imperative on each bidder to acquaint himself of all local site conditions and factors which may have any effect on the execution of work covered under the Tender Document. In their own interest, the bidder(s) is/ are requested to familiarize themselves with the Indian Income Tax Act 1961, Indian Companies Act 1956/2013, and Indian Customs Act 1962, GST Act and other related statutory acts, laws and regulations of India with their latest amendments, as applicable. EMPLOYER shall not entertain any requests for clarifications from the bidder regarding such local conditions.

13.2 It must be understood and agreed that such factors have properly been investigated and considered while submitting the Tender. Any claim for financial or Forex or any other adjustments to Value of Contract, on lack of clarity of such factors shall not be entertained.

14. Extension of Time for Commissioning

14.1 The time for Project commissioning as specified in the SCC is firm & final binding till the final commissioning of the Plant facilities. The Time(s) for Commissioning specified in the SCC shall be extended if the Contractor is delayed or impeded in the Performance of any of its obligations under the Contract due to delay in fulfilment of obligations by the Owner or by the reason

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of any of occurrence of Force Majeure as provided in the Tender for Force Majeure.

14.2 The Contractor shall at all times use its reasonable efforts to minimize any delay in the Performance of its obligations under the Contract.

[D] GENERAL OBLIGATIONS

15.1 Priority of Contract Documents: Several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies, the same shall be explained and adjusted by the Engineer-in-Charge/Project Manager. They shall then issue instructions to the Contractor accordingly. In such an event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:

- a) Contract Agreement and the appendices, along with the amendments, if any thereto
- b) Notification of award (NoA)/Letter of Intent (LOI) /Letter of Award (LOA)/Notice to proceed (NTP)
- c) Special Conditions of Contract
- d) General Conditions of Contract
- e) BDS & ITB
- f) Special Technical Conditions on Technical Specifications
- g) Technical Specifications and Drawings
- h) Price Schedules submitted by the Contractor
- i) Other completed Bidding forms submitted with the Bid
- j) Any other documents forming part of the Employer’s Requirements.

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be as follows: the order in which the Contract Documents are listed above. For example, the Contract Agreement shall take precedence over the Notice of Award.

15.2 Headings and Marginal Notes : All headings and marginal notes to the clauses of these General Conditions of Contract or to the specifications or to any other Tender Document are solely for the purpose of giving a concise indication and not a summary of the contents thereof, and they shall never be deemed to be part thereof or be used in the interpretation or construction thereof the Contract.

15.3 Singular and Plural: In Contract Documents unless otherwise stated specifically, the singular shall include the plural and vice versa wherever the context so requires.

15.4 Interpretation: Words implying ‘Persons’ shall include relevant Corporate Companies/ Registered Associations/ Body of Individuals/ Firm of Partnership’ as the case may be.

16 Special Conditions of Contract (SCC)

16.1 Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract, Specification of Work, Drawings and any other documents forming part of this Contract wherever the context so requires.

16.2 Notwithstanding the sub-division of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the Contract so far as it may be practicable to do so.

16.3 Where any portion of the General Condition of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears the provisions of the Special Conditions of Contract shall be deemed to over-ride the provisions of the General Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.

16.4 Wherever it is mentioned in the specifications that the Contractor shall perform certain Work or provide certain facilities, it is understood that the Contractor shall do so at his cost and the Value of Contract shall be deemed to have included cost of such performance and provisions, so mentioned.

16.5 The materials, design and workmanship shall satisfy the relevant Indian Standards, the Job Specifications contained herein and Codes referred to. Where the job specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

17 Contractor to obtain his own Information

17.1 The Contractor in fixing his cost shall for all purpose whatsoever reason may be, deemed to have himself independently obtained all necessary information for the purpose of preparing his tender and his tender as accepted shall be deemed to have taken into account all contingencies as may arise due to such information or lack of same. The correctness of the details, given in the Tender Document to help the Contractor to make up the tender is not guaranteed. The Contractor shall be deemed to have examined the Contract Documents, to have generally obtained his own information in all matters whatsoever that might affect

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the carrying out of the works at the scheduled rates and to have satisfied himself to the sufficiency of his offer. Any error in description of quantity or omission therefrom shall not vitiate the Contract or release the Contractor from executing the work comprised in the Contract according to Drawings and Specifications at the scheduled rates. He is deemed to have known the scope, nature and magnitude of the Works and the requirements of materials and labour involved etc., and as to what all works he has to complete in accordance with the Contract documents whatever be the defects, omissions or errors that may be found in the documents. The Contractor shall be deemed to have visited surroundings, to have satisfied himself to the nature of all existing structures, if any, and also as to the nature and the conditions of the Railways, Roads, Bridges and Culverts, means of transport and communication, whether by land, water or air, and as to possible interruptions thereto and the access and egress from the site, to have made enquiries, examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other materials, the sites for disposal of surplus materials, the available accommodation as to whatever required, depots and such other buildings as may be necessary for executing and completing the works, to have made local independent enquiries as to the sub-soil, subsoil water and variations thereof, storms, prevailing winds, climatic conditions and all other similar matters effecting these works. He is deemed to have acquainted himself as to his liability of payment of Government Taxes, duties and other charges, levies etc. Any neglect or omission or failure on the part of the Contractor in obtaining necessary and reliable information upon the foregoing or any other matters affecting the Contract shall not relieve him from any risks or liabilities or the entire responsibility from completion of the works at the scheduled rates and times in strict accordance with the Contract. It is, therefore, expected that should the Contractor have any doubt as to the meaning of any portion of the tender Document he shall set forth the particulars thereof in writing to EMPLOYER before bid submission. The EMPLOYER may provide such clarification as may be necessary in writing to Contract, such clarifications as provided by EMPLOYER shall form part of tender Documents. No verbal agreement or inference from conversation with any effect or employee of the EMPLOYER either before, during or after the execution of the Contract Agreement shall in any way affect or modify and of the terms or obligations herein contained. Any change in layout due to site conditions or technological requirement shall be binding on the Contractor and no extra claim on this account shall be entertained.

**18 Time of Performance**

**18.1 Time for Mobilization:** The work covered by this Tender shall be commenced immediately upon issuance of the NOA/ LOI/LOA/NTP (whichever is later) and be completed on or before the dates as mentioned in the Time Schedule of Completion of Work under Section- V, Special Conditions of Contract (SCC). The Contractor should bear in mind that time is the essence of this contract agreement. Request for revision of construction time after tenders are submitted will not receive any consideration. The mobilization period is included within the overall Completion Schedule, not over and above the completion time to any additional work or any other reasons.

**18.2 Time Schedule of Construction**

**18.2.1** The general time schedule of construction is given in the Section- V, Special Conditions of Contract (SCC) of the Tender Documents. Contractor should prepare a detailed monthly or weekly construction program. The Work shall be executed strictly as per the Time Schedule given in the Tender Documents. The period of construction given includes the time required for mobilization testing, rectifications, if any, retesting and completion in all respects in accordance with Contract Document.

**18.2.2** The Contractor shall submit a detailed Bar chart in MS Projects consisting of adequate number of activities covering various key phases of the Work such as Design, Procurement, Manufacturing, Shipment and Field Erection activities. This network shall also indicate the intermediate milestones and interface facilities to be provided by the EMPLOYER, if any and the dates by which such facilities are needed.

**19. Force Majeure**

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

- Act of God, including, but not limited to lightning, fire not caused by Suppliers' negligence and explosion (to the extent originating from a source external to the site), earthquake, volcanic eruption, landslide, unprecedented flood, cyclone, typhoon, tornado, pandemic and quarantine. {Only if it is declared / notified by the competent state / central authority / agency (as applicable)},
- Any act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, terrorist or military action.
- Radioactive contamination or ionizing radiation originating from a source in India or resulting from another Force Majeure Event mentioned above.

**19.2 Force Majeure Exclusions:**

Force Majeure shall not include-

- (i) any event or circumstance which is within the reasonable control of the Parties and
- (ii) the following conditions, except to the extent that they are consequences of an event of Force Majeure:
  - Unavailability, late delivery, or changes in cost of the plant, machinery, equipment, materials, spare parts or consumables for the Power Project;
  - Delay in the performance of any Contractor, sub-Contractor or their agents;

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- Non-performance resulting from normal wear and tear typically experienced in power generation materials and equipment;
- Strikes at the facilities of the Contractor / Affected Party;
- Insufficiency of finances or funds or the agreement becoming onerous to perform; and
- Non-performance caused by, or connected with, the Affected Party's:
  1. Negligent or intentional acts, errors or omissions;
  2. Failure to comply with an Indian Law; or
  3. Breach of, or default under this Contract Agreement.
- Normal rainy seasons and monsoon
- Any Transport strikes not directly affecting the delivery of goods from manufacturer to site.

19.3 In the event of either party being rendered unable by Force Majeure to perform any obligation required to be performed by them under this Contract, relative obligation of the party affected by such Force Majeure shall be treated as suspended during the period which the Force Majeure clause last.

19.4 Upon occurrence of such causes, the party alleging that it has been rendered unable as aforesaid, thereby, shall notify the other party in writing by registered notice within 7 (Seven) Days of the alleged beginning thereof giving full particulars and satisfactory evidence in support of its claim. Further, within 14 (Fourteen) days, the Contractor will furnish a detailed Contingency Plan to overcome the effects of the incident and bring the project on its schedule after cessation of the effect of Force Majeure.

19.5 The Affected Party shall give notice to the other Party of (i) the cessation of the relevant event of Force Majeure; and (ii) the cessation of the effects of such event of Force Majeure on the performance of its rights or obligations under this Agreement, as soon as practicable after becoming aware of each of these cessations.

19.6 Time for Performance of the relative obligation suspended by the force majeure shall stand extended by the period for which such Force Majeure clause lasts.

19.7 If works are suspended by Force Majeure conditions lasting for more than two months, the EMPLOYER/Owner shall have the option of cancelling this Contract in whole or part thereof, at its discretion.

19.8 The Contractor will not be entitled to claim any compensation for Force Majeure conditions and shall take appropriate steps to insure its men and materials utilized by it under the Contract.

#### 20. Liquidated Damages (LD):

20.1 Subject to Force Majeure Clause, if the Contractor fails to comply with the Time for Completion /successful commissioning or any extension thereof of Solar PV Project in accordance with timelines as mentioned under the SCC, then the Contractor shall pay to the Owner a sum equivalent to half percent (0.5%) per week of the Contract Price for the whole of the facilities as liquidated damages for such default and not as a penalty, without prejudice to the Owner's other remedies under the Contract subject to the maximum limit of five percent (05%) of Contract Price for the whole of the facilities. The Owner may, without prejudice to any other method of recovery, deduct the amount of such damages from any amount due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Solar PV Project, or from any other of his obligations and liabilities under the Contract. Owner may consider the termination of contract and/or shall have the discretion of getting executed the work from the Contractor once the maximum limit of LD is reached. Any such recovery on account of the liquidated damages can be done from the running bills of the Contractor by Owner.

20.2 The Owner shall at its sole discretion upon reaching the maximum LD limit, as an alternative to the Liquidated Damages at its option, get work executed from elsewhere at the risk and cost of the Contractor irrespective of the fact whether the scope of Contract is identical to the original scope of Contract and in case the Owner chooses the alternative course as mentioned, it will be entitled to recover compensation/ damages from the Contractor irrespective of maximum limit prescribed under Clause 20.1.

20.3 The Owner may by giving (01) one-month notices to the Contractor cancel the Contract without prejudice to the Owner's right under Clauses 20.1 and 20.2 or any other provisions contained in the Contract to determine the Contract and claim damages from the Contractor.

#### 21. Rights of the Owner to forfeit Contract Performance Security

21.1 Whenever any claim against the Contractor for the payment of a sum of money arises out of or under the Contract, the Contractor shall, on demand, pay any balance remaining due to the Owner. The Owner shall be entitled to recover such sum by appropriating, in part or in whole, from the Contract Performance Security of the Contractor. In the event of the security being insufficient or if no security has been taken from the Contractor, then the balance or the total sum recoverable, as the case may be, shall be deducted from any sum then due or which may become due to the Contractor at any time thereafter.

#### 22. Failure by the Contractor to comply with the provisions of the Contract

22.1 If the Contractor refuses or fails to execute the Work or any separate part thereof with such diligence as will ensure its completion within the time specified in the Contract/O&M Contract or any extension thereof, or fails to perform any of his obligations under the Contract/O&M Contract, or in any manner commits a breach of any of the provisions of the Contract/O&M Contract, it shall be open to the Employer/Owner, at its option, by written notice to the Contractor:

a) To determine the event in which the Contract/O&M Contract shall stand terminated and shall cease to be in force and effect on and from the date appointed by the Owner on that behalf, whereupon the Contractor shall stop forthwith any of the Contractor's work then in progress, except such work as the Owner may, in writing, require to be done to safeguard any property or work, or installations from damage.

22.2 In such events of Clause 22.1(a) above.

a) The whole or part of the Contract Performance Security furnished by the Contractor is liable to be forfeited without prejudice

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to the right of the Owner to recover from the Contractor the excess cost referred to in the Clause aforesaid, the Owner shall also have the right of taking possession and utilizing in completing the works or any part thereof, such as materials, equipment and plants available at work site belonging to the Contractor as may be necessary and the Contractor shall not be entitled for any compensation for use or damage to such materials, equipment and plant.

22.3 Before determining the Contract as per Clause 22.1(a) provided in the judgement of the Owner, the default or defaults committed by the Contractor is/ are curable and can be cured by the Contractor if an opportunity given to him, then the Owner may issue Notice in writing calling the Contractor to cure the default within such time specified in the Notice.

22.4 The Owner shall also have the right to proceed or take action as per 22.1(a) above, in the event that the Contractor becomes bankrupt, insolvent, compounds with his creditors, assigns the Contract in favor of his creditors or any other person or persons, or being a company or a corporation goes into voluntary liquidation, provided that in the said events it shall be necessary for the Owner to give prior notice to the Contractor. Refer clause 25 below for further details on the "termination" of contract pertaining to various contractual situations.

23. Contractor remains liable to pay compensation if

23.1 In any case in which any of the powers conferred upon the Owner by Clause 22.0 thereof shall have become action not taken under clause 22 exercised and the same had not been exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any further case of default by the Contractor for which by any clause or clauses hereof he is declared liable to pay compensation amounting to the whole of his Contract Performance Security, and the liability of the Contractor for past and future compensation shall remain unaffected.

24. The successful bidder shall provide an unconditional and irrevocable Contract Performance Security in accordance with the Special Conditions of the Contract. The Contract Performance Security shall be in the form of either Banker's Cheque or Demand Draft or Bank Guarantee and shall be in the currency of the Contract and will be issued in the name of the Owner as specified in the SCC. The Contract Performance Security shall be for an amount equal to specified in Special Conditions of Contract (SCC) towards faithful performance of the contractual obligations, performance of equipment and shall cover entire Contract. The validity of Contract Performance Security shall be in conjunction with the provisions mentioned under Section - V, Special Conditions of Contract (SCC). Bank Guarantee towards Contract Performance Security shall be from any scheduled bank as specified in the List of Banks enclosed at Form F-9, Section- VI, Sample Forms and Formats of Tender documents or a branch of an International Bank situated in India and registered with Reserve Bank of India as scheduled foreign bank in case of Indian bidder. However, in case of Bank Guarantees from Banks other than the Nationalized Indian banks, the Bank must be a commercial Bank having net worth in excess of INR 500 Crores and a declaration to this effect should be made by such commercial bank either in the Bank Guarantee itself or separately on its letterhead. This Bank Guarantee shall be valid for a period in conjunction with the provisions mentioned under Section- V, Special Conditions of Contract (SCC). The Contract Performance Security may also be submitted in the form of 'crossed payee accounts only' Demand Draft/ Banker's Cheque in favor of as mentioned in the BDS/SCC. In case of default or failure of the successful bidder to comply with the requirements of this article shall constitute sufficient grounds for the cancellation of the award and forfeiture of the EMD, if applicable. In case of default or failure of the Contractor to comply with the requirements of any of the Obligations covered under this Tender Document and/ or Contract Agreement shall constitute sufficient grounds for forfeiture of the Contract Performance Security. The Contract Performance Security has to cover the entire contract value including extra works/ services also. As long as the Contract Performance Security submitted at the time of award takes care of the extra works/ services executed and total executed value are within the awarded contract price, there is no need for additional Contract Performance Security. As soon as the total executed value exceeds the ceiling of awarded contract price by more than 0.5%, the Contractor shall furnish additional Contract Performance Security on proportionate basis of the percentage as defined in the Special Conditions of Contract (SCC) for the additional amount in excess to the original contract value. Further, any delay beyond 30 (Thirty) days shall attract interest @ 1.25% per month on the total Contract Performance Security amount, calculated on pro-rata basis accordingly. Owner at its sole discretion may cancel the NOA/ LOI/LOA & forfeit 100% of EMD if applicable, in case Contract Performance Security is not submitted within 45 (Forty-five) days from issuance of NOA/ LOI/LOA. However, total project completion period shall remain same. Part Security shall not be accepted. The Zero Date shall be counted from the date of LOA. If the Contractor/ Sub-Contractor or their employees or the Contractor's agents and representatives shall damage, break, deface or destroy any property belonging to the EMPLOYER or others during the execution of the Contract, the same shall be made good by the Contractor at his own expenses and in default thereof, the Engineer-in-Charge may cause the same to be made good by other agencies and recover expenses from the Contractor (for which the certificate of the Engineer-in-Charge shall be final). All compensation or other sums of money payable by the Contractor to the Owner under terms of this Contract may be deducted from or paid by the encashment of a sufficient part of his Contract Performance Security or from any sums which may be due or may become due to the Contractor by the Owner of any account whatsoever and in the event of his Contract Performance Security being reduced by reasons of any such deductions or sale of aforesaid, the Contractor shall within 10 (Ten) days thereafter make good in cash, bank drafts as aforesaid any sum or sums which may have been deducted from or realized by encashment of his Contract Performance Security, or any part thereof. No interest shall be payable by the Owner for sum deposited as Contract Performance Security.

25. Termination of contract

25.1 Termination for Owner's Convenience

25.1.1 The Owner may at any time terminate the Contract for any reason by giving the Bidder a notice of termination that refers to this GCC Sub-Clause 25.1.

25.1.2 Upon receipt of the notice of termination under GCC Sub-Clause 25.1.1, the Bidder shall either immediately or upon the date specified in the notice of termination-

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- (a) cease all further supply, except for such supply as the Owner may specify in the notice of termination for the sole purpose of protecting that part of the supplies already executed, or any supply required to leave the Site in a clean and safe condition
- (b) terminate all subcontracts, except those to be assigned to the Owner pursuant to paragraph (d) (ii) below
- (c) remove all Bidder's Equipment from the Site, repatriate the Bidder's and its Sub Bidders' 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
- (d) Subject to the payment specified in GCC sub-clause 25.1.3:
  - (i) deliver to the Owner the parts of the supplies executed by the Bidder up to the date of termination
  - (ii) to the extent legally possible, assign to the Owner all right, title and benefit of the Bidder to the supplies and to the Plant as of the date of termination, and, as maybe required by the Owner, in any subcontracts concluded between the Bidder and its Sub Bidders; and
  - (iii) deliver to the Owner all non-proprietary drawings, specifications and other documents prepared by the Bidder or its Sub Bidders as at the date of termination in connection with the supplies.

25.1.3 In the event of termination of the Contract under GCC Sub-Clause 25.1.1, the Owner shall pay to the Bidder the following amounts:

- (a) the Contract Price, properly attributable to the supplies executed by the Bidder as of the date of termination
- (b) the costs reasonably incurred by the Bidder in the removal of the Bidder's Equipment from the Site and in the repatriation of the Bidder's and its Sub-Bidders' personnel
- (c) any amounts to be paid by the Bidder to its Sub-Bidders in connection with the termination of any subcontracts, including any cancellation charges
- (d) costs incurred by the Bidder in protecting the supplies and leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Sub-Clause 25.1.2

25.2 Termination for Bidder's Default

25.2.1 Neither the Owner nor the Bidder may assign the Contract or any part thereof, or any right, benefit, obligation, or interest therein or thereunder, to any third party without the express prior written consent of the other Party, which consent shall not be unreasonably withheld, except that the Bidder shall be entitled to assign any monies due and payable to it or that may become due and payable to it under the Contract, either absolutely or by way of charge.

25.2.2 The Owner, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons therefor to the Bidder, referring to this GCC Sub-Clause 25.2: (a) if the Bidder becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the 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 resupply, a receiver is appointed over any part of its undertaking or assets, or if the Bidder takes or suffers any other analogous action in consequence of debt (b) if the Bidder assigns or transfers the Contract or any right or interest therein in violation of the provision of GCC Clause 25.2.1. (c) if the Bidder, in the judgment of the Owner has engaged in Fraud and Corruption in competing for or in executing the Contract.

25.2.3 If the Bidder

- (a) has abandoned or repudiated the Contract
- (b) has without valid reason failed to commence supply on the supplies promptly or has suspended the progress of Contract performance for more than twenty eight (28) days after receiving a written instruction from the Owner to proceed
- (c) persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause
- (d) refuses or is unable to provide sufficient materials, services or labor to execute and complete the Facilities in the manner specified in the program at rates of progress that give reasonable assurance to the Owner that the Bidder can attain Completion of the Facilities by the Time for Completion as extended, then the Owner may, without prejudice to any other rights it may possess under the Contract, give a notice to the Bidder stating the nature of the default and requiring the Bidder to remedy the same. If the Bidder fails to remedy or to take steps to remedy the same within fourteen (14) days of its receipt of such notice, then the Owner may terminate the Contract forthwith by giving a notice of termination to the Bidder that refers to this GCC Sub-Clause 25.2.

25.2.4 Upon receipt of the notice of termination under GCC Sub-Clauses 25.2.2 or 25.2.3, the Bidder shall, either immediately or upon such date as is specified in the notice of termination,

- (a) cease all further supply, except for such supply as the Owner may specify in the notice of termination for the sole purpose of protecting that part of the supplies already executed, or any supply required to leave the Site in a clean and safe condition
- (b) terminate all subcontracts, except those to be assigned to the Owner pursuant to paragraph (d) below
- (c) deliver to the Owner the parts of the supplies executed by the Bidder up to the date of termination
- (d) to the extent legally possible, assign to the Owner all right, title and benefit of the Bidder to the supplies and to the Plant as of the date of termination, and, as may be required by the Owner, in any subcontracts concluded between the Bidder and its Sub Bidders
- (e) deliver to the Owner all drawings, specifications and other documents prepared by the Bidder or its Sub Bidders as of the date of termination in connection with the supplies.

25.2.5 Subject to GCC Sub-Clause 25.2.6, the Bidder shall be entitled to be paid the Contract Price attributable to the supplies executed as of the date of termination, the value of any unused or partially used Plant on the Site, and the costs, if any, incurred in protecting the supplies and in leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Sub-Clause 25.2.4. Any sums due the Owner from the Bidder accruing prior to the date of termination shall be deducted from the amount to be paid

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to the Bidder under this Contract.

25.2.6 If the Owner completes the supplies, the cost of completing the supplies by the Owner shall be determined. If the sum that the Bidder is entitled to be paid, pursuant to GCC Sub-Clause 25.2.5, plus the reasonable costs incurred by the Owner in completing the supplies, exceeds the Contract Price, the Bidder shall be liable for such excess. If such excess is greater than the sums due the Bidder under GCC Sub-Clause 25.2.5, the Bidder shall pay the balance to the Owner, and if such excess is less than the sums due the Bidder under GCC Sub-Clause 25.2.5, the Owner shall pay the balance to the Bidder. The Owner and the Bidder shall agree, in writing, on the computation described above and the manner in which any sums shall be paid.

26. Members of the EMPLOYER/ Owner not individually Liable

26.1 No Director, or official or employee of the EMPLOYER/ Owner shall in any way be personally bound or liable for the acts or obligations under the Contract or answerable for any default or omission in the observance or performance of any of the acts, matters or things which are herein contained.

27. EMPLOYER/Owner not bound by Personal Representations

27.1 The Contractor shall not be entitled to any increase on the price or any other right or claim whatsoever by reason of any representation, explanation statement or alleged representation, promise or guarantees given or alleged to have been given to him by any person.

28. Contractor's office at Site & Vehicle requirement for Mobility at site

28.1 The Contractor shall provide and maintain an office at the site for the accommodation of his agent and staff (With meeting room) and such office shall be open at all reasonable hours to receive instructions, notice or other communications. The contractor shall make provisions and arrangements at site locations for temporary office (Portacabin) including all basic amenities having electricity, furniture, Air Conditioning, Sanitation, toilet facilities, etc. at his own cost on behalf & purpose of the EMPLOYER and his staff and shall get the clearance of local authorities for setting up/construction of such facilities. Bidders are required to consider all such temporary office construction cost into his account, while bidding. These facilities shall be provided till the final handing over of the project to the Owner. The contractor shall ensure that the area is kept clean and sanitary conditions are maintained as laid down by the local authorities controlling the area. Further contractor shall also provide & ensure availability of required Vehicle (Preferably SUV Segment Vehicles requiring Off Roading) with driver and fuel/Maintenance/Consumables etc for the purpose of Mobility in and around the site for official purposes for the EMPLOYER & its staff. The vehicle as mentioned is to be provided during project construction and O&M period and inspection by RECPDCL/SPD as per requirement, failing which RECPDCL/SPD shall have full right for alternate arrangement at the risk & cost of the contractor.

29. Contractor's Subordinate Staff and their Conduct

29.1 The Contractor, on or after award of the Work shall name and depute a qualified Engineer having sufficient experience in carrying out work of similar nature, to whom the equipment, materials, if any, shall be issued and instructions for works given. The Contractor shall also provide sufficient and qualified staff to superintend the execution of the Work, competent sub-agents, foremen and leading hands including those specially qualified by previous experience to supervise the types of works contained in the Contract in such manner as will ensure work of the best quality, expeditious working. Whenever in the opinion of the Engineer-in-Charge/Project Manager additional properly qualified supervisory staff is considered necessary, they shall be employed by the Contractor without additional charge on accounts thereof. The Contractor shall ensure that Sub-Contractors, if any, shall provide competent and efficient supervision, over the work entrusted to them.

29.2 If and whenever any of the Contractor's or Sub-Contractor's agents, sub-agents, assistants, foremen, or other employees be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties, it is undesirable for administrative or any other reason for such person or persons to be employed in the works, the Contractor, shall at once remove such person or persons from employment thereon. Any person or persons so removed from the works shall not again be employed in connection with the Works. Any person so removed from the Work shall be immediately replaced at the expense of the Contractor by a qualified and competent substitute. Should the Contractor be requested to repatriate any person removed from the works he shall do so and shall bear all costs in connection herewith.

29.3 The Contractor shall be responsible for the proper behaviour of all the staff, foremen, workmen, and others, and shall exercise a proper degree of control over them and in particular and without prejudice to the said generality, the Contractor shall be bound to prohibit and prevent any employees from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighbourhood and in the event of such employee so trespassing, the Contractor shall be responsible therefore and relieve the Owner of all consequent claims or actions for damages or injury or any other grounds whatsoever. The Contractor shall be liable for any liability to Owner on account of deployment of Contractor's staff etc. or incidental or arising out of the execution of Contract. The Contractor shall be liable for all acts or omissions on the part of his staff, Foremen and Workmen and others in his employment, including misfeasance or negligence of whatever kind in the course of their work or during their employment, which are connected directly or indirectly with the Contract.

29.4 If and when required by the Owner and Contractor's personnel entering upon the Owner's premises shall be properly identified by badges or gate passes which must be worn at all times on Owner's premises. Contractor may be required to obtain daily entry passes for his Staff/ Employees to work within operating areas. These being safety requirements, no relaxations on this account shall be given to Contractor.

29.5 Contractor shall at all times provide EMPLOYER/ RECPDCL/SPD access to site and office during construction/ O&M periods and also provide them with any data/ information sought for.

30, sub-contracting for 100% of the contract on back to back basis shall not be permitted. However, Following works with mentioned terms and conditions can be subcontracted after getting permission from Employer in writing.

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- i) Sub-Contracts for Temporary Works etc. : The Owner / EMPLOYER may give written consent to Sub-Contract for the execution of any part of the Work at the site, being entered in to by Contractor provided each individual Sub-contract is informed to the Engineer-in-Charge/Project Manager.
- ii) List of Sub-Contractors to be supplied: The Contractor shall provide the Engineer-in-Charge/Project Manager with a list of all Sub-Contractors, or other persons or firms engaged by the Contractor and working at the Site during the previous month, along with particulars of the general nature of the Subcontract or the works done by them.
- iii) Contractor's Liability Not Limited by Sub-Contractors: Notwithstanding any sub-letting with such approval as aforesaid, and notwithstanding that the Engineer-in-Charge/Project Manager has received copies of any Subcontracts, the Contractor shall remain solely responsible for the quality, proper, and expeditious execution of the Contract in all respects, as if such sub-letting or Subcontracting had not occurred, and as if such work had been done directly by the Contractor. The Contractor shall bear full responsibility for any act or omission on the part of Sub-Contractors regarding the work to be performed under the Contract.
- iv) No Remedy for Action Taken under this Clause No action taken by the Owner under the clause shall relieve the Contractor of any of his liabilities under the Contract or give rise to any right or compensation, extension of time or otherwise failing which the Owner shall have the right to remove such Sub-Contractor(s) from the site.
- v) Deleted.
- vi) Termination/ Cancellation of Contract Owner is nowhere liable for the communication, acts and deeds and performance of the sub-Contractor as engaged by the principal Contractor. Principal Contractor solely is responsible and liable for the entire execution of project and performance of contract.  
Subject to poor performance and prolonged delay of the project on account of inefficient sub-letting of the project work, Owner may take a final decision to terminate the contract of the principal Contractor which will be binding and non-revertible and henceforth no plea in this regard shall be entertained.
- vii) Subject to the provisions of the Contract, the Contractor shall be solely responsible for the manner in which the Contract is performed. All employees, representatives or Sub-Contractors engaged by the Contractor in connection with the Performance of the Contract shall be under the complete control of the Contractor and shall not be deemed to be employees of the Owner. Nothing contained in the Contract or in any subcontract awarded by the Contractor shall be construed to create any contractual relationship between any such employees, representatives or Sub-Contractors and the Owner.
- viii) Under no circumstances the sub-Contractor shall claim or shall put any binding to the Owner and at all times the sub-Contractor must be managed by the Contractor. The Owner shall not be responsible for any claims at any time by the Contractor in relation to the sub-Contractor.
- ix) No relaxation, forbearance, delay or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect or restrict the rights of that party under the Contract, nor shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract. x) Any waiver of a party's rights, powers or remedies under the Contract must be in writing, must be dated and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived. xi) The Contractor shall be solely responsible for ensuring that his sub-Contractors fulfil and comply with the statutory requirements of Labour and other Laws.

**31. Power of Entry**

31.1 If the Contractor shall not commence the Work in the manner previously described in the Contract documents or if he shall at any time in the opinion of the Engineer-in-Charge/Project Manager:

- i) fail to carry out the Work in conformity with the Contract documents, or
- ii) fail to carry out the Work in accordance with the Time Schedule, or
- iii) substantially suspend the Work for a period of minimum 14 (Fourteen) days without authority from the Engineer-in-Charge/Project Manager, or
- iv) fail to supply sufficient or suitable construction plant, temporary works, labour, materials or things, or
- v) Commit, suffer, or permit any other breach of any of the provisions of the Contract on his part to be performed or observed or persist in any of the above-mentioned breaches of the Contract for 14 (Fourteen) days, after notice in writing shall have been given to the Contractor by the Engineer-in-Charge/Project Manager requiring such breach to be remedied, or
- vi) if the Contractor abandon the Work, or
- vii) If the Contractor during the continuance of the Contract shall become bankrupt, make any arrangement or composition with his creditors or go into liquidation whether compulsory or voluntary not being merely a voluntary liquidation for the purpose of amalgamation or reconstruction then in any such case, the Owner shall have the power to enter upon site and take possession thereof and of the materials, temporary Work, construction plant, and stock thereon, and to revoke the Contractor's license to use the same, and to complete the Work by his agents, other Contractors or workmen or to sublet the same upon any terms and to such other person, firm or corporation as the Owner in his absolute discretion may think proper to employ and for the purpose aforesaid to use or authorize the use of any materials, temporary work, Construction Plant, and stock as aforesaid, without making payment or allowance to the Contractor for the said materials other than such as may be certified in writing by the Engineer-in-Charge/Project Manager to be reasonable, and without making any payment or allowance to the Contractor for the use of the temporary said works, construction plant and stock or being liable for any loss or damage thereto, and if the Owner shall by reason of his taking possession of the Work or of the Work being completed by other Contractor (due account being taken of any such extra work or works which may or be omitted) then the amount of such excess shall be deducted from any money which

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may be due for work done by the Contractor under the Contract and not paid for. Any deficiency shall forthwith be made good and paid to the Owner by the Contractor and the Owner shall have power to sell in such manner and for such price as he may think fit all or any of the construction plant, materials etc. constructed by or belonging to Contractor and to recoup and retain the said deficiency or any part thereof out of proceeds of the sale.

32. Contractor's responsibility

32.1 Contractor's responsibility

32.1.1 The Contractor shall grade/level the land identified for development of the mentioned Power Plant along with the design, procure, manufacture (including associated purchases and/or subcontracting), install, commission and complete the Facilities, carry out the Guarantee tests with due care and diligence in accordance with the Contract along with interconnecting transmission system including Right of Way for Transmission Line and the comprehensive O&M of the complete facilities for the period as defined under the tender document . It is Contractor's responsibility to coordinate with state/central agencies in order to get any permission whatsoever, required for successful development & operation of Plant till its desired life.

32.1.2 The Contractor shall acquire, on behalf of Owner, in the Owner's name, all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the Country/State where the Site is located that are necessary for the setting up of the Plant & operation of Plant till its desired life as mentioned under the Contract, including, but not limited to, entry permits for all imported Owner's/EMPLOYER's Equipment (if any). In this regard, any document required from Owner/ EMPLOYER shall be intimated at least 10 days prior to submission. Contractor has to ensure safe keeping of the documents and diligent use. It is the responsibility of the Contractor to safe keep and return all the original approvals, permits, licenses, certificates and other relevant document generated as a result of the setting up of project and comprehensive O&M process to the Owner.

32.1.3 In the matter of connectivity of Plant to DISCOM's substation, the Owner will take the necessary connectivity permission, however, all the other permissions and clearances as deemed required by the State Agency/DISCOM for Bay allocation, technical/regulatory compliance for interconnection, ROW etc. are to be taken by the Contractor. Statutory fees pertaining to such shall be reimbursed by the Owner on production of the documentary evidence/Demand note over and above the contract value. Further, Contractor shall also facilitate Owner in getting the required permissions/agreements as required for the energy accounting by State agencies/DISCOM.

32.1.4 The Contractor shall acquire in its name all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located that are necessary for the Performance of the Contract, including, but not limited to, the right of way for the access to site and for erection of transmission lines as applicable, visas for the Contractor's and Sub-Contractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals and/or licenses that are not the responsibility of the Owner and that are necessary for the Performance of the Contract.

32.1.5 Contractor shall also seek for any exemption applicable for the project as per the orders released from GOI time to time in appropriate Formats including all the required attachments. In this regard, Contractor shall be responsible to take all necessary certificates as a proof of exemptions on behalf of Owner. However, all the documents required from Owner, as needed for the process, will be provided by Owner. The demand of such documents shall be made to the Owner in at least 10 days advance.

32.1.6 The Contractor shall comply with all laws in force at the place, where the Facilities are installed and where the Installation Services are carried out. The laws will include all national, provincial, municipal labour or other laws that affect the Performance of the Contract and binding upon the Contractor. The Contractor shall indemnify and hold harmless the EMPLOYER/Owner from and against any and all liabilities, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from the violation of such laws by the Contractor or its personnel, including the Sub-Contractors and their personnel.

32.1.7 Any plant, material, spares & spares inventory and services that will be incorporated in or be required for the facilities.

32.1.8 Unless otherwise specified in the Contract or agreed upon by the Owner and the Contractor, the Contractor shall provide/ deploy sufficient, properly qualified operating and maintenance personnel; shall supply and make available all raw materials, spares, tools and tackles and other materials and facilities; and shall perform all work and services of whatsoever nature, to properly carry out Pre-commissioning, Commissioning and Guarantee Tests, all in accordance with the provisions of "Scope of Works and Supply by the Owner/EMPLOYER" to the Contract Agreement at or before the time specified in the program furnished by the Contractor and in the manner thereupon specified or as otherwise agreed upon by the Owner/ EMPLOYER and the Contractor.

33. Other Agencies at Site

33.1 The Contractor shall have to execute the Work in such place and conditions where other agencies may also be engaged for other works such as site grading, filling, and levelling, electrical and mechanical engineering works, etc. No claim shall be entertained due to Work being executed in the above circumstances. The Contractor shall allow such agencies to use the facilities like roads, etc constructed by the Contractor in order that they are able to carry out their respective scope of works unhindered

34. Notice

34.1 To the Contractor : Any notice hereunder may be served on the Contractor or his duly authorized representative at the job site or may be served. Any communication sent shall be confirmed within two (2) days after receipt. Any communication sent by facsimile or e-mail shall be deemed to have been delivered on date of its dispatch and personal delivery deemed to have been delivered on date of delivery. Either party may change its postal, facsimile or e-mail address or addresses for receipt of such notices by ten (10) days' notice to the other party in writing.

34.2 To the EMPLOYER/Owner : Any notice to be given to the EMPLOYER/Owner under the terms of the Contractor shall be served by sending the same by mail to or delivering the same at the offices of EMPLOYER/ Owner at the mentioned address in

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the Tender document.

35. Right of Various Interests

35.1 i) The Owner reserves the right to distribute the work between more than one agency (ies). The Contractor shall cooperate and afford other agency(ies) reasonable opportunity for access to the Work for the carriage and storage of materials and execution of their works. ii) Wherever the work being done by any department of the EMPLOYER/ Owner or by other agency(ies) employed by the EMPLOYER/ Owner is contingent upon Work covered by this Contract, the respective rights of the various interests involved shall be determined jointly to secure the completion of the various portions of the work in general harmony.

36. Patents and Royalties

36.1 The copyright in all drawings, documents and other materials containing data and information furnished to the Owner/ EMPLOYER by the Contractor herein shall remain vested in the Contractor or, if they are furnished to the Owner/ EMPLOYER directly or through the Contractor by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party. The Owner/ EMPLOYER shall however be free to reproduce all drawings, documents, specification and other material furnished to the Owner/ EMPLOYER for the purpose of the contract including, if required, for operation and maintenance of the facilities. The Contractor shall indemnify the Owner/ EMPLOYER against third party claims of infringement of patent, trademark or industrial design rights arising from use of goods or any part thereof in India. The Contractor, if licensed under any patent covering equipment, machinery, materials or compositions of matter to be used or supplied or methods and process to be practiced or employed in the performance of this Contract, agrees to pay all royalties and license fees which may be due with respect thereto. If any equipment, machinery, materials, composition of matters, be used or supplied or methods and processes to be practiced or employed in the performance of this Contract, is covered by a patent under which the Contractor is not licensed then the Contractor before supplying or using the equipment, machinery materials, composition method or processes shall obtain such licenses and pay such royalties and license fees as may be necessary for performance of this Contract. In the event the Contractor fails to pay any such royalty or obtain any such license, any suit for infringement of such patents which is brought against the Contractor or the EMPLOYER/ Owner as a result such failure will be defended by the Contractor at his own expense and the Contractor will pay any damages and costs awarded in such suit. The Contractor shall promptly notify the EMPLOYER/ Owner if the Contractor has acquired the knowledge of any plant under which a suit for infringement could be reasonably brought because of the use by the Owner of any equipment, machinery, materials, process, methods to be supplied hereunder. The Contractor agrees to and does hereby grant to EMPLOYER/ Owner, together with the right to extend the same to any of the subsidiaries of the EMPLOYER/ Owner as irrevocable, royalty free license to use in any country, any invention made by the Contractor or his employee in or as result of the performance of the Work under the Contract.

36.2 All charges on account of royalty, tollage, rent or any other levy on materials obtained for the work or temporary work or part thereof (excluding materials provided by the EMPLOYER/ Owner, if any) shall be borne by the Contractor.

36.3 The Contractor shall not sell or otherwise dispose of or remove except for the purpose of this Contract, the sand, stone, clay, ballast, earth, rock or other substances, or materials obtained from any excavation made for the purpose of the Work or any building or produce upon the site at the time of delivery of the possession thereof, but all such substances, materials, buildings and produce shall be the property of the Owner provided that the Contractor use the same for the purpose of the work.

36.4 The copyright in all drawings, documents and other materials containing data and information furnished to the EMPLOYER/Owner by the Contractor herein shall remain vested in the Contractor or, if they are furnished to the EMPLOYER/Owner directly or through the Contractor by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party. The EMPLOYER/Owner shall however be free to reproduce all drawings, documents, specification and other material furnished to the EMPLOYER/Owner for the purpose of the contract including, if required, for operation and maintenance of the facilities.

36.5 The EMPLOYER/Owner and the Contractor shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Sub-Contractor(s) such documents, data and other information it receives from the EMPLOYER/Owner to the extent required for the Sub-Contractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Sub-Contractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this clause. 36.6 The EMPLOYER/Owner shall not use such documents, data and other information received from the Contractor for any purpose other than the operation and maintenance of the Facilities. Similarly, the Contractor shall not use such documents, data and other information received from the EMPLOYER/Owner for any purpose other than the design, procurement of Plant and Equipment, construction or such other work and services as are required for the Performance of the Contract.

- The obligation of a party under GCC Sub-Clauses 36.5 and 36.6 above, however, shall not apply to that information which
- Now or hereafter becomes available in 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.
- Otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.
- The above provisions of this Clause shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Facilities or any part thereof.
- The provisions of this clause shall survive termination, for whatever reason, of the Contract.

37. Liens

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37.1 If, at any time there should be evidence or any lien or claim for which the Owner might have become liable and which is chargeable to the Contractor, the Owner shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify the Owner against such lien or claim and if such lien or claim be valid, the Owner may pay and discharge the same and deduct the amount so paid from any money which may be or may become due and payable to the Contractor. If any lien or claim remain unsettled after all payments are made, the Contractor shall refund or pay to the Owner all money that the latter may be compelled to pay in discharging such lien or claim including all costs and reasonable expenses. Owner reserves the right to do the same.

37.2 The Owner shall have lien on all materials, equipment including those brought by the Contractor for the purpose of erection, testing and commissioning of the Work.

37.3 The final payment shall not become due until the Contractor delivers the complete release or waiver of all liens arising or which may arise out of his agreement or receipt in full or certification by the Contractor that all invoices for labour, materials, services have been paid in lieu thereof and if required in any case an affidavit that so far as the Contractor has knowledge or information the releases and receipts include all the labour and material for which a lien could be filled.

37.4 Contractor will indemnify and hold the EMPLOYER/ Owner harmless, for a period of 02 (Two) years after the issue of Final Acceptance from all liens and other encumbrances against the EMPLOYER/ Owner on account of debts or claims alleged to be due from the Contractor or his Sub-Contractor to any person including Sub-Contractor and on behalf of EMPLOYER/ Owner will defend at his own expense, any claim or litigation brought against the EMPLOYER/ Owner or the Contractor in connection therewith. Contractor shall defend or contest at his own expense any fresh claim or litigation by any person including his Sub-Contractor, till its satisfactory settlement even after the expiry of 02 (Two) years from the date of issue of Final Acceptance.

#### 38. Delays by EMPLOYER/ Owner or his Authorized representatives

38.1 In case the Contractor's performance is delayed due to any act or omission on the part of the EMPLOYER/ Owner or his authorized representatives, then the Contractor may be given due extension of time for the completion of the Work after proper due diligence by EMPLOYER/ Owner, to the extent such omission on the part of the EMPLOYER/ Owner has caused delay in the Contractor's performance of his Work.

38.2 No adjustment in Contract Price shall be allowed for reasons of such delays and extensions granted except as provided in Tender Document, where the EMPLOYER/ Owner reserves the right to seek indulgence of Contractor to maintain the agreed Time Schedule of Completion. In such an event the Contractor shall be obliged for working by Contractor's personnel for additional time beyond stipulated working hours as also Sundays and Holidays and achieve the completion date/interim targets.

#### 39. Payment if the Contract is terminated

39.1 If the Contract shall be terminated as per the provisions of the Tender/ Contract, the Contractor shall be paid by the Owner in so far as such amounts or items shall not have already been covered by payments of amounts made to the Contractor for the Work executed prior to the date of termination at the cost provided for in the Contract and in addition to the following:

- a) The amount payable in respect of any preliminary items, so far as the Work or service comprised therein has been carried out or performed and an appropriate portion as certified by Engineer-in-Charge of any such items or service comprised in which has been partially carried out or performed.
- b) Any other expenses which the Contractor has expended for performing the Work under the Contract subject to being duly recommended by Engineer-in-Charge/Project Manager and approved by EMPLOYER/ Owner for payment, based on documentary evidence of his having incurred such expenses.

39.2 The Contractor will be further required to transfer the title, Guarantee/Warranty of the Material/Products/Spares of the works & Projects, Power Conditioning Units (PCU)/ Inverters, Transformers, Batteries (If applicable) etc. and provide the following in the manner and as directed by the EMPLOYER/ Owner.

- a) Any and all completed works.
- b) Such partially completed Work including drawings, information and Contract rights as the Contractor has specially performed, produced or acquired for the performance of the Contractor.

#### 40. No Waiver of Rights

40.1 Neither the inspection by the EMPLOYER/ Owner or any of their officials, Employees or representatives nor any order by the EMPLOYER/ Owner for payment of money or any payment for or acceptance of the whole or any part of the Work by the EMPLOYER/ Owner nor any extension of time, nor any possession taken by Owner shall operate as a waiver of any provision of the Contract, or of any power herein reserved to the EMPLOYER/ Owner, or any right to damages herein provided, nor shall any waiver of any breach in the Contract be held to be a waiver of any other subsequent breach.

#### 41. Certificate not to Affect Right of EMPLOYER and Liability of Contractor

41.1 No interim payment certificate(s) issued by the EMPLOYER/ Owner, nor any sum paid on account by the EMPLOYER/ Owner, nor any extension of time for execution of the work granted by EMPLOYER/ Owner shall affect or prejudice the rights of the EMPLOYER/ Owner against the Contractor or relieve the Contractor of his obligations for the due performance of the Contract, or be interpreted as approval of the Work done or of the equipment supplied and no certificate shall create liability for the EMPLOYER/ Owner to pay for alterations, amendments, variations or additional works not ordered, in writing, by EMPLOYER/ Owner or discharge the liability of the Contractor for the payment of damages whether due, ascertained, or certified or not or any sum against the payment of which he is bound to indemnify the EMPLOYER/ Owner.

#### 42. Language and Measures

42.1 All documents pertaining to the Contract including Specifications, Schedules, Notices, Correspondence, Operating and Maintenance Instructions, Drawings or any other writing shall be written in English language only. The SI System of measurement

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shall be used in the Contract unless otherwise specified. Any literature/standard required for the execution of the project work will be provided by the Contractor in the English language only.

43. Guarantee Tests & Operational Acceptance and Transfer of Title

43.1 Functional Guarantees

43.1.1 The Contractor guarantees that during the Guarantee Test, the Facilities and all parts thereof shall attain the Functional Guarantees specified under Technical Specifications, subject to and upon the conditions therein specified. Respective compensation in case of the non-achievement of the same is mentioned in the SCC of the tender document.

43.1.2 If, for reasons attributable to the Contractor, the guaranteed level of the Functional Guarantees specified under Technical Specifications are not met either in whole or in part, the Contractor shall, within a mutually agreed time, at its cost and expense make such changes, modifications and/ or additions to the Plant or any part thereof as may be necessary to meet such Guarantees. The Contractor shall notify the EMPLOYER/Owner upon completion of the necessary changes, modifications and/or additions, and shall seek the EMPLOYER's/Owner's consent to repeat the Guarantee Test. If the level of the specified Functional Guarantee parameters, as demonstrated even during repeat of the Guarantee Test(s), are outside the acceptable shortfall limit, the EMPLOYER//Owner may at its option, either

- Reject the Equipment and advise immediate replacement to suit the provisions of Technical Specification without any additional cost or;
- Reject the Equipment and recover the payments already made, or;
- Terminate the Contract and recover the payments already made, or;
- Accept the equipment after levy of liquidated damages in accordance with the provisions specified.

43.2 Plant Performance Guarantee Test the Plant Performance Guarantee (as mentioned in TS) Test shall be conducted by the Contractor after Commissioning of the Facilities to ascertain whether the Facilities or the relevant part(s) can attain the Functional Guarantees specified in the Contract Documents. The Contractor's and Project Manager's advisory personnel shall attend the Guarantee Test. The detailed procedure for Performance Guarantee Test shall be carried out as per procedure laid down in Technical Specifications.

43.3 Operational Acceptance

43.3.1 Operational Acceptance shall occur in respect of the Facilities when: a) The Plant Performance Guarantee in accordance with the procedure specified in "Technical Specifications" has been successfully completed and the Functional Guarantees are met. b) Completion of the Facilities have been achieved as per Technical Specifications

43.3.2 The milestone payment linked with successful Operation acceptance shall be released subjected to following:

- a) All "As- Built" Drawings and documents are submitted.
- b) Detailed Engineering Document with detailed specification, schematic drawing, circuit drawing, cable routing plans and test results, manuals for all deliverable items, Operation, Maintenance & Safety Instruction Manual and other information about the project are submitted
- c) Bill of material of the installed Facility is submitted.
- d) Inventory of recommended and mandatory spares including special tools and tackles at project Site are provided
- e) All the required approvals and NOC's as required, are submitted
- f) List of deviation from the approved drawings with reason for deviation is submitted
- g) List of punch points, duly signed, is provided.
- h) Settlement of liquidated damages against delay and performance
- i) Certificates of final levels as set out for various works
- j) Certificates of tests performed for various Works.
- k) Material appropriation, Statement for the materials issued by the Owner, if applicable for the Work and list of surplus materials returned to the Owner's store duly supported by necessary documents.
- l) Warranty certificates for each equipment are handed over to Owner' and 'Statutory approvals/ permits/ NOC are handed over to Owner'
- m) Supply of all mandatory and recommended spares

43.3.3 At any time after the events set out in GCC Sub- Clause 43.3.1 have occurred, the Contractor may give a notice to the Project Manager/EIC requesting the issue of an Operational Acceptance Certificate in the form acceptable to the EMPLOYER in respect of the Facilities or the part thereof specified in such notice as at the date of such notice.

43.3.4 The Owner shall, after consultation with the Project Manager/EIC, and within thirty (30) days after receipt of the Contractor's notice, issue an Operational Acceptance.

43.3.5 If within thirty (30) days after receipt of the Contractor's notice, the Project Manager fails to issue the Operational Acceptance or fails to inform the Contractor in writing of the justifiable reasons why the Owner has not issued the Operational Acceptance, the Facilities shall be deemed to have been accepted as at the date of the Contractor's said notice.

43.3.6 The start date of the Comprehensive Operation and Maintenance shall be reckoned from the date mentioned in the Operational Acceptance Certificate.

43.4 Final Acceptance

43.4.1 Final Acceptance shall occur in respect of the Facilities when: a) The plant has achieved the Operational Acceptance; and b) Handing over – Taking over of Solar PV Plant should have been completed; and c) Successful demonstration of the performance guarantees d) Contractor has provided the list of recommended spares with detailed specification, source and price for further procurement; and e) The Contractor has paid the liquidated damages, if any, as specified in SCC thereto; f) Account reconciliation and NCR/ Punch list closure.

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43.4.2 At any time after the events set out in GCC Sub – Clause 43.4.1 have occurred, the Contractor may give a notice to the Project Manager/EIC requesting the issue of Final Acceptance in the form acceptable to the EMPLOYER in respect of the Facilities or the part thereof specified in such notice as at the date of such notice.

43.4.3 The EMPLOYER shall, after consultation with the Project Manager/EIC, and within thirty (30) days after receipt of the Contractor’s notice, issue Final Acceptance.

43.4.4 If within thirty (30) days after receipt of the Contractor’s notice, the Owner fails to issue the Final Acceptance or fails to inform the Contractor in writing of the justifiable reasons why the Owner has not issued the Final Acceptance, the Facilities shall be deemed to have been accepted as at the date of the Contractor’s said notice.

43.4.5 The O&M contract period may further be extended for a period as per mutually agreed terms and conditions.

43.4.6 In case the Owner wishes to extend the O&M period beyond the agreed period under this contract, he shall intimate Contractor at least 6 months prior to the completion period. The Contractor may accept the offer as per the terms and conditions to be mutually agreed with the Owner.

44. Release of Confidential Information

44.1 The Contractor shall not communicate or use in advertising, publicity, sales releases or in any other medium, photographs, or other reproduction of the Work under this Contract or description of the site dimensions, quantity, quality or other information, concerning the Work unless prior written permission has been obtained from the EMPLOYER/ Owner.

44.2 The Owner/ EMPLOYER and the Contractor shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Sub Contractor(s) such documents, data and other information it receives from the EMPLOYER/Owner to the extent required for the Sub Contractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Sub Contractor(s) an undertaking of confidentiality similar to that imposed on the Contractor.

44.3 The Owner/ EMPLOYER shall not use such documents, data and other information received from the Contractor for any purpose other than the operation and maintenance of the Facilities. Similarly, the Contractor shall not use such documents, data and other information received from the Owner/ EMPLOYER for any purpose other than the design, procurement of Plant and Equipment, construction or such other work and services as are required for the Performance of the Contract.

44.4 The obligation of a party above, however, shall not apply to that information which

- 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.
- Otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

44.5 The above provisions of this GCC shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Facilities or any part thereof.

44.6 The provisions of this GCC Clause 44 shall survive termination, for whatever reason, of the Contract.

45. Operation & Maintenance

45.1 The Operation and Maintenance shall be comprehensive. The maintenance service provided shall ensure project functioning of the Solar PV system as a whole and Power Evacuation System to the extent covered in the Contract. All preventive / routine maintenance and breakdown / corrective maintenance required for ensuring maximum uptime shall have to be provided. Accordingly, the Comprehensive Operation & Maintenance shall have two distinct components as described below-

45.2. Preventive / Routine Maintenance:

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

45.3 Breakdown / Corrective maintenance:

Whenever a fault occurs, the Contractor has to attend to rectify the fault & the fault must be rectified within the 72 hours from the time of occurrence of fault. The Contractor must maintain all the records pertaining to all such faults and necessary measures taken. The date of Comprehensive Operation & Maintenance Contract period shall begin from the date of Operational acceptance. However, operation of the Power Plant means operation of system as per TS and workmanship in order to keep the project trouble free covering the O&M period. The Contractor must demonstrate the committed CUF at the end of every year in accordance with commitment made in line with the Performance guarantees.

45.4 Serviceability Level Agreement (SLA)

45.4.1 Contractor shall make efforts to maintain 100 % serviceability of complete Plant including all other associated infrastructure developed by the Contractor during execution of project as its scope of work & the respective report of the same shall be submitted to the Owner.

45.4.2 Contractor shall maintain a complaint log book, which shall include the timing of logging of complaint including unique Complaint number, time of closure of complaint & it’s Root Cause Analysis.

45.4.3 Contractor will be responsible for maintaining the Insurance Policy for the complete Plant and Facilities during the O&M period also. He shall maintain seamless insurance cover during Construction and O&M phases. Copy of policies shall be given to

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the Owner.

45.4.4 Such rectification work carried out by Owner doesn't exempts/relieves Contractor from its responsibility towards subsequent operation, maintenance, repair & replacement of such component/ infrastructure of the Plant or meeting the performance parameters of the Plant. 45.4.5 O&M Routine & Manpower: Contractor shall provide Preventive / Routine Maintenance schedule based on Original Equipment manufacturer and good engineering practices. The team deployed for the O&M must have the sufficient experience of executing the similar tasks. However, Contractor shall engage additional manpower as and when need arise.

45.5 Bidder is requested to provide the list of all the spares required to maintain the facility for O&M period. Contractor agrees to supply such spare parts, as recommended or otherwise required for the effective and hassle-free operation and maintenance of the Facilities. However, the Contractor, with its previous experience, is to provide a list of spares including specifications, supplier details and indicative price, as recommended by him and OEM. The Contractor shall keep and maintain the inventory of such spares for the hassle-free operation during the complete O&M period without additional cost to Owner. Also, at the end of penultimate year of the O&M contract, Contractor shall supply a list of all recommended spares as per the operational requirement of the plant and with reference to the mean time between failures (MTBF), along with detailed specifications, supplier details and tentative cost for future purchase. The price of such spare parts shall include the breakup of taxes and duties as applicable towards purchase and supply of spare parts. Owner, at its discretion, will purchase the spare as required for future operation. However, the Contractor shall replenish the mandatory spares at his cost prior to the completion of the O&M period.

46. Completion of Contract

46.1 Unless otherwise terminated under the provisions of any other relevant clause, this Contract shall be deemed to have been completed at the expiration of the Period of Liability/ Validity of the Contract as provided under Section- V, Special Conditions of Contract (SCC).

47. Pre- Commissioning & Commissioning

47.1 As soon as installation of the Facilities has, in the opinion of the Contractor, been completed as specified in the Technical Specifications, excluding items not materially affecting the operation or safety of the Facilities, the Contractor shall so notify the Project Manager/ EIC in writing to witness the pre- commissioning of the facility.

47.2 If the Project Manager/EIC is satisfied that the Facilities have reached Completion, the Project Manager/EIC shall, within seven (7) days after receipt of the Contractor's notice, arrange to witness the pre – commissioning of the Facilities.

47.3 If the Project Manager/EIC notifies the Contractor of any defects and/or deficiencies, the Contractor shall then correct such defects and/or deficiencies and shall repeat the procedure described in GCC Sub- Clause 47.1.

47.4 If the Project Manager/EIC is still not so satisfied, then it shall notify the Contractor in writing of any defects and/or deficiencies within seven (7) days after receipt of the Contractor's repeat notice, and the above procedure shall be repeated.

47.5 As soon as all works in respect of Pre-commissioning are completed and, in the opinion of the Contractor, the Facilities are ready for Commissioning, the Contractor shall so notify the Project Manager in writing. The Contractor shall commence Commissioning of the facilities as per the GCC Sub – Clause 47.6.

47.6 Commissioning of the Facilities shall be completed by the Contractor as per procedures detailed in the Technical Specifications and in the presence of the Project Manager/ EIC and Owner.

47.7 If the Project Manager/EIC fails to inform the Contractor of any defects and/or deficiencies within fourteen (14) days after receipt of the Contractor's notice under GCC Sub-Clause 47.1 or within seven (7) days after receipt of the Contractor's repeated notice under GCC Sub-Clause 47.3, then the Facilities shall be deemed to have taking up the date of the Contractor's notice or repeated notice, accepted for commissioning, as the case may be.

47.8 As soon as possible after Commissioning, the Contractor shall complete all outstanding minor items so that the Facilities are fully in accordance with the requirements of the Contract, failing which the EMPLOYER will undertake such completion and deduct the costs thereof from any monies owing to the Contractor.

47.9 As soon as possible after Commissioning, the Contractor shall make the facility ready for the performance test (PR test) and inform the Project Manager/EIC at least 7 (seven) days prior to the start of the performance test as per the procedure mentioned in the Technical Specifications.

47.10 Upon successful Operational Acceptance of the Facilities as per GCC sub clause 43.3, the Contractor shall be responsible for the care and custody of the Facilities, together with the risk of loss or damage thereto, and shall thereafter take over the Facilities or the relevant part thereof for the agreed duration of comprehensive operation and maintenance as stipulated and mutually agreed terms and conditions.

[E] PERFORMANCE OF WORK

48. Execution of Work

48.1 All the Works shall be executed in strict conformity with the provisions of the Contract Documents and with such explanatory detailed drawings, specification and instructions as may be furnished from time to time by the Contractor whether mentioned in the Contract or not. The Contractor shall be responsible for ensuring that works throughout are executed in the most substantial, proper and workmanlike manner with the quality of material and workmanship in strict accordance with the Specifications. The Contractor shall provide all necessary materials, equipment, labour etc. for execution and maintenance of Work till completion unless otherwise mentioned in the Contract.

48.2 All materials shall be brand new & of the best quality and workmanship capable of satisfactory operation under the operating and climatic conditions as has been specified. Unless otherwise specified, they shall conform in all respect to the latest edition of the relevant IS codes specification wherever Indian specifications apply or IEC codes or equivalent internationally accepted standard.

48.3 The Contractor shall supply & deliver all equipment and materials for installation at site. The Contractor shall arrange for

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transportation, loading & unloading, local sifting, EAR insurance and safe storage of materials at project site at his own cost & risk.

48.4 If the Contractor offers equipment manufactured in accordance with other international well recognized standards (mentioned above), he shall, in that case, supply a copy in English of the Standard Specification adopted and shall clearly mention in what respect such standard specification differs from Indian Standard Specifications. The Plant, equipment, and materials offered by the Contractor should comply with one consistent set of Standards only to make the system compatible and work in harmony as far as possible, except if mentioned otherwise.

49. Void

50. Work in Monsoon and Dewatering

50.1 Unless otherwise specified elsewhere in the tender, the execution of the Work may entail working in the monsoon also. The Contractor must maintain a minimum labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No extra rate will be considered for such work in monsoon. 50.2 During monsoon and other period, it shall be the responsibility of the Contractor to keep the construction work site free from water logging at his own cost.

51. Change in Laws and Regulations

51.1 If, after the date seven (7) days prior to the date of Bid submission, in the country where the Site is located, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed (which shall be deemed to include any change in interpretation or application by the competent authorities), including

(i) the enactment of any new law; or

(ii) an amendment, modification or repeal of an existing law; or

(iii) any change in the rates of any Taxes including any duties and cess or introduction of any new tax made applicable for setting up the project that subsequently affects the costs and expenses of the Contractor and/or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the Performance of any of its obligations under the Contract. Contractor shall promptly and within 15 days of such enactment coming into force, forward relevant supporting documents to Owner. However, these adjustments would be restricted to direct transactions between the Owner and Contractor and Bought out items (dispatched directly from sub vendor's works to Site). These adjustments shall not be applicable on procurement of raw materials, intermediary components and intermediary services etc. by the Contractor. 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. However, any increase in the rate of these taxes, duties and levies beyond the contractual completion period shall be to Contractor's account and any decrease shall be passed on to Owner. However, Change in Law shall not include (i) any change in taxes on corporate income or (ii) any change in any withholding tax on income or dividends distributed to the shareholders of the Contractor, or (iii) any change on account of regulatory measures by the Appropriate Commission. 52. General Conditions for Construction and Erection Work

52.1 Overtime work is permitted in cases of need and the Owner will not compensate the same. Shift working at 2 or 3 shifts per day may become necessary and the Contractor should take this aspect into consideration for formulating his rates. No extra claims will be entertained by the Owner on this account.

52.2 The Contractor must arrange for the placement of workers in such a way that the delayed completion of the Work or any part thereof for any reason whatsoever will not affect their proper employment. The Owner will not entertain any claim for idle time payment whatsoever.

52.3 The Contractor shall submit to the Owner/ EMPLOYER progress reports at regular intervals regarding the state and progress of Work. The details and format of the report will be mutually agreed after the award of Contract. The Contractor shall provide display boards showing progress and labour strengths at worksite. Updated project schedule in MS Projects shall also be furnished by Contractor as per agreed interval 53. Design and Engineering

53.1 The Work covered under this Contract having to be executed by the Contractor on a lump-sum firm price quoted by him, the Owner will not accept any proposals for changes in Value of Contract or extension in time on account of any such changes which may arise to the Contractor's scope of Work as a result of detailed Engineering and thereafter during the execution of Work.

53.2 Specifications and Drawings

53.2.1 The Contractor shall execute the basic and detailed design and engineering work in compliance with the provisions of the Contract, or where not so specified, in accordance with good and sound engineering practice. 53.2.1 The Contractor shall be responsible for any discrepancies, errors or omissions in the specifications, drawings and other technical documents that it has prepared, whether such specifications, drawings and other documents have been approved by the Project Manager/ EIC or not, provided that such discrepancies, errors or omissions are not because of inaccurate information furnished in writing to the Contractor by or on behalf of the Owner/ EMPLOYER.

53.3 Codes and Standards

53.3.1 Wherever references are made in the Contract to codes and standards in accordance with which the Contract shall be executed, the edition or the revised version of such codes and standards current at the date of bid submission shall apply unless otherwise specified.

53.3.2 Approval / Review of Technical Documents by Project Manager the Contractor shall prepare list of documents and drawings i.e. Master drawing list (MDL) as per technical specifications and furnish to the Project Manager/EIC for review & Approval of the same within 14 days from the Zero date.

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53.3.3 Within ten (10) working days after receipt by the Project Manager of any document requiring the Project Manager's approval, the Project Manager shall either return one copy thereof to the Contractor with its approval endorsed thereon or shall notify the Contractor in writing of its disapproval thereof and the reasons therefor and the modifications that the Project Manager proposes.

53.3.4 The Project Manager shall not disapprove any document, except on the grounds that the document does not comply with some specified provision of the Contract or that it is contrary to good engineering practice.

53.3.5 If the Project Manager disapproves the document, the Contractor shall modify the document and resubmit it for the Project Manager's approval. If the Project Manager approves the document subject to modification(s), the Contractor shall make the required modification(s), and upon resubmission with the required modifications the document shall be approved.

53.3.6 The procedure for submission of the documents by the Contractor and their approval by the Project Manager shall be as per the Contract Co-ordination procedure.

53.3.7 If any dispute or difference occurs between the EMPLOYER and the Contractor in connection with or arising out of the disapproval by the Project Manager of any document and/or any modification(s) thereto that cannot be settled between the parties within a reasonable period, then such dispute or difference may be settled in accordance with GCC Clause (Settlement of Dispute) hereof. If such dispute or difference is referred as per GCC clause, the Project Manager shall give instructions as to whether and if so, how, Performance of the Contract is to proceed. The Contractor shall proceed with the Contract in accordance with the Project Manager's instructions, provided that if the Arbitration upholds the Contractor's view on the dispute, then the Contractor shall be reimbursed by the Owner for any additional costs incurred by reason of such instructions and shall be relieved of such responsibility or liability in connection with the dispute and the execution of the instructions as the Arbitration shall decide, and the Time for Completion shall be extended accordingly.

53.3.8 The Project Manager's approval, with or without modification of the document furnished by the Contractor, shall not relieve the Contractor of any responsibility or liability imposed upon it by any provisions of the Contract except to the extent that any subsequent failure results from modifications required by the Project Manager.

53.3.9 The Contractor shall not depart from any approved document unless the Contractor has first submitted to the Project Manager an amended document and obtained the Project Manager's approval thereof, pursuant to the provisions of this GCC Clause.

53.3.10 If the Project Manager requests any change in any already approved document and/or in any document based thereon, generally shall be taken care by the Contractor if the change is not causing any major financial impact.

**54. Drawings to be supplied by the Owner/EMPLOYER**

54.1 The drawings attached with tender, if any, are only for the general guidance to the Contractor to enable him to visualize the type of work contemplated and scope of work involved. The Contractor will be deemed to have studied the Drawings and formed an idea about the Work involved.

54.2 The Contractor shall be deemed to have gone through the Drawings supplied to him thoroughly and carefully and in conjunction with all other connected drawings and bring to the notice of the Engineer-in-Charge/ Project Manager discrepancies, if any, therein before actually carrying out the Work.

54.3 Copies of all detailed working drawings relating to the Work shall be kept at the Contractor's office on the site and shall be made available to the Engineer-in-Charge/Project Manager at any time during the Contract. The drawings and other documents issued by the EMPLOYER/ Owner shall be returned to the EMPLOYER/ Owner on completion of the Work.

**55. Drawings to be supplied by the Contractor**

55.1 The drawings/ data which are to be furnished by the Contractor shall be furnished within the specified time.

55.2 Where approval/ review of drawings before manufacture/ construction/ fabrication has been specified, it shall be Contractor's responsibility to have these drawings prepared as per the TS and get it approved before proceeding with manufacture/ construction/ fabrication as the case may be. Any change that may have become necessary in these drawings during the execution of the work shall have to be carried out by the Contractor at no extra cost. All as built drawings shall bear the certification stamp duly signed by both the Contractor and Engineer-in-Charge/Project Manager. The Contractor shall incorporate any modifications and/ or corrections as highlighted/notified and submit the drawings for approval practically within the next 7 working days.

55.3 The Drawings submitted by the Contractor shall be reviewed by the Engineer-in-Charge/Project Manager as far as practicable within 10 (Ten) working days. The Contractor shall incorporate any modifications and/ or corrections as highlighted/notified and submit the drawings for approval. Any delays arising out of failure by the Contractor to rectify the drawing in good time shall not alter the Contract Completion Time.

55.4 All GA & GFC drawings shall be provided in soft as well as Hard form in appropriate format/size to EMPLOYER for review & approval. All as built drawings showing all corrections, adjustments & deviations, if any, etc shall be furnished by the Contractor in 04 (Four) Hard Copies & a soft copy for record purpose to the EMPLOYER/ Owner immediately after the Operational Acceptance.

**56. Setting out Works**

56.1 The Contractor shall provide, fix and be responsible for the maintenance of all stakes, templates, level marks, profiles and other similar things and shall take all necessary precautions to prevent their removal or disturbance and shall be responsible for the consequence of such removal or disturbance should the same take place and for their efficient and timely reinstatement. The Contractor shall also be responsible for the maintenance of all existing survey marks, boundary marks, distance marks and center line marks, either existing or supplied and fixed by the Contractor. Contractor shall carry out Geotech investigation at site at his own cost and design the foundations accordingly. A copy of the investigation report shall also be forwarded to EMPLOYER and

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**Owner**

56.2 Before beginning the Works, the Contractor shall at his own cost, provide all necessary reference and level posts, pegs, bamboos, flags, ranging rods, strings and other materials for proper layout of the works in accordance with the schemes for bearing marks as required. The center, longitudinal or face lines and cross lines shall be marked by means of small masonry pillars. Each pillar shall have distinct mark at the center to enable theodolite to be set over it.

56.3 Pillars bearing geodetic marks located at the sites of units of Works under construction should be protected and fenced by the Contractor.

56.4 On completion of Work, the Contractor must submit the geodetic documents according to which the Work was carried out.

57. Geological Discoveries All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site where the services are performed, be deem to be the absolute property of the Owner. The Contractor shall take reasonable precautions to prevent the personnel or any other persons from removing or damaging any such article or thing and shall immediately upon the discovery thereof and, before removal, acquaint the Owner of such discovery any carry out, at the expense of the Owner, the Owner's orders as to the disposal of the same.

58. Materials to be supplied by Contractor

58.1 Plant and Equipment The Contractor shall procure and transport all the Plant and Equipment in an expeditious and orderly manner to the Site to achieve completion of activities as per schedule to enable commissioning of the Project by the scheduled commissioning date. Contractor shall deliver supplies at site in accordance to its erection sequence.

58.2 Transportation The Contractor shall ensure that all the plant and equipment required to complete the Facility at site, are procured and dispatched. The Contractor shall at its own risk and expense transport all the Plant and Equipment and the Contractor's Equipment to the Site by the mode of transport that the Contractor judges most suitable under all the circumstances. Contractor shall be responsible to assess in advance suitability of access roads, bridges, culverts, etc for transportation of ODC shipments, if any and arrange to transport them accordingly.

58.3 Packing and Marking The Contractor shall be responsible for securely protecting and packing the plant & equipment as per prescribed standards in force to withstand the journey and ensuring safety of materials and also arrival of materials at destination in original condition and good for contemplated use. Packing case size & weight shall take into consideration the remoteness of the goods final destination and absence of heavy material handling facilities at all points in transit. Packing lists of materials shall be provided in each package to facilitate checking up of the contents at the destination. In order to import any items, associated with the Solar PV Power Project, from abroad or from any other state in India, Contractor shall have to arrange any clearance, permission, if required at his own risk, from any Government (Government of State & Government of India) or any Government (Government of State & Government of India) controlled organization for transportation of materials from manufacturing shop to delivery at Site. Contractor shall take necessary insurances to ensure safe transit & consequential risks. All packing material is the property of the Owner and shall be immediately taken into the safe storage.

58.4 Storage of Equipment The plant and equipment thus procured under the scope of the contract must be kept in safe custody till put under operation, essentially free from water contact. All the spares, as required for the trouble free comprehensive O&M of Plant, must be kept under secure storage during O&M period. Contractor has to ensure the appropriate and proper storage arrangement prior to the arrival of the equipment including containers, temporary structures, sheds, platforms etc at its own cost. The Contractor shall procure and provide within the Value of Contract the whole of the materials required for the construction including steels, cement and other building materials, tools, tackles, construction plant and equipment for the completion and maintenance of the Work except the materials which will be issued by the Owner and shall make his own arrangement for procuring such materials and for the transport thereof. The Owner may give necessary recommendation to the respective authority if so desired by the Contractor but assumes no further responsibility of any nature. The Owner will insist on the procurement of materials which bear ISI stamp and/ or which are supplied by reputed suppliers. 58.5 The Contractor shall properly store all materials either issued to him or brought by him to the Site to prevent damages due to rain, wind, direct exposure to sun, etc. as also from theft, pilferage, etc. for proper and speedy execution of his works. The Contractor shall maintain sufficient stocks of all materials required by him including commissioning spares.

59. Stores Supplied by the Owner

59.1 If the Specification of the Work provides for the use of any material of special description to be supplied from the Owner's stores or it is required that the Contractor shall use certain stores to be provided by the Owner, such materials and stores, there for as hereinafter mentioned being so far as practicable for the convenience of the Contractor, but not so as in any way to control the meaning or effect of the Contract, the Contractor shall be bound to purchase and shall be supplied such materials and stores as are from time to time required to be used by him for the purpose of the Contract only. After the completion of the Work, however, the Contractor has to account for the full quantity of materials supplied to him as per relevant clauses in this document.

59.2 All materials so supplied to the Contractor shall remain the absolute property of the Owner and shall not be removed on any account from the Site of the Work and shall be at all times open for inspection to the Engineer-in-Charge/Project Manager. Any such materials remaining unused at the time of the completion or termination of the Contract shall be returned to the Owner's stores or at a place as directed by the Engineer-in-Charge/Project Manager in perfectly good condition at Contractor's cost.

59.3 Owner, at his sole discretion and upon request from Contractor, may provide appropriate space for storage outside the site on chargeable basis mutually agreeable to both parties. However, the transportation of equipment from store to site shall be arranged by the Contractor at his cost and risk

60. Conditions for Issue of Materials

60.1 i) Materials specified as to be issued by the Owner will be supplied to the Contractor by the Owner from his stores. It shall

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be responsibility of the Contractor to take delivery of the materials and arrange for its loading, transport and unloading at the Site of Work at his own cost. The materials shall be issued between the working hours and as per the rules of the Owner as framed from time to time. Once the material is issued or taken over by the Contractor, then the same will be his own liability to store, use & maintain.

ii) The Contractor shall bear all incidental charges for the storage and safe custody of materials at site after these have been issued to him.

iii) Materials specified as to be issued by the Owner shall be issued in standard sizes as obtained from the manufacturers.

iv) The Contractor shall construct suitable godowns at the Site of Work for storing the materials safe against damage by rain, dampness, fire, theft etc. He shall also employ necessary watch and ward along with proper illumination establishment for the purpose.

v) It shall be duty of the Contractor to inspect the materials supplied to him at the time of taking delivery and satisfy himself that they are in good condition. After the materials have been delivered by the Owner, it shall be the responsibility of the Contractor to keep them in good condition and if the materials are damaged or lost, at any time, they shall be repaired and/ or replaced by him at his own cost.

vi) The Owner shall not be liable for delay in supply or non-supply of any materials which the Owner has undertaken to supply where such failure or delay is due to natural calamities, act of enemies, transport and procurement difficulties and any circumstances beyond the control of the Owner. In no case, the Contractor shall be entitled to claim any compensation or loss suffered by him on this account.

vii) It shall be responsibility of the Contractor to arrange in time all materials required for the Work other than those to be supplied by the Owner. If, however, in the opinion of the Engineer-in-Charge/Project Manager the execution of the Work is likely to be delayed due to the Contractor's inability to make arrangements for supply of materials which normally he has to arrange for, the Engineer-in-Charge/Project Manager shall have the right at his own discretion to issue such materials, if available with the Owner or procure the materials from the market or as elsewhere and the Contractor will be bound to take such materials at the rates decided by the Engineer-in-Charge/Project Manager. This, however, does not in any way absolve the Contractor from responsibility of making arrangements for the supply of such materials in part or in full, should such a situation occur nor shall such action by Owner constitute a reason for the delay in the execution of the Work.

viii) The Contractor shall, if desired by the Engineer-in-Charge/Project Manager, be required to execute an Indemnity Bond in the prescribed form for safe custody and accounting of all materials issued by the Owner.

ix) The Contractor shall furnish to the Engineer-in-Charge/Project Manager sufficiently in advance a statement showing his requirement of the quantities of the materials to be supplied by the Owner and the time when the same will be required by him for the works, so as to enable the Engineer-in-Charge/Project Manager to make necessary arrangements for procurement and supply of the material.

x) Account of the materials issued by the Owner shall be maintained by Contractor indicating the daily receipt, consumption and balance in hand. This account shall be maintained in a manner prescribed by the Engineer-in-Charge/Project Manager along with all connected papers viz. requisitions, issues, etc., and shall be always available for inspection in the Contractor's office at Site.

xi) The Contractor should see that only the required quantities of materials are got issued. The Contractor shall not be entitled to cartage and incidental charges for returning the surplus materials, if any, to the stores wherefrom they were issued.

xii) Materials/ Equipment(s) supplied by EMPLOYER/ Owner shall not be utilized for any purpose(s) than issued for.

#### 61. Material Procured with Assistance of Owner/ Return of Surplus

61.1 Notwithstanding anything contained to the contrary in any or all the clauses of this Contract where any materials for the execution of the Contract are procured with the assistance of the Owner either by issue from Owner's stock or purchases made under order or permits or licenses issued by Government, the Contractor shall hold the said materials as trustee for the Owner and use such materials economically and solely for the purpose of the Contract and not dispose them off without the permission of the Owner and return, if required by the Engineer-in-Charge/Project Manager, shall determine having due regard to the condition of the materials.

#### 62. Materials obtained from Dismantling

62.1 If the Contractor in the course of execution of the Work is called upon to dismantle any part for reasons other than those stipulated in Clauses 67 and 70 hereunder, the materials obtained in the Work of dismantling etc., will be considered as the Owner's property and will be disposed off to the best advantage of the Owner.

#### 63. Articles of Value Found

63.1 All gold, silver and other minerals of any description and all precious stones, coins, treasure relics, antiquities and other similar things which shall be found in, under or upon the Site, shall be the property of the Owner and the Contractor shall duly preserve the same and shall from time to time deliver the same to such person or persons indicated by the Owner.

#### 64. Discrepancies between Instructions

64.1 Should any discrepancy occur between the various instructions furnished to the Contractor, his representative or staff or any doubt arises as to the meaning of any such instructions or should there be any misunderstanding between the Contractor's staff and the Engineer-in-Charge/Project Manager's staff, the Contractor shall refer the matter immediately in writing to the Engineer-in-Charge/Project Manager whose decision thereon shall be final and conclusive and no claim for losses alleged to have been caused by such discrepancies between instructions, doubts, or misunderstanding shall in any event be admissible.

#### 65. Action where no Specification is issued

65.1 In case of any class of Work for which there is no Specification supplied by the EMPLOYER/ Owner as mentioned in the Tender Documents such Work shall be carried out in accordance with Indian Standard Specifications and if the Indian Standard

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Specifications do not cover the same, the Work should be carried out as per standard Engineering Practice subject to the approval of the Engineer-in-Charge/Project Manager.

66. Inspection of Works

66.1 The Engineer-in-Charge/Project Manager will have full power and authority to inspect the Work at any time wherever in progress either on the Site or at the Contractor's premises/ workshops wherever situated, premises/ workshops of any person, firm or corporation where Work in connection with the Contract may be in hand or where materials are being or are to be supplied, and the Contractor shall afford or procure for the Engineer-in-Charge/Project Manager every facility and assistance to carry out such inspection. The Contractor shall, at all time during the usual working hours and at all other time at which reasonable notice of the intention of the Engineer-in-Charge/Project Manager or his representative to visit the Work shall have been given to the Contractor, either himself be present or receive orders and instructions, or have a responsible representative duly accredited in writing, present for the purpose. Orders given to the Contractor's representative shall be considered to have the same force as if they had been given to the Contractor himself. The Contractor shall give not less than 15 (Fifteen) day notice in writing to the Engineer-in-Charge/Project Manager for carrying out the inspection, Domestic or Overseas) so as to reach out for the inspection by the concerned officials and/or measurement of any work in order that the same may be inspected and measured. EMPLOYER/Owner at his own discretion may or may not attend the scheduled inspection calls as arranged by the contractor on account of preoccupation and other site exigencies. In the event of breach of above, the same shall be uncovered at Contractor's expense for carrying out such measurement or inspection.

66.2 The Contractor is to provide at all time during the progress of the Work and the maintenance period, proper means of access with ladders, gangways etc. to move and adopt as directed for inspection or measurements of the Work by the Engineer-in-Charge/Project Manager.

66.3 The Contractor shall make available to the Engineer-in-Charge/Project Manager free of cost all necessary instruments and assistance in checking or setting out of Work and in the checking of any Work made by the Contractor for the purpose of setting out and taking measurements of Work.

67. Tests for Quality of Work

67.1 All workmanship shall be of the respective kinds described in the Contract Documents and in accordance with the instructions of the Engineer-in-Charge/Project Manager and shall be subjected from time to time to such test as the Engineer-in-Charge/Project Manager may direct at the place of manufacture or fabrication or on the site or at all or any such places. The cost of inspection/ pre-dispatch inspection/ in-stage inspection (Exclusive of EMPLOYER/ Owners representatives TA/DA) shall be borne by Contractor. Such pre-dispatch inspection(s) at the manufacturer's facility shall be carried out in the presence of the EMPLOYER/Owner or their authorized representatives, for such items as is specified by the Engineer-in-Charge/Project Manager. Travel expenses for the representatives of EMPLOYER/Owner for such inspections shall be borne by the EMPLOYER/Owner respectively. However, in case re-inspection is necessitated on account of non-acceptance of item(s) due to failure on Factory Acceptance Test(s), the cost of associated travel and accommodation for the revisit shall be borne by the Contractor. A minimum of 07 (Days) notice shall be given by the Contractor for witnessing such inspection at the works The Contractor shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing any workmanship as may be selected and required by the Engineer-in-Charge/Project Manager and keep all stage inspection/ material TC readily available for the Inspector.

67.2 All the tests that will be necessary in connection with the execution of the Work as decided by the Engineer-in-Charge/Project Manager shall be carried out at the field-testing laboratory of the Owner by paying the charges as decided by the Owner from time to time. In case of non-availability of testing facility with the Owner, the required test shall be carried out at the cost of Contractor at Government or any other accredited testing laboratory.

67.3 If any tests are required to be carried out in conjunction with the Work or materials or workmanship not supplied by the Contractor, such tests shall be carried out by the Contractor and cost of such tests shall be reimbursed by the Owner.

67.4 The Solar Panels, inverters/ cables and other Balance of system equipment deployed in the solar PV power Plant shall have valid test certificates for their qualification as per above specified IEC/ IS Standards by one of the NABL Accredited /Govt approved Test Centers in India. In case of module types/ equipment for which such Test facilities may not exist in India, test certificates from reputed ILAC Member body accredited Labs abroad (with proof of accreditation) will be acceptable.

68. Samples for Approval 68.1 In case of requirement, the Contractor shall furnish to the Engineer-in-Charge/Project Manager for approval, when requested or if required by the specifications, adequate samples of all materials and finished to be used in the Work. Such samples shall be submitted before the Work is commenced and in ample time to permit tests and examinations thereof. All materials furnished and finishes applied in actual Work shall be fully equal to the approved samples. 69. Action and Compensation in case of Poor/Non-compliant Work.

69.1 If, against documentary proofs, is established that any work has been executed with unsound, imperfect or unskilled workmanship, or with materials of any inferior description, or that any materials or articles provided by the Contractor for the execution of the Work are unsound, or of a quality inferior to that contracted for, or otherwise not in accordance with the Contract, the Contractor shall on demand in writing from the Engineer-in-Charge/Project Manager or his authorized representative specifying the Work, materials or articles complained of notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the Work so specified and provide other proper and suitable materials or articles at his own cost. In the case of any such failure the Engineer-in-Charge/Project Manager may on expiry of notice period rectify or remove and re-execute the Work or remove and replaced with others, the materials or articles complained of to as the case may be at the risk and expense in all respects of the Contractor. The decision of the Engineer-in-Charge/Project Manager as to any question arising under this clause shall be final and conclusive. No additional time for Project

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completion shall be granted for undertaking such replacement/ rectification works by Contractor.

70. Suspension of Works

70.1 i) Subject to the provisions of sub-para (ii) of this clause, the Contractor shall, if ordered in writing by the Engineer-in-Charge/Project Manager, or his representative, temporarily suspend the Works or any part thereof for such written order, proceed with the Work therein ordered to be suspended until, he shall have received a written order to proceed therewith. The Contractor shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of the Works aforesaid. However, suitable time extension may be considered at the sole discretion of the owner. ii) In case of suspensions of entire Work, ordered in writing by Engineer-in-Charge/Project Manager, for a period of more than 03 (Three) months, the Contractor shall have the option to terminate the Contract.

71. Owner may do Part of Work

71.1 Upon failure of the Contractor to comply with any instructions given in accordance with the provisions of this Contract the Owner has the alternative right, instead of assuming charge of entire Work, to place additional labour force, tools, equipment and materials on such parts of the Work, as the Owner may designate or also engage another contractor to carry out the Work. In such cases, the Owner shall deduct from the amount which otherwise might become due to the Contractor, the cost of such work and material with 110% (Hundred & Ten Percent) of the actual cost of works and materials.

72. Possession prior to Completion

72.1 The Engineer-in-Charge/Project Manager shall have the right to take possession of or use any completed or partially completed Work or part of the Work. Such possession or use shall not be deemed to be an acceptance of any work completed in accordance with the Contract Agreement. If such prior possession or use by the Engineer-in-Charge/Project Manager delays the progress of Work, equitable adjustment in the time of completion will be made and the Contract Agreement shall be deemed to be modified accordingly.

**73. Defects Liability Period [12 (Twelve) Months Period of Liability from the date of Operational Acceptance]**

73.1 The Contractor must warrant that the Facilities shall be free from defects in the design, engineering, materials and workmanship of the Plant and Equipment supplied and of the work executed.

73.2 If it shall appear to the Project Manager that any supplies have been executed with unsound, imperfect or unskilled workmanship, or with materials of any inferior description, or that any materials or articles provided by the Contractor for the execution of Contractor are unsound or otherwise not in accordance with the Contract, the Contractor shall on demand in writing inform the Project Manager or its authorized representative specifying the item, materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for. The Contractor shall forthwith rectify or remove and replace that item so specified and provide other proper and suitable materials or articles at its own charge and cost, and in the event of failure to do so within a period to be specified by the Project Manager in its demand aforesaid, the Project Manager may on expiry of notice period rectify or remove and re-execute the time or remove and replace with others, the materials or articles complained of as the case may be at the risk and expense in all respects of the Contractor. The decisions of the Project Manager in this regard shall be final and binding.

73.3 The Contractor shall also be undertaking the operation and maintenance of the Facility and consequently shall be required to rectify any defects that emerge during the operation of the Facilities for the entire term of this Contract.

73.4 The Defect Liability Period shall be of twelve (12) months from the date of Operation Acceptance, during which the Contractor must repair any defect identified by the Project Manager / EIC after commissioning of the Plant. All the expenses to repair the defects shall be borne by the Contractor and no additional cost charged to the Owner.

73.5 If during the Defect Liability Period any defect should be found in the design, engineering, materials and workmanship of the Plant and Equipment supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Owner regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good (as the Contractor shall, at its discretion, determine) such defect as well as any damage to the Facilities caused by such defect.

73.6 Furthermore, without prejudice to the generality of the foregoing, it is clarified that the Contractor shall also be responsible for the repair, replacement or making good of any defect, or of any damage to the Facilities arising out of or resulting from any of the following causes: • Improper operation or maintenance of the Facilities by the Contractor during operation and maintenance of the Facility; and • Operation of the Facilities outside specifications of the Facilities.

73.7 The Contractor may, with the consent of the Owner, remove any Plant and Equipment or any part of the Facilities that are defective from the Site, if the nature of the defect and/or any damage to the Facilities caused by the defect is such that repairs cannot be expeditiously carried out at the Site.

73.8 If the repair, replacement or making good is of such a nature that it may affect the efficiency of the Facilities or any part thereof, the Owner may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests.

73.9 If such part fails the tests, the Contractor shall carry out further repair, replacement or making good (as the case may be) until that part of the Facilities passes such tests. The tests, in character, shall in any case be not inferior to what has already been agreed upon by the Owner and the Contractor for the original equipment/part of the Facilities.

73.10 If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than seven (7) days), the Owner may, following a notice to the Contractor, proceed to do such work, and the costs incurred by the Owner in connection therewith shall be paid to the Owner by the Contractor or may be deducted by the Owner from any monies due to the Contractor or claimed under the Performance Guarantee, without prejudice to other rights, which the Owner may have against the Contractor in respect

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of such defects.

73.11 If the Facilities or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be extended by a period equal to the period during which the Facilities or such part cannot be used by the Owner because of any of the aforesaid reasons. Upon correction of the defects in the Facilities or any part thereof by repair/replacement, such repair/replacement shall have the defect liability period of twelve (12) months from such replacement.

73.12 In addition, the Contractor shall also provide an extended warranty for any such component of the Facilities and for the period of time. Such obligation shall be in addition to the defect liability specified.

73.13 Latent defect liability: Notwithstanding, the defect liability period of 12 months above, the plant shall carry a latent defect liability of 5 years from date of Operational Acceptance towards any design/ manufacturing defects in the equipment supplied by the Contractor

73.14 The Contractor's liability under this contract for any reason, what so ever, shall be limited to the total Contract Price (Including GST etc.)

73.15 Limitation of Liability Notwithstanding anything contrary contained herein, the aggregate total liability of Contractor under the Agreement or otherwise shall be limited to 100% of Agreement/ Contract Value except in case of Patent Infringement liability. However, neither party shall be liable to the other party for any indirect and consequential damages, loss of profits or loss of production.

73.16 Guarantee/ Warranty : As enumerated in Clause no. 73 (Defect Liability Period) of GCC, the overall DLP should stand valid for a period of 12 (Twelve) Months from the date of Operational Acceptance. However, Contractor needs to ensure following Guarantees/ Warranties to the best possible extent for the successful execution of the Contract. Subsequently, necessary Guarantee/ Warranty Certificate shall be produced by the Contractor prior to Operational Acceptance of the Facility. Guarantee/ Warranty as defined under Section VII, Scope of work and Technical specifications will prevail in this clause. Contractor should guarantee the Plant facility for the workmanship for a period of 05 (Five) years from the date of Operational Acceptance.

73.16.1 The Contractor must ensure that the goods supplied under the Contract are new, unused and of most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.

73.16.2 The Contractor shall transfer the warranty/ guarantees of the equipment as such from the OEM/ supplier in the name of the Owner. The period of the warranty / guarantee for each equipment shall be as per the "Technical Specifications".

73.16.3 During the period of Warranty / Guarantee the Contractor shall remain liable to replace any defective parts, that becomes defective in the plant, of its own manufacture or that of its sub-contractors, under the conditions provided for by the Contract under and arising solely from faulty design, materials or workmanship & faulty operation/repair, provided such defective parts are not repairable at Site. After replacement, the Contractor is allowed to take back the defective parts to its works at his expenses.

73.16.4 At the end of warranty/ guarantee period, the Contractor's liability shall cease subjected to fulfilment of its liability under GCC Clause 73.16 (Defect Liability Period). In respect of goods not mentioned for the warranty/ guarantee in "Technical Specifications", the Owner shall be entitled to the benefit of such guarantee given to the Contractor by the original supplier or manufacturer of such goods eg. Performance guarantee for 25 yrs for modules, etc.

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

74. Care of Works

74.0 From the commencement to completion of the Work & till the completion of O&M period (If applicable), the Contractor shall take full responsibility for the care for all works including all temporary works and in case any damages, loss or injury shall happen to the Work or to any part thereof or to any temporary works from any cause whatsoever, shall at his own cost repair and make good the same so that at completion the Work shall be in good order and in conformity in every respects with the requirement of the Contract and the Engineer-in- Charge's instructions. Also damage to external property of Third Parties.

74.1 Defects Prior to Taking Over If at any time, before the Work is taken over, the Engineer-in-Charge/Project Manager shall:

a) Decide that any works done or materials used by the Contractor or by any Sub-Contractor is defective or not in accordance with the Contract, or that the works or any portion thereof are defective, or do not fulfil the requirements of Contract (all such matters being hereinafter, called 'Defects' in this clause), and

b) As soon as reasonably practicable, gives to the Contractor notice in writing of the said decision, specifying particulars of the defects alleged to exist or to have occurred, then the Contractor shall at his own expenses and with all speed make good the defects so specified. In case, Contractor shall fail to do so, the Owner may take, at the cost of the Contractor, such steps as may take in all circumstances, be reasonable to make good such defects. The expenditure so incurred by the Owner will be recovered from the amount due to the Contractor. The decision taken by the Owner in this regard towards the amount to be recovered from the Contractor will be final and binding on the Contractor. As soon as the Work has been completed in accordance with the Contract (except in minor respects that do not affect their use for the purpose for which they are intended and have passed the tests on completion, the Owner shall be deemed to have taken over the Work on the date so certified.

74.2 Defects after Taking Over (If applicable) : In order that the Contractor could obtain a Completion he shall make good, with all possible speed, any defect arising from the defective materials supplied by the Contractor or workmanship or any act or omission of the Contract or that may have been noticed or developed, after the works has been taken over, the period allowed for carrying out such Work will be normally 01 (One) Month. If any defect be not remedied within a reasonable time, the Owner

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may proceed to do the Work at Contractor's risk and expense and deduct from the final bill such amount as may be decided by the Owner. If by reason of any default on the part of the Contractor a Completion has not been obtained in respect of any portion of the Work within 01 (One) Month after the date fixed by the Contract for the completion of the Work, the Owner shall be at liberty to use the Work or any portion thereof in respect of which a completion has not been obtained, provided that the Work or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completing these works for the Completion.

75. Guarantee/ Transfer of Guarantee : For the major Material/Products/Spares of the works & Projects including but not limited to Power Conditioning Units (PCU)/ Inverters, Transformers, Batteries (If applicable) etc the Contractor shall invariably engage OEMs/Sub-Contractors who are specialists in the field and OEM's/OPM's/firms of repute and such a OEM/OPM/Sub-Contractor shall furnish guarantees/warranties for their workmanship to the Owner directly in the name of Owner only without any deviation. The Contractor shall give the guarantee/warranty to the Owner directly For other minor Material/Products/Spares also. In case of the contract termination/cancellation and wherein the title of Guarantee/Warranty for the major Material/Products/Spares of the works & Projects including but not limited to Power Conditioning Units (PCU)/ Inverters, Transformers, Batteries (If applicable) is in the name of the Contractor, then all such Guarantee/Warranties for all such major products/material/spares will have to be mandatorily transferred in the name of Owner as soon as the contract is terminated/cancelled & no plea/deviation from the Contractor side will be entertained in this regard. For works like water-proofing, acid and alkali resisting materials, pre-construction soil treatment against termite or any other specialized works etc. the Contractor shall invariably engage Subcontractors who are specialists in the field and firms of repute and such a Sub-Contractor shall furnish guarantees for their workmanship to the Owner, through the Contractor. In case such a Sub-Contractor is not prepared to furnish a guarantee to the Owner, the Contractor shall give that guarantee to the Owner directly.

76. Installation and Training of EMPLOYER's/ Owner's Personnel

76.1 Tools & Tackles : The Contractor shall provide technically suitable tools and tackles for installation & erection of Plant & Machineries conforming to relevant BIS safety and technical standards for proper execution of work. The Owner, in no way, shall be responsible for supply of any tools and tackles for implementation of the work and also to carry out operation & maintenance activities. 76.2 Setting up/Supervision/Labor

76.2.1 Bench Mark: The Contractor shall be responsible for the true and proper setting-up of the Facilities in relation to bench marks, reference marks which are mutually agreed upon by the Contractor and Owner. If, at any time during the progress of installation of the Facilities, any error shall appear in the position, level or alignment of the Facilities, the Contractor shall forthwith notify the Project Manager of such error and, at its own expense, immediately rectify such error.

76.2.2 Contractor's Supervision: The Contractor shall give or provide all necessary supervision during the installation of the Facilities, and the Construction Manager or its deputy shall be constantly on the Site to provide full-time supervision of the installation. The Contractor shall provide and employ only technical personnel who are skilled and experienced in their respective fields and supervisory staff who are competent to adequately supervise the work at hand.

76.2.3 Labour: The Contractor shall provide and employ on Site in the installation of the Facilities such skilled, semiskilled and unskilled labor as is necessary for proper and timely execution of the Contract. The Contractor is encouraged to use local labor that has the necessary skills. Unless otherwise provided in the Contract, the Contractor shall be responsible for the recruitment, transportation, accommodation, sanitation, first aid facility and catering of all labor, local or expatriate, required for the execution of the Contract and for all payments in connection therewith. The Contractor shall be responsible for obtaining all necessary permit(s) and/or visa(s) from the appropriate authorities for the engagement and entry of all labour and personnel to be employed by Contractor on the Site including that of his sub-Contractors. The Contractor shall at all times during the progress of the Contract use its best endeavours to prevent any unlawful, riotous or disorderly conduct or behaviour by or amongst its employees and the labour of its Sub-Contractors. The Contractor shall, in all dealings with its labour and the labour of its Sub-Contractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor. The Contractor shall keep the Owner indemnified, during construction as well as during O&M period, in respect of compliance with the statutory provisions in respect to the labor employed at site. Upon completion of the construction activities/ O&M activities, the Contractor shall obtain no – objection certificate (NOC) from local/ statutory bodies in respect to the fulfilment of all compliance and submit a copy to the Owner prior to the final settlement

76.3 Contractor's Equipment

76.3.1 All equipment brought by the Contractor onto the Site shall be deemed to be intended to be used exclusively for the execution of the Contract. The Contractor shall not remove the same from the Site without the Project Manager's consent that such Contractor's Equipment is no longer required for the execution of the Contract. All the necessary approvals with due taxes, insurance and license, as required for the use of equipment at site, are to be taken by the Contractor. The equipment should be in a good operating condition for safe use at site. The operator shall be competent to operate. It is advised to keep adequate spares, consumables, etc to reduce the breakdown time.

76.3.2 Unless otherwise specified in the Contract, upon completion of the Facilities, the Contractor shall remove from the Site all Equipment brought by the Contractor onto the Site.

76.4 Site Regulations and Safety : Contractor shall submit the EHS policy for the site to the Project Manager/EIC within 14 (fourteen) days from effective date and shall abide by the rules and regulations of the EHS policy. The Contractor shall have to provide necessary and adequate safety measures including personal protective equipment and precautions to avoid any accident, which may cause damage to any equipment / material or injury to workmen. The Owner shall not be liable for any such accidents during the performance of the contract. The Contractor, if required, will provide necessary safety training to workmen. Also,

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Contractor shall engage sufficient security guards to protect Facility from any theft and unauthorized access to site during the entire construction and O&M periods.

**76.5 Site Clearance**

**76.5.1 Site Clearance in Course of Performance** In the course of carrying out the Contract, the Contractor shall keep the Site reasonably free from all unnecessary obstruction, store or remove any surplus materials, clear away any wreckage, packaging material, rubbish & debris and temporary installations from the Site, and remove any Contractor's Equipment no longer required for execution of the Contract with due approval of the Owner.

**76.5.2 Site Clearance after Completion** After Completion of all parts of the Facilities, the Contractor shall clear away and remove all wreckage, packaging material, rubbish & debris and temporary works & installations of any kind from the Site with due approval of the Owner and shall leave the Site and Facilities clean and safe.

**76.5.3 Disposal of Scrap** The term 'Scrap' shall refer to scrap/ waste/ remnants arising out of the unpacking of equipment, construction debris, breakage of modules, fabrication of structural steel work and piping work at the project site in the course of execution of the contract and shall also include any wastage of cables during the termination process while installing the cables. The Contractor shall with the agreement of the Owner promptly remove from the site any 'Scrap' generated during Performance of any activities at site in pursuance of the Contract. The disposal of such Scrap shall vest with the Contractor for the items supplied by the Contractor and issued by Owner under this contract for installation and construction without any additional cost to the Owner. The removal of scrap shall be subject to the due approval of Owner & Contractor producing the necessary clearance from the relevant authorities, if required by the law, in respect of disposal of the scrap. The liability for the payment of the applicable GST shall be that of the Contractor. The Contractor shall also indemnify to keep the Owner harmless from any act of omission or negligence on the part of the Contractor in following the statutory requirements with regard to removal/disposal of scrap. The undertaking shall be furnished by Contractor as per Format enclosed in the Section VI of Forms & Formats. Further, in case the laws require the Owner to take prior permission of the relevant Authorities before handing over the scrap to the Contractor, the same shall be obtained by the Contractor on behalf of the Owner.

In case, the scrap is generated against the free issue material supplied by the Owner, the Contractor shall maintain a separate record of same and intimate Owner before its disposal thereafter. After due approval from Owner, the scrap should be disposed of and its value shall be remitted to the Owner.

**76.5.4 Watch & Ward and Lighting** The Contractor shall provide and maintain at its own expense all lighting, fencing, watch and ward wherever necessary for the proper execution and the protection of the Facilities, or for the safety of the Owners and occupiers of adjacent property and for the safety of the public during the entire construction and O&M period.

**76.6 Training** The period and the nature of training for the individual personnel shall be agreed upon mutually between the Contractor and the Owner. These personnel shall be given special training at the shops, where the equipment will be manufactured and/ or in their collaborator's works and where possible, in any other plant where equipment manufactured by the Contractor or his collaborators is under installation or test to enable those personnel to become familiar with the equipment being furnished by the Contractor. Owner shall bear the cost of Boarding, Lodging & Travel only for the said personnels. The Contractor undertakes to provide training to personnel selected and sent by the Owner at the works of the Contractor without any cost to the Owner.

**77. Replacement of Defective Parts and Materials**

**77.1** If during the progress of the Work, Owner shall decide and inform in writing to the Contractor, that the Contractor has manufactured any plant or part of the plant unsound or imperfect or has furnished plant inferior to the quality specified, the Contractor on receiving details of such defects or deficiencies shall at his own expenses within 07 (Seven) days of his receiving the notice, or otherwise within such time as may be reasonably necessary for making it good, proceed to alter, reconstruct or remove such work and furnish fresh equipment's up to the standards of the specifications. In case the Contractor fails to do so, Owner may on giving the Contractor 07 (Seven) day notice in writing of his intentions to do so, proceed to remove the portion of the Work so complained of and at the cost of Contractor's, perform all such works or furnish all such equipment's provided that nothing in the clause shall be deemed to deprive the Owner of or affect any rights under the Contract, the Owner may otherwise have in respect of such defects and deficiencies.

**78. Indemnity**

**78.1** If any action is brought before a Court, Tribunal or any other authority against the EMPLOYER/ Owner or an officer or agent of the EMPLOYER/ Owner, for the failure, omission or neglect on the part of the Contractor to perform any acts, matters, covenants or things under the Contract, or damage or injury or death caused by the alleged omission or negligence on the part of the Contractor, his agents, representatives or his Sub-Contractor's, or in connection with any claim based on lawful demands of Sub-Contractor's workmen suppliers or employees, the Contractor, shall in such cases indemnify and keep the EMPLOYER/ Owner and/ or their representatives harmless from all losses, damages, expenses or decrees arising out of such action.

**79. Construction Aids, Equipment, Tools & Tackles**

**79.1** Contractor shall be solely responsible for making available for executing the Work, all requisite Construction Equipments, Special Aids, Barges, Cranes and the like, all Tools, Tackles and Testing Equipment and Appliances, including imports & insurance of such equipment etc. as required. In case of import of the same the rates applicable for levying of Custom Duty on such Equipment, Tools & Tackles and the duty drawback applicable thereon shall be ascertained by the Contractor from the concerned authorities of Government of India. It shall be clearly understood that Owner shall not in any way be responsible for arranging to obtain Custom Clearance and/ or payment of any duties and/ or duty draw backs, license etc. for such equipment's so imported by the Contractor and the Contractor shall be fully responsible for Goods and Service Tax (GST) and documentation with regard

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to the same. Bidder in his own interest may contact, for any clarifications in the matter, concerned agencies/ Dept./ Ministries of Govt. of India. All clarifications so obtained and interpretations thereof shall be solely the responsibility of the Contractor.

[F] CERTIFICATES AND PAYMENTS

80. Schedule of Rates and Payments

80.1 Contractor's Remuneration For EPC/ Lumpsum Turnkey Contracts, the billing procedure will follow as per the prescribed payment terms as defined in Special Conditions of Contract (SCC).The price to be paid by the Owner to Contractor for the whole of the Work to be done and for the performance of all the obligations undertaken by the Contractor under the Contract Documents shall be ascertained by the application of the respective Schedule of Rates (the inclusive nature of which is more particularly defined by way of application but not of limitation, with the succeeding Clause of this clause) and payment to be made accordingly for the Work actually executed and approved by the Engineer-inCharge/Project Manager. The sum so ascertained shall (excepting only as and to the extent expressly provided herein) constitute the sole and inclusive remuneration of the Contractor under the Contract and no further or other payment whatsoever shall be or become due or payable to the Contractor under the Contract.

80.2 Schedule of Rates to be Inclusive The prices quoted by the Contractor shall remain firm till the contract period and shall not be subject to escalation. Schedule of Rates shall be deemed to include and cover all costs, expenses and liabilities of every description and all risks of every kind to be taken in executing, completing and handing over the Work to the Owner by the Contractor. The Contractor shall be deemed to have known the nature, scope, magnitude and the extent of the Work and materials required though the Contract Document may not fully and precisely furnish them. Bidders in the Schedule of Rates should cover all costs as he may consider necessary to cover the cost of any works and materials as may be reasonable and necessary to complete the Work. Generality of this present provision shall not be deemed to cut down or limit in any way because in certain cases it may and in other cases it may not be expressly stated that the Contractor shall do or perform a work or supply articles or perform services at his own cost or without addition of payment or without extra charge or words to the same effect or that it may be stated or not stated that the same are included in and covered by the Schedule of Rates.

80.3 Schedule of Rates to Cover Construction Equipment, Materials, Labour etc. Without in any way limiting the provisions of the preceding Clause the Schedule of Rates shall be deemed to include and cover the cost of all construction equipment, temporary Work (except as provided for herein), pumps, materials, labour, insurance, fuel, consumables, stores and appliances to be supplied by the Contractor and all other matters in connection with each item in the Schedule of Rates and the execution of the Work or any portion thereof finished, complete in every respect and maintained as shown or described in the Contract Documents or as may be ordered in writing during the continuance of the Contract.

80.4 Schedule of Rates to Cover Royalties, Rents and Claims The Schedule of Rates (i.e., Contract Value) shall be deemed to include and cover the cost of all Royalties and Fees for the articles and processes, protected by letters, patent or otherwise incorporated in or used in connection with the Work, also all Royalties, Rents and other payments in connection with obtaining materials of whatsoever kind for the Work and shall include an Indemnity to the EMPLOYER/ Owner which the Contractor hereby gives against all actions, proceedings, claims, damages, costs and expenses arising from the incorporation in or use on the Work of any such articles, processes or materials, other municipal or local Board Charges, if levied on materials, equipment or machineries to be brought to site for use on Work shall be borne by the Contractor.

80.5 Schedule of Rates to Cover GST/Applicable taxes No exemption or reduction of Duties, Goods & Service Tax (GST) on Works Contract quay or any port dues, transport charges, stamp duties or Central or State Government or Local Body or Municipal Taxes or from or of any other body, whatsoever, will be granted or obtained, all of which expenses shall be deemed to be included in and covered by the Schedule of Rates. The Contractor shall also obtain and pay for all permits or other privileges necessary to complete the Work.

80.6 Schedule of Rates to Cover Risks of Delay: The Schedule of Rates shall be deemed to include and cover the risk of all possibilities of delay and interference with the Contractor's conduct of Work which occur from any causes including orders of the EMPLOYER/ Owner in the exercise of his power and on account of extension of time granted due to various reasons and for all other possible or probable causes of delay.

80.7 Schedule of Rates Cannot be altered

(a) For Engineering, Procurement and Commissioning (EPC) Contracts or Lumpsum Turnkey (LSTK) Contracts, the total Project/ Contract Value stands to be fixed inclusive of entire items, Materials, Spares, Consumables, Services, Erection and all quoted and unquoted items/ Services in the Bill of Quantity (BOQ) of the Tender/ Contract. Contract Value of such EPC Contracts comprises of all the related costs required for successful execution of the work. The final payment outlay or total cost of the project will be limited to the total value of the EPC Contract and O & M Contract. Any kind of variations related to Total Contract Value shall be to Contractor's account. The payment will be made according to the Work carried out, for which purpose an item wise, or work wise Schedule of Rates shall be furnished, suitable for evaluating the value of Work done and preparing running account bill.

(b) If applicable, For Item Rate Contracts, no alteration will be allowed in the Schedule of Rates by reason of works or any part of them being modified, altered, extended, diminished or committed. The Schedule of Rates are fully inclusive of rates which have been fixed by the Contractor and agreed to by the EMPLOYER/Owner and cannot be altered. Based on the mechanism of Tender as described in the Special Conditions of Contract (SCC), the methodologies described above shall prevail. However, payment for any additional work which is not covered in the Schedule of Rates, shall only be released on issuance of change order.

81. Procedure for Measurement and Billing

81.1 Billing Procedure Following procedures shall be adopted for billing of works executed by the Contractor.

81.1.1 For EPC/ Lumpsum Turnkey Contracts, the billing procedure will follow as per the prescribed payment terms as defined in

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Special Conditions of Contract (SCC).

81.1.2 If applicable, For Item Rate Contracts, all measurements shall be recorded in sextuplicate on standard measurement sheets in duly approved formats for scrutiny and passing by EMPLOYER/ Owner. EMPLOYER/ Owner shall scrutinize and check the measurements recorded on the sheets and shall certify correctness of the same on the measurement sheets.

81.1.3 Engineer-in-Charge/Project Manager shall pass the bills after carrying out the comprehensive checks in accordance with the terms and conditions of the Contracts, within 21 (Twenty-one) days of submission of the bills along with all necessary enclosures and documents, complete in all respects and send the same to the Owner to effect payment to the Contractor as per the defined payment terms.

81.1.4 Owner shall make all endeavor to make payments of undisputed amount of the bills submitted based on the joint measurements within 30 (Thirty) days from the date of certification by the Engineer-in-Charge/Project Manager. Any disputed claims/amounts will be mutually settled and paid accordingly.

81.1.5 Measurements shall be recorded as per the methods of measurement spelt out in Contract Document.

81.2 Secured Advance on Material Unless otherwise provided in the SCC of the tender, no 'Secured Advance' on security of materials brought to site for execution of contracted items(s) shall be paid to the Contractor whatsoever.

81.3 Dispute in Mode of Measurement In case of any dispute as to the mode of measurement not covered by the Contract to be adopted for any item of Work, mode of measurement as per latest Indian Standard Specifications shall be followed.

81.4 Rounding-Off of Amounts In calculating the amount of each item due to the Contractor in every certificate prepared for payment, sum of less than 50 paise shall be omitted and the total amount on each certificate shall be rounded off to the nearest rupees, i.e., sum of less than 50 paise shall be omitted and sums of 50 paise and more up to one rupee shall be reckoned as one rupee.

82. Lumpsum in Tender

82.1 The payment against any Lumpsum item shall be made only on completion of that item (Excluding Milestones linked payment structure) as per the provision of the Contract after certification by Engineer-in-Charge/Project Manager.

83. Running Account Payments to be regarded as Advance

83.1 All running account payments shall be regarded as payment by way of advance against the final payment only and not as payments for Work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected or be considered as an admission of the due performance of the Contract, or any part thereof, in this respect, or of the occurring of any claim by the Contractor, nor shall it conclude, determine or affect in any way the powers of the EMPLOYER/ Owner under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise, or in any other way vary or affect the Contract. The final bill shall be submitted by the Contractor within 01 (One) Month of the date of the final acceptance of the Work; otherwise, the Engineer-in-Charge/Project Manager's measurement and of total amount payable for the Work accordingly shall be final and binding on all parties

84. Notice of Claims for Additional Payments

84.1 Should the Contractor consider that he is entitled to any extra payment for any extra/ additional Works or Material change in original Specifications carried out by him in respect of Work he shall forthwith give notice in writing to the Engineer-in-Charge/Project Manager that he claims extra payment. Such notice shall be given to the Engineer-in-Charge/Project Manager upon which Contractor bases such claims and such notice shall contain full particulars of the nature of such claim with full details of amount claimed. Irrespective of any provision in the Contract to the contrary, the Contractor must intimate his intention to lodge claim on the Owner within 10 (Ten) days of the commencement of happening of the event and quantify the claim within 30 (Thirty) days, failing which the Contractor will lose his right to claim any compensation /reimbursement/ damages etc. or refer the matter to arbitration. Separate bills shall be raised for the extra claim.

84.2 Engineer-in-Charge/Project Manager shall review such claims within a reasonable period of time and cause to discharge these in a manner considered appropriate after due deliberations thereon. However, Contractor shall be obliged to carry on with the Work during the period in which his claims are under consideration by the Owner, irrespective of the outcome of such claims, where additional payments for Works considered extra are justifiable in accordance with the Contract provisions, Owner shall arrange to release the same in the same manner as for normal Work payments. Such of the extra works so admitted by Owner shall be governed by all the terms, conditions, stipulations and specifications as are applicable for the Contract. Settlement of all extra claims shall be taken up after Project commissioning.

85 Payment of Contractor's Bill

85.1 Payment due to the Contractor shall be made by the Owner either by e-Banking or by Account Payee Cheque forwarding the same to registered office or the notified office of the Contractor. In no case, will Owner be responsible if the cheque is mislaid or misappropriated by unauthorized person/ persons. In all cases, the Contractor shall present his bill duly pre-receipted on proper revenue stamp & payment shall be made in Indian Currency only.

85.2 In general payment of final bill shall be made to Contractor within 60 days of the submission of bill on joint measurements, after completion of all the obligations under the Contract against the final completion.

86 Receipt for Payment

86.1 Receipt for payment made on account of work when executed by a company, must be signed by a person holding due power of attorney in this respect on behalf of the Contractor, except when the Contractors are described in their tender as a limited company in which case the receipts must be signed in the name of the company by one of its principal officers or by some other person having authority to give effectual receipt for the company.

87. Handing Over – Taking Over

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87.1 Subsequent to Operational Acceptance of the Facilities by the EMPLOYER and within 15 (Fifteen) days of the commencement of the O&M period, the Contractor shall furnish undertakings as per F-32 of "Sample Forms and Formats" which is to be executed by the Contractor for the plant handed over by Owner for performance of its O&M Contract (Entire Solar Photo Voltaic Plant). The Facility shall be taken over by the Owner upon successful Operational Acceptance in accordance with GCC Clause 43.3 (Operational Acceptance). Immediately after taking over of complete facilities (s), the Facilities will be handed over to the Contractor for Comprehensive Operation & Maintenance for a period as mentioned in the Contract document.

88. Final Decision and Final Acceptance

88.1 Upon expiry of the period of liability & the Works have been duly maintained by the Contractor during monsoon or such period as hereinbefore provided in Clause 73 & 74 and that the Contractor has in all respect duly made-up any subsidence and performed all his obligations under the Contract, the Owner give a final acceptance to that effect and the Contractor shall not be considered to have fulfilled the whole of his obligations under Contract until Final acceptance shall have been given by the Owner notwithstanding any previous entry upon the Work and taking possession, working or using of the same or any part thereof by the Owner.

89. Certificate and Payments on Evidence of Completion

89.1 Except the Final Acceptance, no other payments on general account shall be taken to be an admission by the Owner of the due performance of the Contract or any part thereof or of occupancy or validity of any claim by the Contractor.

90. Deductions from the Contract Price

90.1 All costs, damages or expenses which Owner may have paid or incurred, which under the provisions of the Contract, the Contractor is liable/ will be liable, will be claimed by the Owner. All such claims shall be billed by the Owner to the Contractor regularly as and when they fall due. Such claims shall be paid by the Contractor within 15 (Fifteen) days of the receipt of the corresponding bills and if not paid by the Contractor within the said period, the Owner may, then, deduct the amount from any moneys due including Contract Performance Security or becoming due to the Contractor under the Contract or may be recovered by actions of law or otherwise, if the Contractor fails to satisfy the Owner of such claims.

[G] TAXES AND INSURANCE

91. Taxes & Duties – Goods & Service Tax

91.1 Except as otherwise specifically provided in the Contract, the Contractor shall bear and pay all taxes, duties, levies and charges assessed on the Contractor, its Sub-contractor or their employees by all municipal, state or national government authorities in connection with the Facilities in and outside of the country where the Site is located.

91.2 The Owner shall bear and pay/reimburse to the Contractor Goods and Services Tax (GST) applicable on:

- (a) Supply of Equipment (including Type Test Charges) and Mandatory Spares to be supplied from within the EMPLOYER's country to be incorporated in the Facilities, by the law of country where the site is located,
- (b) local transportation & insurance, other local costs incidental to delivery of plant & equipment including mandatory and
- (c) Installation Services including Erection, Civil & Allied Works and other services. However, all other taxes, duties & levies as may be applicable on goods and services specified in under the contract and on the materials used for civil construction works and erection & commissioning shall be to the contractor's account and no separate claim in this regard will be entertained by the EMPLOYER. Notwithstanding anything to contrary contained in the Contract, the Contractor's right to payment under the Contract is subject to issuance of valid tax invoice, payment of applicable GST to the credit of appropriate Government and submission of valid particulars of tax invoice under GST returns in accordance with GST Law. The Contractor shall issue tax invoices, file appropriate returns, and deposit the applicable GST to the account of appropriate government within the time limit prescribed under the GST Law. In the event of any default, Contractor shall be liable to pay any penalty/demand raised on Owner due to default by Contractor, and the same shall be recovered/Contractor shall make good the loss. The Contractor shall be responsible for the issuance of e-way bill and other compliances relating to e-way bill as per GST law. The Owner will deduct GST at source at the applicable rates in case transactions under the contract are liable to GST deduction at source as per the prevailing provisions of GST Law.

91.3 If any tax exemptions, reductions, allowances or privileges are available to the Contractor in the country where the Site is located, the Owner shall use its best endeavours to enable the Contractor to benefit from any such tax savings to the maximum allowable extent.

91.4 The Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and GST/all Taxes. now in force or hereafter imposed, increased, modified, from time to time in respect of Works and materials and all contributions and taxes for unemployment compensation, insurance and old age pensions, PF, ESI etc or annuities now in force or hereafter imposed by any Central or State Government authorities which are imposed with respect to or covered by the wages, salaries or other compensations paid to the persons employed by the Contractor and the Contractor shall be responsible for the compliance of all Sub-Contractors, with all applicable Central, State, Municipal and local law and regulation and requirement of any Central, State or local Government agency or authority. Contractor further agrees to defend, indemnify and hold EMPLOYER/ Owner harmless from any liability or penalty which may be imposed by the Central, State or Local authorities by reason or any violation by Contractor or Sub-Contractor of such laws, suits or proceedings that may be brought against the EMPLOYER/ Owner arising under, growing out of, or by reason of the work provided for by this Contract, by third parties, or by Central or State Government authority or any administrative sub-division thereof. Tax deductions will be made as per the rules and regulations in force in accordance with acts prevailing from time to time.

91.5 Bidder should quote all-inclusive prices including the liability of GST (in line with the given SOR Format) whether on the works contract as a whole or in respect of bought out components used by the Contractor in execution of the Contract. Owner/EMPLOYER shall not be responsible for any such liability of the Contractor in respect of this Contract. 91.6 Goods & Service

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Tax (GST) [applicable for both Centre and state] and other levies [if any] payable by the Contractor under the Contract, or for any other cause, shall be included in the rates/ prices and the total bid-price submitted by the Bidder. Applicable rate of GST shall be indicated in Agreed SOR formats.

92. Income Tax As per Indian Income Tax Act & Rules, Owner is required to deduct Income Tax at source from all the payments to be made to Non-resident/ Foreign Contractor. For this purpose, the Contractor shall be required to either furnish

(i) the certificate from Indian Tax Authority or

(ii) Ruling from “the Authority for Advance Ruling (AAR)” determining the applicable rate of Income tax in India before release of first payment. The Contractor will be required to submit PAN details to the Project Manager before the submission of the first bill. If the Owner orders any spare at a later date, all applicable additional taxes & duties, if any, not included in the original price shall be to the account of Owner. Notwithstanding anything to contrary contained in the agreement/Purchase Order, Contractor/Supplier’s right to payment under the contract/agreement/Purchase Order is subject to issuance of valid tax invoice, payment of applicable GST to the credit of appropriate Government and submission of a valid particulars of tax invoice under GST returns in accordance with GST Act. Unless expressly stated otherwise, a common mechanism for reconciliation of input credit mismatch, to be followed by both Owner and Contractor/Supplier, shall be mutually agreed so that both parties follow the same procedure for disclosing the transactions in their respective returns. Notwithstanding anything in the agreement/ contract, penalty / damages shall be recovered in case the Contractor/Supplier makes a default in following the agreed procedure. Contractor/Supplier shall issue tax invoices, file appropriate returns, and deposit the applicable GST to the account of appropriate government within the time limit prescribed under the GST Law. In the event of any default, Contractor/Supplier shall be liable to pay the amount which may be imposed on Owner due to such default. Contractor/Supplier should comply with the provisions of e-way bill notified by appropriate authorities from time to time. The existing provisions regarding road permit will continue till such time if applicable. Owner will deduct GST at source at the applicable rates in case transactions under the contract are liable to GST deduction at source as per the prevailing provisions of GST Law.

93. Void

94. Insurance: To the extent specified in the Contract Agreement, 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. The identity of the insurers and the form of the policies shall be subject to the approval of the Owner, who should not unreasonably withhold such approval.

94.1 During the Contract period including O&M period, i.e., during Construction & O&M period, all insurance related expenses shall be borne by the Contractor. The goods supplied under the Contract shall be fully insured against the loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in such a manner that Owner shall not incur any financial loss, as long as the plant continues to remain under the custody of the Contractor. During O&M period also (after the Construction period is over), the insurances shall be in the scope of the Contractor.

94.2 In case of any loss or damage or pilferage or theft or fire accident or combination of the said incidents etc. under the coverage of insurance, the Contractor shall lodge the claim as per rules of insurance. Any FIR required to be lodged to local Police Station shall be the responsibility of the Contractor.

94.3 The Contractor shall arrange to supply/ rectify/ recover the materials without waiting for settlement of the insurance claim and even if the claim is unsettled for timely completion of the project. The final financial settlement with the insurance company shall rest upon the Contractor.

94.4 In case of any delay of the project attributable to the Contractor, the Contractor himself in consultation with Owner/EMPLOYER shall take the extension of insurance. Any financial implications shall be borne by the Contractor.

94.5 The Contractor should arrange for providing insurance coverage to its workmen under Workmen’s Compensation Act or similar Rules and Acts as applicable during execution of work for covering risk against any mishap to its workmen. The Contractor shall also undertake a Third-Party Insurance and shall at all times keep Owner indemnified against any Third-Party claims and shall arrange to settle them at the earliest. The Owner/ EMPLOYER will not be liable for any such loss or mishap.

94.6 All other insurance like – transit insurance (Marine/ Cargo/ others as applicable), Construction All Risk, Erection All Risk, workmen compensation, fire, third party liability, insurance against theft, Contractor’s Equipment, machinery breakdown policy, business interruption insurance, Property damage Insurance & Environmental risk insurance as required during the Construction and O&M period of the Plant shall be in the contractor’s scope & shall borne by the Contractor.

94.7 Owner shall be named as co – insured under all insurance policies taken out by the Contractor, except for the workmen compensation, third party liability and Owner’s liability insurances. All insurers’ rights of subrogation against such co – insured for losses or claims arising out of the performance of the contract shall be waived under such policies.

94.8 All the insurance cover taken for the construction and O&M period shall be seamless in nature & preferably taken from the same insurance company.

94.9 The insurance is to be suitably taken for the activity/ act which is required to cover all the risks associated to the activity / act. The Contractor shall be responsible to take suitable insurance till the completion of the O&M contract and indemnify the EMPLOYER/Owner from all associated risks whatsoever.

94.10 The Contractor shall be responsible to take suitable insurance(s) and claim management during and till the completion of the O&M contract and indemnify the Owner from all associated risks whatsoever. Various Types of Insurance to be taken by Contractor during Construction & O&M period:

a) Machinery Breakdown: Electrical & or machinery breakdown of any machinery or other equipment resulting in costly repairs or even replacement of the solar panel.

b) Business Interruption: Cover for period of operational downtime i.e., covering the cash flow of the solar business as a result of

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- an insured peril, for example fire or storm damage, machinery breakdown or equipment failure.
- c) Property Damage: The insurance should cover material damage due to external causes such as fire, theft, vandalism, sabotage, hail damage, snow load, lightning strike, overload, operational mistakes, clumsiness, negligence & theft.
- d) EMPLOYERs Liability: Provides cover against the risk of accident from usual workplace risks such as working at height & manual handling during construction & O&M period.
- e) Environmental Risk Insurance: Environmental damage coverage indemnifies solar system owners of the risk of either environmental damage done by their development or pre-existing damage on the development site.

**94.11 Employees State Insurance (ESI) Act**

The Contractor agrees to and does hereby accept full and exclusive liability for the compliance with all obligations imposed by the Employee State Insurance Act 1948 and the Contractor further agrees to defend, indemnify and hold EMPLOYER/ Owner harmless for any liability or penalty which may be imposed by the Central, State or Local authority by reason of any asserted violation by Contractor or Sub-Contractor of the Employees' State Insurance Act, 1948, and also from all claims, suits or proceeding that may be brought against the EMPLOYER/ Owner arising under, growing out of or by reasons of the work provided for by this Contractor, by third parties or by Central or State Government authority or any political sub- division thereof.

The Contractor agrees to fill in with the Employee's State Insurance Corporation, the Declaration Forms, and all forms which may be required in respect of the Contractor's or Sub-Contractor's employees, who are employed in the Work provided for or those covered by ESI from time to time under the Agreement. The Contractor shall deduct and secure the agreement of the Sub-Contractor to deduct the Employee's contribution as per the first schedule of the Employee's State Insurance Act from wages and affix the Employees Contribution Card at wages payment intervals.

The Contractor shall remit and secure the agreement of Sub-Contractor to remit to the Employee's State Insurance Corporation Account, the Employee's contribution as required by the Act. The Contractor agrees to maintain all cards and Records as required under the Act in respect of employees and payments and the Contractor shall secure the agreement of the Sub-Contractor to maintain such records. Any expenses incurred for the contributions, making contributions or maintaining records shall be to the Contractor's or Sub-Contractor's account.

**Workmen Compensation and EMPLOYER's/Owner's Liability Insurance**

Insurance shall be effected for all the Contractor's employees engaged in the performance of this Contract. If any of the work is sublet, the Contractor shall require the Sub-Contractor to provide workman's Compensation and Owner's liability insurance for the latter's employees if such Employees are not covered under the Contractor's Insurance.

**94.12 Accident or Injury to Workmen** The EMPLOYER/ Owner shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the Employment of the Contractor or any Sub-Contractor and the Contractor shall indemnify and keep indemnified the EMPLOYER/ Owner against all such damages and compensation (save and except and aforesaid) and against all claims, demands, proceeding, costs, charges and expenses, whatsoever in respect or in relation thereto.

**94.13 Transit/Cargo Insurance** In respect of all items to be transported by the Contractor to the Site of Work and any consequential risks, the cost of transit insurance shall be borne by the Contractor and the quoted price shall be inclusive of this cost. Covering loss or damage occurring, while in transit from the supplier's or manufacturer's works or stores until arrival at the Site, to the Facilities (including spare parts therefor) and to the construction equipment to be provided by the Contractor or its Subcontractors.

**94.14 Comprehensive Automobile Insurance** This insurance shall be in such a form as to protect the Contractor against all claims for injuries, disability, disease and death to members of public including EMPLOYER's/ Owner's men and damage to the property of others arising from the use of motor vehicles during on or off the site operations, irrespective of the EMPLOYER ship of such vehicles.

**94.15 Installation All Risks Insurance** Covering physical loss or damage to 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 Defect Liability Period while the Contractor is on the Site for the purpose of performing its obligations during the Defect Liability Period.

Amount	Deductible Limits	Parties Insured	From	To
110% of the Ex-works value of supply	Nil	Contractor, Sub contractor & Owner	Receipt at site	Upto Defect Liability period

**94.16 Comprehensive General Liability Insurance**

- a) This insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of member 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-Contractor's or from riots, strikes and civil commotion.
- b) Contractor shall take suitable Group Personal Accident Insurance Cover for taking care of injury, damage or any other risks in respect of his Engineers and other Supervisory staff who are not covered under Employees State Insurance Act.
- c) The policy shall cover third party liability. The third party (liability shall cover the loss/ disablement of human life (person not belonging to the Contractor) and also cover the risk of damage to others materials/ equipment/ properties during construction, erection and commissioning at site & during O&M period. The value of third-party liability for compensation for loss of human

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life or partial/ full disablement shall be of required statutory value but not less than INR 02 (Two) Lakhs per death, INR 1.5 (One and Half) Lakhs per full disablement and INR 1 (One) Lakh per partial disablement and shall nevertheless cover such compensation as may be awarded by Court by Law in India and cover for damage to others equipment/ property as approved by the Purchaser. However, third party risk shall be maximum to INR 10 (Ten) Lakhs for death.

d) The Contractor shall also arrange suitable insurance to cover damage, loss, accidents, risks etc., in respect of all his plant, equipment and machinery, erection tools & tackles and all other temporary attachments brought by him at site to execute the work.

e) The Contractor shall take out insurance policy in the joint name of Owner and Contractor from one or more nationalized insurance company from any branch office at Project site. f) Any such insurance requirements as are hereby established as the minimum policies and coverages which Contractor must secure and keep in force must be complied with, Contractor shall at all times be free to obtain additional or increased coverages at Contractor's sole expenses.

94.17 The Contractor shall also arrange suitable insurance to cover following during the O&M Period:

a) Machinery Breakdown: Electrical & or machinery breakdown of any machinery or other equipment resulting in costly repairs or even replacement of the solar panel.

b) Business Interruption: Cover for period of operational downtime i.e., covering the cash flow of the solar business as a result of an insured peril, for example fire or storm damage, machinery breakdown or equipment failure.

c) Property Damage: The insurance should cover material damage due to external causes such as fire, theft, vandalism, sabotage, hail damage, snow load, lightning strike, overload, operational mistakes, clumsiness, negligence & theft.

d) EMPLOYERs Liability: Provides cover against the risk of accident from usual workplace risks such as working at height & manual handling during construction & O&M period.

e) Environmental Risk Insurance: Environmental damage coverage indemnifies solar system owners of the risk of either environmental damage done by their development or pre-existing damage on the development site.

94.18 ANY OTHER INSURANCE REQUIRED UNDER LAW OR REGULATIONS OR BY OWNER: Contractor shall also carry and maintain any and all other insurance(s) which he may be required under any law or regulation from time to time without any extra cost to Owner. He shall also carry and maintain any other insurance which may be required by the Owner.

Amount	Deductible Limits	Parties Insured	From	To
To be indicated by the Contractor	Nil	Contractor, Sub contractor & Owner	Receipt at site	Up to Defect Liability period

95 Damage to Property or to any Person or any Third Party

95.1 Contractor shall be responsible for making good to any loss or any damage to structures and properties belonging to the Owner or being executed or procured or being procured by the Owner or of other agencies within in the premises of all the work of the Owner, if such loss or damage is due to fault and/ or the negligence or wilful acts or omission of the Contractor, his employees, agents, representatives or Sub-Contractors.

95.2 The Contractor shall take sufficient care in moving his plants, equipment and materials from one place to another so that they do not cause any damage to any person or to the property of the EMPLOYER/ Owner or any third party including overhead and underground cables and in the event of any damage resulting to the property of the Owner or of a third party during the movement of the aforesaid plant, equipment or materials the cost of such damages including eventual loss of production, operation or services in any plant or establishment as estimated by the EMPLOYER/ Owner or ascertained or demanded by the third party shall be borne by the Contractor. Third party liability risk shall be INR 1 (One) Lakh for single accident and limited to INR 10 (Ten) Lakhs.

95.3 The Contractor shall indemnify and keep the EMPLOYER/ Owner harmless of all claims for damages to property other than EMPLOYER's/ Owner's property arising under or by reason of this agreement, if such claims result from the fault and/ or negligence or willful acts or omission of the Contractor, his employees, agents, representative of Sub-Contractor. [H] LABOUR LAWS

96. Labour Laws & Indemnity Bond

i) No labour below the age of 18 (Eighteen) Years shall be employed on the Work.

ii) The Contractor shall at his expense comply with all labour laws and keep the EMPLOYER/ Owner indemnified in respect thereof.

iii) The Contractor shall employ labour in sufficient numbers either directly or through SubContractor's to maintain the required rate of progress and of quality to ensure workmanship of the degree specified in the Contract. iv) The Contractor shall indemnify the EMPLOYER/ Owner against any payments to be made under and for the observance of the provisions of the aforesaid labour compliances without prejudice to his right to obtain indemnity from his Sub-Contractor's. v) The Contractor shall also indemnify to keep the Owner/ EMPLOYER harmless from any act of omission or negligence on the part of the Labour Laws compliance in following the statutory requirements with regard to Labour laws. Against the signing of the contract, The Indemnity Bond shall be furnished by Contractor as per Format enclosed under Forms and Formats for the labour law compliance. vi) Upon completion of the construction activities/ O&M activities, the Contractor shall obtain no – objection certificate (NOC) from local/ statutory bodies in respect to the fulfillment of all compliance related to labour law and submit a copy to the EMPLOYER/Owner prior to the final settlement

97. Void

98. Contractor to Indemnify the EMPLOYER/ Owner

98.1 The Contractor shall indemnify the EMPLOYER/ Owner and every member, office and employee of the EMPLOYER/ Owner, also the Engineer-in-Charge/Project Manager and his staff against all actions, proceedings, claims, demands, costs and expenses

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whatsoever arising out of or in connection with the matters referred to in Clause 95 and elsewhere and all actions, proceedings, claims, demands, costs and expenses which may be made against the EMPLOYER/ Owner for or in respect of or arising out of any failure by the Contractor in the performance of his obligations under the Contract Document. The EMPLOYER/ Owner shall not be liable for or in respect of or arising out of any failure by the Contractor in the performance of his obligations under the Contract Document. The EMPLOYER/ Owner shall not be liable for or in respect of any demand or compensation payable by law in respect or in consequence of any accident or injury to any workmen or other person. In the employment of the Contractor or his Sub-Contractor the Contractor shall indemnify and keep indemnified the EMPLOYER/ Owner against all such damages and compensations and against all claims, damages, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

98.2 Payment of Claims and Damages: Should the EMPLOYER/ Owner have to pay any money in respect of such claims or demands as aforesaid the amount so paid and the costs incurred by the EMPLOYER/ Owner shall be charged to and paid by the Contractor and the Contractor shall not be at liberty to dispute or question the right of the EMPLOYER/ Owner to make such payments notwithstanding the same, may have been made without the consent or authority or in law or otherwise to the contrary. 98.3 In every case in which by virtue of the provisions of Section 12, Sub-section (i) of workmen's compensation Act, 1923 or other applicable provision of Workmen Compensation Act or any other Act, the EMPLOYER/ Owner is obliged to pay compensation to a workman employed by the Contractor in execution of the Work, the EMPLOYER/ Owner will recover from the Contractor the amount of the compensation so paid, and without prejudice to the rights of EMPLOYER/ Owner.

under Section 12, Sub- section (2) of the said Act, EMPLOYER/ Owner shall be at liberty to recover such amount or any part thereof by deducting it from the Contract Performance Security or from any sum due to the Contractor whether under this Contract or otherwise. The EMPLOYER/ Owner shall not be bound to contest any claim made under Section 12, Sub-section (i) of the said act, except on the written request of the Contractor and upon his giving to the EMPLOYER/ Owner full security for all costs for which the EMPLOYER/ Owner might become liable in consequence of contesting such claim.

99. Health and Sanitary Arrangements for Workers

99.1 In respect of all labour directly or indirectly employed in the Works for the performance of the Contractor's part of this agreement, the Contractor shall comply with or cause to be complied with all the rules and regulations of the local sanitary and other authorities or as framed by the Owner from time to time for the protection of health and sanitary arrangements for all workers.

99.2 The Contractor shall provide in the labour colony all amenities such as electricity, water and other sanitary and health arrangements. The Contractor shall also provide necessary surface transportation to the place of work and back to the colony for their personnel accommodated in the labour colony.

[I] APPLICABLE LAWS & SETTLEMENT OF DISPUTES

100. Settlement of Dispute

(a) If any dispute or difference or claim occurs between the Owner and the Contractor in connection with or arising out of the Contract including without prejudice to the generality of the foregoing, any question regarding the formation, existence, validity termination or breach, the parties shall seek to resolve any such dispute or difference by mutual consent. If the parties fail to resolve, such a dispute or difference by mutual consent, within 45 days of such dispute or difference being raised by one party to the other, then such disputes/claims/differences shall be resolved through arbitration in the mode and manner provided in clause (b) and (c) as hereinafter mentioned below. No arbitration proceedings will commence unless such notice is given.

b. In case the Contractor is an entity covered under Department of Public Enterprises, Government of India Office Memorandum No. 05/0003/2019-FTS-10937, as amended from time to time (DPE Office Memorandum): In the event any dispute or difference arises relating to the interpretation and application of the provisions of Contract and the Parties fails to resolve the dispute as per Clause 100 (a) above, all such dispute or difference shall be taken up by either party for resolution in accordance with the DPE Office Memorandum.

c. in all other cases (i.e Contractor not falling within the purview of the DPE Office Memorandum): If the parties fails to resolve the dispute/differences in accordance with Clause 100(a) above, all such disputes/differences shall be settled through an arbitral tribunal consisting of three Arbitrators with one Arbitrator each to be nominated by the Owner and the Contractor respectively and the third Arbitrator to be appointed as the presiding arbitrator by both the Arbitrators in accordance with the Arbitration and Conciliation Act, 1996. If either of the parties fails to appoint its Arbitrator within 60 (sixty) days after receipt of a notice from the other party invoking the arbitration, the Arbitrator appointed by the party invoking the arbitration clause shall act as the sole arbitrator to conduct the arbitration under the Arbitration and Conciliation Act 1996, as amended from time to time. The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modification thereof. The seat of arbitration shall be New Delhi. The cost of arbitration shall equally be borne by the parties.

d. Notwithstanding the pendency of dispute or difference or claim for arbitration, the parties hereto shall continue to perform their respective obligations (which are not in dispute) under the Contract.

101. Jurisdiction i. The Contract shall be governed by and interpreted in accordance with laws in force in India. The Courts of New Delhi shall have exclusive jurisdiction in all matters arising under the Contract.

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[J] SAFETY CODES

102. General

102.1 Contractor shall adhere to safe construction practice and guard against hazardous, and unsafe working conditions and shall comply with Safety rules as set forth herein. Any hazardous material used during construction or used as part of the plant has to be taken back by the supplier for recycling or dumping purpose after its operating / working life, so that it may not affect the environment or any living being. Contractor have to comply with State Pollution Board regulation.

103. Safety Regulations

103.1 i) In respect of all labour, directly employed in the Work for the performance of Contractor's part of this agreement, the Contractor shall at his own expense arrange for all the safety provisions as per safety codes of C.P.W.D., Indian Standards Institution. The Electricity Act, The Mines Act and such other acts as applicable.

ii) The Contractor shall observe and abide by all fire and safety regulations of the Owner. Before starting construction, Contractor shall consult with Owner's safety Engineers or Engineer-in-Charge/Project Manager and must make good to the satisfaction of the EMPLOYER/ Owner any loss or damage due to fire to any portion of the work done or to be done under this agreement or to any of the EMPLOYER's/Owner's existing property.

104. First Aid and Industrial Injuries

104.1 i) Contractor shall maintain first aid facilities for its employees and those of its Sub-Contractor.

ii) Contractor shall make arrangements for Ambulance Service, on requirement basis and for the treatment of industrial injuries. Names of those providing these services shall be furnished to EMPLOYER/ Owner prior to start of construction and their telephone numbers shall be prominently posted in Contractor's Site Office. ii) All critical industrial injuries shall be reported promptly to EMPLOYER/ Owner, and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to the EMPLOYER/ Owner.

105. General Rules

105.1 Site is a Non-smoking zone area. Hence, smoking within the battery area is strictly prohibited.

106. Contractor's Barricades

106.1 i) Contractor shall erect and maintain barricades required in connection with his operation to guard or protect:-

a) Excavations

b) Hoisting Areas.

c) Areas adjudged hazardous by Contractor's or EMPLOYER's/ Owner's inspectors.

d) EMPLOYER's/ Owner's existing property subject to damage by Contractor's Operations.

e) Rail Road unloading spots

ii) Contractor's employees and those of his Sub-Contractor's shall become acquainted with EMPLOYER's/ Owner's barricading practice and shall respect the provisions thereof.

iii) Barricades and hazardous areas adjacent to, but not located in normal routes of travel shall be marked by red flasher lanterns at nights. 107. Working at Height

107.1 i) Scaffolding or staging more than 4 meters above the ground or floor, swing suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise retarded at least one meter high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

ii) Working platform, gangway and stairway should be so constructed that they should not sag unduly or unequally and if the height of platform of the gangway or the stairway is more than 4 meters above the ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as in ii) above.

iii) Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing of railing whose minimum heights shall be 1 meter.

iv) While working at the substation and for construction of transmission line Towers and their subsequent maintenance, experienced manpower should be deployed with appropriate protection Equipment, such as insulating gloves, fall arrestor etc.

108. Excavation and Trenching

108.1 All trenches 1.5 Meters or more in depth, shall at all times be supplied with at least one ladder for each 50 Meters length or fraction thereof. Ladder shall be extended from bottom of the trenches to at least 1 meter above the surface of the ground. The sides of the trenches which are 1.5 Meters in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated materials shall not be placed within 1.5 Meters of the edge of the trench or half of the trench width whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or under-cutting shall be done.

109. Demolition/ General Safety

109.1 i) Before any demolition work is commenced and also during the progress of the demolition work a) All roads and open areas adjacent to the work site shall either be closed or suitably protected. B) No electric cable or apparatus which is liable to be a source of danger shall remain electrically charged. C) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

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ii) All necessary personal safety equipment as considered adequate should be kept available for the use of the persons employed on the Site and maintained in condition suitable for immediate use, and the Contractor shall take adequate steps to ensure proper use of equipment by those concerned.

a) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.

b) Those engaged in white washing and mixing or stacking or cement bags or any material which are injurious to the eyes be provided with protective goggles.

c) Those engaged in welding and cutting works shall be provided with protective face & eye shield, hand gloves, etc.

d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

e) When workers are employed in sewers and manholes, which are in use, the CONTRACTOR shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or board to prevent accident to the public.

f) The CONTRACTOR shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken.

1) No paint containing lead or lead product shall be used except in the form of paste or readymade paint.

2) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

3) Overalls shall be supplied by the Contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash them during and on cessation of work.

iii) When the work is done near any place where there is risk of drowning, all necessary safety equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

iv) Use of hoisting machines and tackles including their attachments, anchorage and supports shall conform to the following standards or conditions:

a) These shall be of good mechanical construction, sound materials and adequate strength and free from latent defect and shall be kept in good working order.

b) Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength and free from patent defects.

c) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding, winch or give signals to the operator.

d) In case of every hoisting machine and of every chain ring hook, shackle, swivel, and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gears referred to above shall be plainly marked with the safe working load of the conditions under which it is applicable and the same shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond safe working load except for the purpose of testing.

e) As regards Contractor's machines, the Contractor shall notify the safe working load of the machine to the Engineer-in-Charge/Project Manager whenever he brings any machinery to Site of Work and get it verified by the Engineer concerned.

v) Motors, gears, transmission lines, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as to reduce to minimum the accidental descent of the load, adequate precautions should be taken to reduce the minimum risk of any part or parts of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves, and boots as may be necessary should be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

vi) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffolds, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.

vii) These safety provisions should be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work-spot. The person responsible for compliance of the safety code shall be named therein by the Contractor.

viii) To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the Contractor shall be open to inspection by the Engineer-in-Charge/Project Manager or safety Engineer of the Owner.

ix) Notwithstanding the above clauses there is nothing in these to exempt the Contractor for the operations of any other Act or rules in force in the Republic of India. The work throughout including any temporary works shall be carried out in such a manner as not to interfere in any way whatsoever with the traffic on any roads or footpath at the site or in the vicinity thereto or any existing works whether the property of the Administration or of a third party. In addition to the above, the Contractor shall abide by the safety code provision as per C.P.W.D. Safety code and Indian Standard Safety Code from time to time.

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110. Care in Handling Inflammable Gas

110.1 The Contractor has to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinder/ inflammable liquids/ paints etc. as required under the law and/ or as advised by the fire Authorities of the Owner or Administration.

111. Temporary Combustible Structures

111.1 Temporary combustible structures will not be built near or around work site.

112. Precautions against Fire

112.1 The Contractor will have to provide portable Fire Extinguishers, Fire Buckets and drums at worksite as per specifications & standards. They will have to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinders/ inflammable liquid/ paints etc. as advised by Engineer-in-Charge/Project Manager. Temporary combustible structure will not be built near or around the work-site.

113. Explosives

113.1 Explosives shall not be stored or used on the Work or on the Site by the Contractor without the permission of the Engineer-in-Charge/Project Manager in writing and then only in the manner and to the extent to which such permission is given. When explosives are required for the Work they will be stored in a special magazine to be provided at the cost of the Contractor in accordance with the Explosives Rules. The Contractor shall obtain the necessary license for the storage and the use of explosives and all operations in which or for which explosives are employed shall be at sole risk and responsibility of the Contractor and the Contractor shall indemnify the EMPLOYER/Owner against any loss or damage resulting directly or indirectly therefrom. Only licensed persons shall be engaged for handling and working with explosives.

114. Preservation of Place

114.1 The Contractor shall take requisite precautions and use his best endeavours to prevent any riotous or unlawful behaviour by or amongst his worker and others employed or the works and for the preservation of peace and protection of the inhabitants and security of property in the neighbourhood of the Work. In the event of the Owner requiring the maintenance of a Special Police Force at or in the vicinity of the site during the tenure of works, the expenses thereof shall be borne by the Contractor and if paid by the Owner shall be recoverable from the Contractor.

115. Outbreak of Infectious Diseases

115.1 The Contractor shall remove from his camp such labour and their facilities who refuse protective inoculation and vaccination when called upon to do. Should Cholera, Plague or other infectious diseases break out the Contractor shall burn the huts, beddings, clothes and other belongings or used by the infected parties and promptly erect new huts on healthy sites as failing which the work may be done by the Owner and the cost thereof recovered from the Contractor.

116. Use of Intoxicants

116.1 The unauthorized sale of spirits or other intoxicants, beverages upon the work in any of the buildings, encampments or tenements owned, occupied by or within the control of the Contractor or any of his employee is forbidden and the Contractor shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition. In addition to the above, the Contractor shall abide by the safety code provision as per C.P.W.D. safety code, Indian Standard Code & OHSAS 18001 framed from time to time.

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# SECTION- V

# SPECIAL CONDITIONS

# OF CONTRACT

# (SCC)

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## SPECIAL CONDITIONS OF CONTRACT (SCC)

The following Special Conditions of Contract (SCC) shall supplement the General Conditions of Contract (GCC). Wherever there is a conflict, the provisions herein shall prevail over those in the GCC. The corresponding Clause number(s) of the GCC is/ are indicated in parentheses.

SCC No.	GCC Clause Ref. No. (If Applicable)	Details/ Description/ Special Conditions
1.	Definitions (GCC clause-1)	<p>The Employer/Owner is:</p> <p>REC Power Development and Consultancy Limited, Plot Number 1-4, REC World Headquarters, D-Block, Sector-29, Gurugram – 122001, Haryana, India Website: <a href="http://www.recpdcl.in">www.recpdcl.in</a></p> <p>Kind Attn.: Shri Mukul Agarwal, General Manager (RE) Email: - <a href="mailto:rediv@recpdcl.in">rediv@recpdcl.in</a></p>
2.	GCC Clause 1.1.31	<p>The Engineer-in-Charge:</p> <p>“Shall be intimated to the successful bidder”</p>
3.		<p>The Time period for Land Procurement and Commissioning for the cumulative capacity of 1MW Ground mounted Solar PV Power Plant along with other associated equipment as per this tender document in total shall be 9 (Nine) Months from the Date of the Notification of Award NOA/LOA/LOI.</p> <p>Further Contractor is also to provide Operation &amp; Maintenance Contract of Solar Photo Voltaic Plant for a period of 05 (Five) years from the date of Operational Acceptance of the Plant</p>

SCC No.	Stage	Reference from D
3.1	Issue of NOA/ LOA/ LOI (as applicable)	Zero Date (D)
3.2	Date of successful commissioning	<b><u>D + 9 Months</u></b>
	The contractor shall submit the L2/L3 schedule for the project clearly indicating the timelines for submission and approval of drawings, procurement, and transportation of materials to site, their installation at site, commissioning, PRtest etc.	

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S. No.	GCC Clause Ref. No. (If Applicable)	Details/ Description/ Special Conditions
4	Construction Water Supply (GCC clause 2.3)	Add following to the existing clause:  The Contractor shall make own arrangements at his cost from the nearest supply source as per Owner terms and conditions.
5	Construction Power Supply  GCC clause 2.4)	Add following to the existing clause:  The Contractor shall make own arrangements at his cost from the nearest supply source as per Owner terms and conditions.
6	Land for contractor's field office, godown and Workshop  (GCC clause 2.5)	Add following to the existing clause:  The contractor shall make own arrangement at his cost for the duration of the execution of the work near the site as per RECPDCL terms and conditions for construction of Contractor's Temporary Field Office, godowns, workshops and assembly yard required for the execution of the Contract.
7	Land for Residential Accommodation  (GCC clause 2.6)	<b><u>Replace the existing clause by following:</u></b>  Contractor has to arrange the accommodation for their staff/labour.
8	Contract Performance Security  (GCC clause 24)	<b><u>Replace the existing clause by following:</u></b>  Against Composite EPC & O&M Contract of the project, within 30 (Thirty) days from the issuance of the Notification of Award/ Letter of Intent/Letter of Award, the successful bidder shall furnish unconditional and irrevocable individual Bank Guarantees issued by any Nationalized Banks in the manner as mentioned below.  The Contract Performance Security shall be in the form of Bank Guarantee only and shall be in the currency of the Contract and will be issued in the name of the Owner as "REC Power Development Consultancy of India Ltd".  The Contract Performance Security against this Contract need to be furnished as mentioned below:  1. First Stage (Supply and Services): The value of the Contract Performance Security shall be 10% (Five percent) of the Contract Value (i.e., total sum of the Supply & Service Contract). This Performance security will be valid for a total period of 72 Months (9 Months Project commissioning period + prescribed O & M Period, i.e., 60 Months + 03 Months additional) from the date of its issuance. The successful bidder can submit Contract Performance Security with initial validity of 36 months and the same may be extended after every 36 months till completion of the total 72 months period.  2. The Contract Performance Security shall be towards faithful performance of the contractual obligations and performance of equipment.  3. In case of any default or failure of the Contractor to comply with the requirements of any of the Obligations covered under this Tender Document and/ or Contract Agreement shall constitute sufficient grounds for forfeiture of the entire Contract Performance Security, in such cases, the liability on account of GST will be borne by the contractor.  4. Further, any delay beyond 30 (Thirty) days shall attract delay charges @ 1.25% per month on the total Contract Performance Security amount, calculated on pro-rata basis accordingly. However, total project completion period shall remain same. Part Security shall not be accepted. Further, Owner at its sole discretion may cancel the Contract Agreement/ NOA & forfeit 100% of EMD inclusive of GST, in case Contract Performance Security is not submitted within 45 (Forty-Five) days from issuance of NOA/LOA/LOI.

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S. No.	GCC Clause Ref. No. (If Applicable)	Details/ Description/ Special Conditions
		<p>Contract Performance Security submitted shall be released to the Contractor without any interest not later than 75 (Seventy- Five) days after the successful completion of the complete O&amp;M period (5 Years) subject to the approval and acceptance of the O&amp;M period deliverables.</p> <p>5. Payment on Order Instrument (POI) against PBG:</p> <p>As an alternative to submission of PBG as above, the successful bidder also has an option to submit a letter of undertaking issued by either of the following three organizations, viz. (i) Indian Renewable Development Agency Limited (IREDA) or (ii) Power Finance Consultancy Limited or (iii) REC Limited. This Letter of Undertaking shall be issued as “Payment on Order Instrument” (POI), wherein the POI issuing organization undertakes to pay in all scenarios under which the PBG would be liable to be encashed by RECPDCL within the provisions of tender. This instrument would have to be furnished as per Format 28 of the tender document, within the timelines, for the amount and validity period as per clause above. In case the successful bidder chooses to submit POI, delay in submission of the POI beyond the timeline stipulated above, will be applicable in this case too.</p> <p>The term “Performance Bank Guarantee (PBG)” occurring in the entire tender document shall be read as “e-PBG/Performance Bank Guarantee” (PBG)/Payment on Order Instrument (POI)”.</p>
9	Contractor’s responsibility (GCC clause 32.1.3)	<p><u>Replace the existing clause by following:</u></p> <p>In the matter of connectivity of Plant to STU substation, the Contractor will take the necessary connectivity permission, however along with all the other permissions such as technical/regulatory compliance for interconnection etc. All the required fees including statutory fees, Supervision charges etc. shall be paid / born by the contractor.</p>
10	Materials to be supplied by Contractor(GCC clause 58.4 and58.5)	<p><u>Replace the existing clause by following:</u></p> <p>58.4 Storage of Equipment</p> <p>The plant and equipment thus procured under the scope of the contract and PV Modules as supplied by the Owner must be kept in safe custody till put under operation, essentially free from water contact. All the spares, as required for the trouble-free comprehensive O&amp;M of Plant, must be kept under secure storage during O&amp;M period. Contractor has to ensure the appropriate and proper storage arrangement prior to the arrival of the equipment including containers, temporary structures, sheds, platforms etc at its own cost.</p> <p>The Contractor shall procure and provide within the Value of Contract the whole of the materials required for the construction including steels, cement and other building materials, tools, tackles, construction plant and equipment for the completion and maintenance of the Work except the materials which will be issued by the Owner and shall make his own arrangement for procuring such materials and for the transport thereof. The Owner may give necessary recommendation to the respective authority if so desired by the Contractor but assumes no further responsibility of any nature. The Owner will insist on the procurement of materials which bear ISI stamp and/ or which are supplied by reputed suppliers.</p> <p><u>58.5</u> The Contractor shall properly store all materials either issued to him (PV Modules which will be issued by the Owner) or brought by him to the Site to prevent damages due to rain, wind, direct exposure to sun, etc. as also from theft, pilferage, etc. for proper and speedy execution of his works. The Contractor shall maintain sufficient stocks of all materials required by him including commissioning spares</p>

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S. No.	GCC Clause Ref. No. (If Applicable)	Details/ Description/ Special Conditions
11	<p><b>Conditions for Issue of Materials</b></p> <p>(GCC clause 60)</p>	<p><u>Replace the existing clause by following:</u></p> <p>i) PV modules will be supplied to the Contractor by the Owner from the manufacturing plant. The transportation and unloading of the PV modules will be done by the supplier of the PV modules from the manufacturing plant to the designated storage location at the site. It shall be responsibility of the Contractor to take delivery of the materials and arrange for its storage at the Site of Work at his own cost. Once the material is issued or taken over by the Contractor, then the same will be his own liability to store, use &amp; maintain.</p> <p>ii) The Contractor shall bear all incidental charges for the storage and safe custody of materials at site after these have been issued or taken over by him.</p> <p>iii) Materials specified as to be issued by the Owner shall be issued in standard sizes as obtained from the manufacturers.</p> <p>iv) The Contractor shall construct suitable storage yard at the Site of Work for storing the modules safe against damage by rain, dampness, fire, theft etc. He shall also employ necessary watch and ward along with proper illumination establishment for the purpose.</p> <p>v) It shall be duty of the Contractor to inspect the materials supplied to him at the time of taking delivery/handing over and satisfy himself that they are in good condition. After the materials have been delivered by the Owner, it shall be the responsibility of the Contractor to keep them in good condition and if the materials are damaged or lost, at any time, they shall be repaired and/ or replaced by him at his own cost. Upon identifying a damaged module post handing over of the Modules to the contractor, the contractor shall keep them in a separate storage and enlist them, upon verification, the entire damaged modules shall be replaced. In case of any discrepancy, the differential modules cost shall be debited from contractors' RA bills.</p> <p>vi) The Owner shall not be liable for delay in supply or non-supply of any materials which the Owner has undertaken to supply where such failure or delay is due to natural calamities, act of enemies, transport and procurement difficulties and any circumstances beyond the control of the Owner. In no case, the Contractor shall be entitled to claim any compensation or loss suffered by him on this account.</p> <p>vii) It shall be responsibility of the Contractor to arrange in time all materials required for the Work other than those to be supplied by the Owner. If, however, in the opinion of the Engineer-in- Charge/Project Manager the execution of the Work is likely to be delayed due to the Contractor's inability to make arrangements for supply of materials which normally he has to arrange for, the Engineer-in-Charge/Project Manager shall have the right at his own discretion to issue such materials, if available with the Owner or procure the materials from the market or as elsewhere and the Contractor will be bound to take such materials at the rates decided by the Engineer-in-Charge/Project Manager. This, however, does not in any way absolve the Contractor from responsibility of making arrangements for the supply of such materials in part or in full, should such a situation occur nor shall such action by Owner constitute a reason for the delay in the execution of the Work.</p> <p>viii) The Contractor shall, if desired by the Engineer-in- Charge/Project Manager, be required to execute an Indemnity Bond in the prescribed form for safe custody and accounting of all materials issued by the Owner.</p> <p>ix) Account of the materials issued by the Owner shall be maintained by Contractor indicating the daily receipt, consumption and balance in hand. This</p>

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S. No.	GCC Clause Ref. No. (If Applicable)	Details/ Description/ Special Conditions
		<p>account shall be maintained in a manner prescribed by the Engineer-in-Charge/Project Manager along with all connected papers viz. requisitions, issues, etc., and shall be always available for inspection in the Contractor's office at Site.</p> <p>x) Materials/ Equipment(s) supplied by EMPLOYER/ Owner shall not be utilized for any purpose(s) than issued for.</p>
12	Inspection of Works(GCC clause 66)	<p><b><u>Add following to the existing clause:</u></b></p> <p><b>66.4</b> All PV Modules supplied at the site shall be inspected at site by the Contractor along with the Owner. In all cases necessary test certificates, guarantee certificate in respect of material/equipment performance shall be furnished by the Contractor.</p>
13	<b>Training</b>  (GCC clause 76.6)	<p><b><u>Add following to the existing clause:</u></b></p> <p>The contractor shall provide training (free of cost) to the personnel of RECPDCL/Nominated person of RECPDCL for 50 (Fifty) man-days at his works/or at the mutually agreed designated place/ or at site for erection, testing, commissioning and O&amp;M of the Project. Expenses towards travel, lodging, and boarding for the personnel shall be borne by RECPDCL. Such training may include Class Room &amp; hands on experience etc as mutually agreed.</p>
14	Schedule of Rates & Payments  (GCC clause 80.1)	<p><b>Add following to the existing clause:</b></p> <p>All payments shall be made against invoices raised in line with the approved billing break up under individual heads of Supply, Services and Civil works. Following general payment terms will be followed, which will be payable after complying the provision of ALMM clause only.</p> <p>A. Land Lease payment: Lease rent payment of Land shall be paid quarterly directly by RECPDCL to Land owner(s).</p> <p>B. The payment for the Supply Portion of the First Contract (Supply Contract) shall be made as per the following terms and conditions:</p> <p>i) Seventy percent (70%) payments shall be paid on Pro-rata basis against supply, receipt and acceptance of Materials at site on submission of documents, Contractor's detailed invoice &amp; packing list identifying contents of each shipment, evidence of dispatch (GR/ LR copy), Manufacturer's/ Contractor's Guarantee certificate of Quality, submission of the certificate by the Executing Agency's authorized representative that the item(s) have been received and MDCC (Material Dispatch Clearance Certificate) issued by EMPLOYER's authorized representative in original.</p> <p>(ii) Twenty percent (20%) payments shall be paid against successful Erection, testing and commissioning of materials on pro rata basis at site.</p> <p>(iv) Final Ten percent (10%) payment of Supplies shall be paid against submission of the BG of the equivalent amount &amp; against the Operational Acceptance of the plant Facility pursuant to successful Guarantee Tests and demonstration of Performance Ratio (PR) including submission of all as-built drawings and O&amp;M manual. This BG shall be valid for a period of 18 (Eighteen) months from the date of its issuance &amp; will be released after CUF demonstration on completion of first year of O&amp;M, pursuant to the submission of all requisite documentation up to the final acceptance of the Plant facilities. However, in case of any delay, the BG shall be extended suitably.</p> <p>C. The payment for the Service Portion of the First Contract (Services Contract) shall be made as per the following terms and conditions.</p> <p>i) For Freight and Insurance Portion, the payment shall be made in line with</p>

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S. No.	GCC Clause Ref. No. (If Applicable)	Details/ Description/ Special Conditions
		<p>Supply Portion of the First Contract, as described in point B(ii) of this clause, without releasing any initial advance. The complete payment of the freight will be made along with the respective deliveries of the supply portion at site.</p> <p>ii) For Erection, Testing and Commissioning Portion, the payment shall be made as detailed below: -</p> <p>(a) Eighty Percent (80%) of the total price of Design, Engineering, Erection, Testing and Commissioning shall be paid on pro-rata basis on completion of installation of equipment on certification by the Engineer-In-Charge/ Project Manager for the quantum of work completed after successful clearance of quality check points involved in the quantum of work billed.</p> <p>(b) Ten Percent (10%) of the total price of Design, Engineering, Erection, Testing and Commissioning shall be paid against successful commissioning of the plant on pro rata basis for the capacity commissioned.</p> <p>(c) Final Ten percent (10%) payment of Services shall be paid against submission of the BG of the equivalent amount &amp; against the Operational Acceptance of the plant Facility pursuant to successful Guarantee Tests and demonstration of Performance Ratio (PR) including submission of all as-built drawings and O&amp;M manual. This BG shall be valid for a period of 18 (Eighteen) months from the date of its issuance &amp; will be released after CUF demonstration on completion of first year of O&amp;M, pursuant to the submission of all requisite documentation up to the final acceptance of the Plant facilities. However, in case of any delay, the BG shall be extended suitably.</p> <p>iii) For Civil &amp; Allied works portion, of the First contract, the payment shall be made as detailed below:</p> <p>(a) Eighty Percent (80%) of the total price of Civil Works shall be paid progressively on certification by the Project Manager/ Engineer In - Charge for the quantum of work completed/ Milestones achieved after successful clearance of quality check points involved in the quantum of work.</p> <p>(b) Ten Percent (10%) of the total price of Civil Works shall be paid against successful commissioning of the plant on pro rata basis for the capacity commissioned.</p> <p>(c) Final Ten percent (10%) payment of Civil Works shall be paid against submission of the BG of the equivalent amount &amp; against the Operational Acceptance of the plant Facility pursuant to successful Guarantee Tests and demonstration of Performance Ratio (PR) including submission of all as-built drawings and O&amp;M manual. This BG shall be valid for a period of 18 (Eighteen) months from the date of its issuance &amp; will be released after CUF demonstration on completion of first year of O&amp;M, pursuant to the submission of all requisite documentation up to the final acceptance of the Plant facilities. However, in case of any delay, the BG shall be extended suitably.</p> <p>D. For the Second Contract (Operation &amp; Maintenance Part), the payment shall be made as detailed below: -</p> <p>(a) Operation and Maintenance of the entire Project payment will be released on quarterly basis at the end of every quarter for each year till 05 (Five) years.</p> <p>(i) Year 1 : OM -1  (ii) Year 2 : OM -2  (iii) Year 3 : OM -3  (iv) Year 4 : OM -4</p>

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S. No.	GCC Clause Ref. No. (If Applicable)	Details/ Description/ Special Conditions
		<p>(v) Year 5 : OM -5</p> <p>In case of any default, Non-Performance or breach of contractual conditions of the O&amp;M contract during the O&amp;M period, the penalties/deductions, if applicable will be liable to be deducted from the Quarterly O&amp;M payments first &amp; then from the Contract Performance Security.</p> <p>E. The required ESI/PF Challans/any other mandatory compliance will also be provided by the Contractor during any of the Service (Services + O&amp;M) related payments.</p> <p>F. All the payment shall be released from Owner's Head Office upon submission of Original Documents like MDCC, delivery challan, warranty certificate, LR, WCC, MRN, commissioning certificate, handing over certificate, Insurance, PF, ESI, etc as required and mentioned against each Milestone payment, duly certified by the authorized representative of the EMPLOYER/Owner.</p> <p>A payment to be taken through "TReDS" or directly from RECPDCL is a sole discretion of the supplier. RECPDCL shall not intervene in the supplier's decision to place their invoices on "TReDS" Platform or directly taking payments from RECPDCL.</p> <p>TReDS" option shall only be given to the MSME supplier and any other supplier "NOT" registered as MSME with RECPDCL, cannot avail this facility.</p>
16	Penalties	<p>1. Delay in commencement of supply of power, beyond the Scheduled Commencement of Supply Date (SCSD) shall involve penalties on the EPC Contractor as detailed further:</p> <p>i. RECPDCL will levy penalty for delay on per day basis at Rs.5,000/- per day plus applicable taxes and duties and may encash the Performance Bank Guarantee (PBG)/POI for this purpose, if required.</p> <p>ii. For Delay in commencement of supply of power beyond 3 (three) months from the Commencement of Supply Date (SCSD) or the extended SCSD (if applicable) –Event of Default shall be considered to have occurred and contract shall stand terminated and Performance Bank Guarantee (PBG) will be encashed by RECPDCL on the basis of <b>Risk and cost</b> analysis done by RECPDCL.</p> <p>2. CUF maintenance at least <b>19%</b> or declared CUF (whichever is higher) for 1<sup>st</sup> year and declared CUF there afterwards will be maintained as per the contract. In case CUF is not maintained the penalty will be deducted from O&amp;M contractor's payments.</p> <p>The contractor shall maintain generation so as to achieve annual CUF within (+/-) 10% of the declared value till the end of 10 years from COD.</p> <p>If, for any contract year, it is found that the project supplies less energy than the energy corresponding to the minimum CUF, the contractor will be liable to pay penalty for the shortfall in availability of energy. The amount of such penalty will be equal to one and a half (1.5) times the tariff agreed with REC for the shortfall in energy terms.</p> <p>3. Penalties, fines and charges imposed by the STU under any statute or regulation in relation to delay in commissioning of the project shall be payable by the Composite EPC contractor to the extent the delay is attributable to the Composite EPC contractor.</p>

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<p align="center"><u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024</p>	<p align="center">SCC Page 8 of 9</p>	<p align="center"><u>Signature of Bidder</u></p>
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S. No.	GCC Clause Ref. No. (If Applicable)	Details/ Description/ Special Conditions
		<p>4. Any penalties/ fees / any liabilities imposed by any Govt. agency/ Authority/ Dept. due to non-compliance of the relevant standards/ laws/ regulations during O&amp;M imposed will be deducted from the O&amp;M payments.</p> <p>5. IDC compensation - In the event of any delay in the execution of the project by the EPC contractor, resulting in the RECPDCL incurring Interest during construction payable to the lender, the EPC contractor shall be liable to compensate RECPDCL for such Interest during construction payments made to the lender. The compensation shall be calculated based on the actual amount of Interest during construction paid by RECPDCL and shall be paid by the EPC contractor within 15 days from the date of notice given by RECPDCL.</p>
17	GCC-Clause No. 20	Liquidated Damages (LD)- Deleted
18	Additional Clause	<p>The Bank account details of RECPDCL for the purpose of depositing Cost of Bidding Documents and Tender Processing Fee:</p> <p>Account Name: REC POWER DEVELOPMENT AND CONSULTANCY LIMITED  Account Number:10171707713  Bank Name: IDFC First Bank Ltd.  Branch Name: Gurgaon Golf Course Road Branch  IFSC Code: IDFC0021001</p>

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# SECTION - VI

## SAMPLE FORMS & FORMATS

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 1 of 57	<u>Signature of Bidder</u>
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**Preamble**

This Section (Section - VI) of the Bidding Documents [named as Sample Forms and Formats (SFF)] provides proforma to be used by the bidders at the time of their bid preparation and by the Contractor subsequent to the award of Contract.

The Bidder shall complete, sign and submit with its bid the relevant FORMS to be used un amended, in accordance with the requirements included in the Bidding Documents.

The Bidder shall provide the EMD, if applicable in the form included hereafter acceptable to the EMPLOYER, pursuant to the provisions in the instructions to Bidders.

The Performance Security (ies) and Bank Guarantee for Advance Payment forms should not be completed by the bidders at the time of their bid preparation. Only the successful Bidder will be required to provide the Performance Security(ies) and Bank Guarantee for Advance Payment, according to one of the forms indicated herein acceptable to the Owner/EMPLOYER and pursuant to the provisions of the General and Special Conditions of Contract, respectively.

Depending on specific facts and circumstances related to the Bid/ Tender and the contract, the text of the Forms herein may need to be modified to some extent. The EMPLOYER reserves the right to make such modifications in conformity with such specific facts and circumstances and rectify and consequent discrepancies, if any. However, modifications, if any, to the text of the Forms that may be required in the opinion of the Bidder/ Contractor shall be effected only if the same is approved by the EMPLOYER. The EMPLOYER's decision in this regard shall be final and binding.

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<b><u>LIST OF FORMS &amp; FORMAT</u></b>	
<b>FORM NO.</b>	<b>DESCRIPTION</b>
F-0	COVERING LETTER
F-1	BIDDER'S GENERAL INFORMATION
F-2	PROFORMA OF "BANK GUARANTEE" FOR "EARNEST MONEYDEPOSIT (EMD)"
F-3	NO DEVIATION CONFIRMATION
F-4	DECLARATION REGARDING BANNING AND LIQUIDATION, COURT RECEIVERSHIP ETC.
F-5	DECLARATION REGARDING THE MANDATORY PROCUREMENT OF INVERTERS FROM CLASS I LOCAL SUPPLIERS
F-6	BIDDER'S EXPERIENCE
F-7	FORMAT OF CHARTERED ACCOUNTANT CERTIFICATE FOR FINANCIAL CAPABILITY OF THE BIDDER
F-8	E-BANKING FORMAT
F-9	LIST OF BANKS
F-10	SHAREHOLDING CERTIFICATE
F-11	POWER OF ATTORNEY FOR BIDDING COMPANY
F-12	FORMAT FOR CYBER SECURITY AGREEMENT
F-13	INTEGRITY PACT FORMAT
F-14	FORMAT OF PAYMENT ON ORDER INSTRUMENT TO BE ISSUED BY IREDA/REC/PFC (IN LIEU OF BG TOWARDS EMD)
F-15	FORMAT OF PAYMENT ON ORDER INSTRUMENT TO BE ISSUED BY IREDA/REC/PFC (IN LIEU OF BG TOWARDS PBG)
F-16	FORMAT FOR UNDERTAKING REGARDING CONFIRMATION ON INSPECTION OF MODULE UNDER CONTRACTOR SCOPE
F-17	FORMAT FOR JOINT VENTURE AGREEMENT
F-17A	FORMAT FOR POWER OF ATTORNEY FOR JOINT VENTURE AGREEMENT
F-18	FORMAT FOR CONSORTIUM AGREEMENT
F-18A	FORMAT FOR POWER OF ATTORNEY OF CONSORTIUM AGREEMENT
F-27	PERFORMANCE BANK GUARANTEE
F-28	ADVANCE BANK GUARANTEE
F-30	FORM OF UNDERTAKING BY BIDDER AND THE FIRM
F-31	UNDERTAKING RELATED TO ESG
F-32	UNDERTAKING BY THE CONTRACTOR FOR THE PLANT HANDED OVER FOR THE OPERATIONAL PERFORMANCE
F-60	DECLARATION BY CONTRACTOR
F-61	FORMAT FOR PRE-BID QUERIES

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 3 of 57	<u>Signature of Bidder</u>
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**Form F-0**

**COVERING LETTER**

(The Covering Letter should be submitted on the Letter Head of the Bidding Company)

Ref.No. \_\_\_\_\_

Date: \_\_\_\_\_

From: \_\_\_\_\_ (Insert name and address of Bidding Company)

Tel.#: \_\_\_\_\_

Fax#: \_\_\_\_\_

E-mail address# \_\_\_\_\_

To \_\_\_\_\_

REC Power Development and Consultancy Limited,  
Plot Number I-4, REC World Headquarters, D-Block,  
Sector-29, Gurugram-122001,  
Haryana, India  
Website: www.recpdcl.in

Sub: Bid for "Composite EPC for setting up of Grid Connected 1 MW Ground Mounted Solar PV plant with arrangement of Land and ISTS Connectivity"

Dear Sir / Madam,

1. We, the undersigned.... [insert name of the 'Bidder'] having read, examined and understood in detail the tender Document for Bid for "Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity" hereby submit our Bid comprising of Techno Commercial Bid and Price Bid.

"We confirm that neither we nor any of our Parent Company/ Affiliate / Ultimate Parent Company has submitted Bid other than this Bid directly or indirectly in response to the aforesaid tender."

Note: In case a common Company/Companies directly or indirectly hold(s) more than 10% but less than 26% shareholding in more than one Bidder participating in the Tender, each of such Bidders will be required to submit the Disclosure as per the attached format. In such a case, the above-mentioned highlighted declaration/statement will be modified suitably by the bidder. In all other cases, this disclosure is not required & standard covering letter & other forms & formats will be applicable.

2. We give our unconditional acceptance to the tender, dated \_\_\_\_\_ and \_\_\_\_\_ tender documents attached thereto, issued by REC Power Development Consultancy Limited, as amended. As a token of our acceptance to the tender documents, the same have been initialed by us and enclosed to the Bid. We shall ensure that we execute such tender documents as per the provisions of the tender and provisions of such tender documents shall be binding on us.

3. Bid Capacity

We have bid for the Total capacity of 1 MW under Route as per the laid down Technical Eligibility Conditions.

4. Bid Processing Fees

We have enclosed a Bid Processing Fees of INR \_\_\_\_\_ (Insert Amount), in the form of Demand Draft/

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Banker's Cheque no..... (Insert reference of the DD/ Banker's Cheque) dated (Insert date of DD/ banker's cheque) from (Insert name of Bank providing DD/ banker's cheque) and valid up to and including ..... in terms of Clause ..... of this tender.

5. Earnest Money Deposit

We have enclosed an Earnest Money Deposit of INR..... (Insert Amount), in the form of bank guarantee no..... (Insert reference of the bank guarantee) dated..... (Insert date of bank guarantee) as per Form F-2 from .....(Insert name of Bank providing BG) and valid up to and including ..... in terms of Clause ..... of this tender.

6. We have submitted our Price Bid strictly as per this tender, without any deviations, conditions and without mentioning any assumptions or notes for the Price Bid in the said format(s).

7. In case we are a Successful Bidder, we shall furnish a declaration at the time of commissioning of the Project to the effect that neither we have availed nor we shall avail in future any Incentive other than received from Employer/Owner for implementation of the project.

8. Acceptance

We hereby unconditionally and irrevocably agree and accept that the decision made by REC Power Development Consultancy Limited in respect of any matter regarding or arising out of the tender shall be binding on us. We hereby expressly waive any and all claims in respect of Bid process. We confirm that there are no litigations or disputes against us, which materially affect our ability to fulfil our obligations with regard to execution of project of capacity offered by us.

9. Familiarity with Relevant Indian Laws & Regulations

We confirm that we have studied the provisions of the relevant Indian laws and regulations as required to enable us to submit this Bid and execute the tender documents, in the event of our selection as Successful Bidder. We further undertake and agree that all such factors as mentioned in tender have been fully examined and considered while submitting the Bid.

10. Contact Person

Details of the contact person are furnished as under:

Name : .....  
 Designation : .....  
 Company : .....  
 Address : .....  
 Phone Nos. : .....  
 Fax Nos. : .....  
 E-mail address : .....

11. We are enclosing herewith the Envelope-I (Covering Letter, Processing Fees, EMD etc through Offline and Online, Techno-Commercial documents through online as per clause no. 11.1 of Section - II, ITB) and Envelope II (Price Bids) (through online) containing duly signed formats, each one duly sealed separately, in one original as desired by you in the tender for your consideration as per clause no. 11.0 of Section - II, ITB.

It is confirmed that our Bid is consistent with all the requirements of submission as stated in the tender and subsequent communications from REC Power Development Consultancy Limited. The information submitted in our Bid is complete, strictly as per the requirements stipulated in the tender and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our Bid. We confirm that all the terms and conditions of our Bid are valid for acceptance for a period as specified in BDS from the date of opening of "Techno-Commercial/ Un-priced Bid". We

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 5 of 57	<u>Signature of Bidder</u>
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confirm that we have not taken any deviation so as to be deemed non-responsive.

Dated the\_      day of      , 20.... Thanking you,

Yours faithfully,

Name, Designation and Signature of Authorized Person in whose name Power of Attorney/ Board Resolution/ Declaration. Copy of Power of Attorney/ Board Resolution/ Declaration should be enclosed along with Covering Letter.

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 6 of 57	<u>Signature of Bidder</u>
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**Form F-1**

**BIDDER'S GENERAL INFORMATION**

**(To be submitted on the Letter Head of the Bidding Company)**

Sr. No.	Description	Remarks
1	Name of the Bidder	
2	Status of the Firm	
3	Mailing Address of Registered Office	
4	Mailing Address of Operation Office	
5	E-mail	
6	Web site	
7	Authorized Contact Person(s) with Name, Designation, Address and Mobile Phone No., E- mail address / Fax No. to whom all references shall be made	
8	Year of Incorporation	
9	Number of Years in Operation	
10	ISO Certification (Yes/No)	
11	Name of the Banker	
12	Branch Details of Bank	
13	Type of Account with Account Number	
14	IFSC Code	
15	Permanent Account Number (PAN) of the Bidder	<i>(Copy of PAN Card to be enclosed)</i>
16	Whether the Bidder is registered/ Likely to be registered under GST	Yes or No : If Yes, then customer will be treated as registered customer & he will have to provide further details as stated on the below left hand side
17	GST ID (Proof to be submitted – GST No acknowledgement OR Email from GoI)	
18	GSTN Address	

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Sr. No.	Description	Remarks
19	PF Registration Number with Details	<i>(Copy of Registration to be enclosed)</i>
20	ESI Registration Number with Details	<i>(Copy of Registration to be enclosed)</i>
21	Have the Bidder/ Company ever been debarred by any Govt. Dept./ Undertaking for undertaking any work	Yes/No <i>(If answer is YES, please provide details)</i>
22	Reference of any document information attached by the Bidder other than specified in the tender.	
23	Whether the Bidder wishes to form a Project Company for execution of work	Yes/No
24	Bidding company is listed in India	Yes/No
25	Whether company is MSME as on the bidding date	Yes/No

(Signature of Authorized Signatory)

**With Stamp**

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 8 of 57	<u>Signature of Bidder</u>
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**PROFORMA OF BANK GUARANTEE FOR EARNEST MONEY DEPOSIT (EMD)**

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

Ref. Bank Guarantee No.

Date:

This deed of Guarantee made this \_\_\_\_\_ day of 20\_\_\_\_ by \_\_\_\_\_ (Name of the Bank) having one of its branch at \_\_\_\_\_ acting through its Manager (hereinafter called the "Bank") which expression shall wherever the context so requires includes its successors and permitted assigns in favor of RECPDCL registered under the Companies Act, 1956, having its office at \_\_\_\_\_ (here in after called "RECPDCL") which expression shall include its successors and assigns.

WHEREAS RECPDCL has invited tender vide their Tender Notice No. \_\_\_\_\_ Dated \_\_\_\_\_ (Tender) to be opened on \_\_\_\_\_ AND WHEREAS M/s \_\_\_\_\_ (Name of Tenderer) having its office at \_\_\_\_\_ (hereinafter called the "Tenderer"), has/have in response to aforesaid tender notice offered to supply/ do the job as contained in the Tender.

AND WHEREAS the Tenderer is required to furnish to RECPDCL a Bank Guarantee for a Sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ Only) as Earnest Money for participation in the Tender aforesaid.

AND WHEREAS, we \_\_\_\_\_ (Name of the Bank) have at the request of the Tenderer agree to give RECPDCL this as hereinafter contained.

NOW, THEREFORE, in consideration of the promises we, the undersigned, hereby covenant that, the aforesaid Tender shall remain open for acceptance by RECPDCL during the period of validity as mentioned in the Tender or any extension thereof as RECPDCL and the Tenderer may subsequently agree and if the Tenderer for any reason back out or is not in compliance of the provisions of the Tender, whether expressly or impliedly, from his said Tender during the period of its validity or any extension thereof as aforesaid or fail to furnish Bank Guarantee for performance as per terms of the aforesaid Tender, we hereby undertake to pay RECPDCL, Gurugram on demand without demur to the extent of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ Only).

We further agree as follows: -

1. That RECPDCL may without affecting this guarantee extend the period of validity of the said Tender or grant other indulgence to or negotiate further with the Tenderer in regard to the conditions contained in the said Tender or thereby modify these conditions or add thereto any further conditions as may be mutually agreed to in between RECPDCL and the Tenderer AND the said Bank shall not be released from its liability under these presents by an exercise by RECPDCL of its liberty with reference to the matters aforesaid or by reason of time being given to the Tenderer or any other forbearance, act or omission on the part of the RECPDCL or any indulgence by REC to the said Tenderer or any other matter or thing whatsoever.
2. The Bank hereby waive all rights at any time in consistent with the terms of this Guarantee and the obligations of the Bank in terms thereof shall not be otherwise affected or suspended by reason of any dispute or dispute having been raised by the Tenderer (whether or not pending before any arbitrator, tribunal or court) or any denial of liability by the Tenderer stopping or preventing or purporting to stop or prevent any payment by the Bank to REC in terms thereof.

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3. We the said Bank, lastly undertake not to revoke this Guarantee during its currency except with the previous consent of REC in writing and agree that any change in the constitution, winding up, dissolution or insolvency of the Tenderer, the said Bank shall not be discharged from their liability.

NOTWITHSTANDING anything contained above, the liability of the Bank in respect of this Guarantee is restricted to the said sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ Only) and this Guarantee shall remain in force till \_\_\_\_\_ unless a claim under this guarantee is filed with the bank within 60(Sixty) days from this date or the extended date, as the case may be i.e. up to \_\_\_\_\_ all rights under this Guarantee shall lapse and the Bank be discharged from all liabilities hereunder.

In witness whereof the Bank has subscribed and set its name and seal here under.

Authorized Signature

Seal of Bank

Bank Contact Details & e-mail ID is to be provided

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**Form F-3**

**NO DEVIATION CONFIRMATION  
(To be submitted on the Letter Head of the Bidding Company)**

Ref. No.

Date:

From: (Insert name and address of Bidding Company)

Tel.#:

Fax#:

E-mail address#

To

REC Power Development and Consultancy Limited,  
Plot Number I-4, REC World Headquarters, D-Block, Sector-29,  
Gurugram – 122001, Haryana,  
India Website: www.recpdcl.in

Sub: Bid for the “Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity Dear Sir / Madam,

We understand that any 'deviation/ exception' in any form may result in rejection of bid. We, therefore, certify that we have not taken any 'exception/ deviation' anywhere in the bid and we agree that if any 'deviation/ exception' is mentioned or noticed, our bid may be rejected.

Place:

[Signature of Authorized Signatory of Bidder]

Date:

Name:

Designation:

Seal:

Form F-4

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 11 of 57	<u>Signature of Bidder</u>
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**DECLARATION REGARDING BANNING, LIQUIDATION, COURT RECEIVERSHIP ETC.  
(To be submitted on the Letter Head of the Bidding Company)**

Ref.No.

Date:

From: (Insert name and address of Bidding Company)

Tel.#:

Fax#:

E-mail address#

To

REC Power Development and Consultancy Limited  
Plot Number I-4, REC World Headquarters, D-Block,  
Sector-29, Gurugram – 122001, Haryana, India  
Website: www.recpdcl.in

Sub: Bid for the “Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity Dear Sir / Madam,

We hereby confirm that we are not on Banning List by EMPLOYER/ Owner or Public Sector Project Management Consultant due to “poor performance” or “corrupt and fraudulent practices” or any other reason or banned by Government department/ Public Sector on due date of submission of bid.

Further, we confirm that neither we nor our allied agency/(ies) (as defined in the Procedure for Action in case of Corrupt/ Fraudulent/ Collusive/ Coercive Practices) are on banning list of EMPLOYER/ Owner or the Ministry of New & Renewable Energy.

We also confirm that we are not under any liquidation, court receivership or similar proceedings or 'bankruptcy'.

In case it comes to the notice of EMPLOYER/ Owner that we have given wrong declaration in this regard, the same shall be dealt as 'fraudulent practices' and action shall be initiated as per the Procedure for action in case of Corrupt/Fraudulent/Collusive/Coercive Practices.

Further, we also confirm that in case there is any change in status of the declaration prior to award of contract, the same will be promptly informed to EMPLOYER/ Owner by us.

Place:

[Signature of Authorized Signatory of Bidder]

Date:

Name:

Designation:

Seal:

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**DECLARATION REGARDING THE MANDATORY PROCUREMENT OF  
INVERTERS FROM CLASS I LOCAL SUPPLIERS**

(To be submitted on the Letter Head of the Statuary Auditor/Cost Auditor of the company (In case of companies) or from a practicing cost accountant or practicing chartered accountant (In respect of suppliers other than companies))

**Reference: Ministry of New & Renewable Energy (MNRE) Order No 283/22/2019- GRID SOLAR dated 23rd Sep 2020 & any amendments thereof, for the Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of Renewable Energy (RE) Sector.**

**Reference 2: Department for Promotion of Industry and Internal Trade (DPIIT) Notification No. P-45021/2/2017-PP (BE-II) dated 4th June, 2020.**

Ref.No.

Date:

To  
REC Power Development and Consultancy Limited  
Plot Number I-4, REC World Headquarters, D-Block,  
Sector-29, Gurugram – 122001, Haryana, India  
Website: www.recpdcl.in

Sub: Bid for “.....”

Dear Sir / Madam,

We hereby confirm that in line with the mandate of Ministry of New & Renewable Energy (MNRE) Order No 283/22/2019-GRID SOLAR dated 23rd Sep 2020 for the Public Procurement (Preference to Make in India) & any amendments thereof, to provide for Purchase Preference (linked with local content) in respect of Renewable Energy (RE) Sector & Department for Promotion of Industry and Internal Trade (DPIIT) Notification No. P-45021/2/2017-PP (BE-II) dated 4th June, 2020, we hereby declare that:

- a) The procurement of Solar Inverters for the subject tender will be done from Class I Local suppliers only.
- b) The percentage of Local content in the procurement of mentioned Solar Inverters is... %  
(In words).

A Class-I local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under the above said Orders.

False declaration will be in the breach of the code of integrity under Rule 175(1)(i)(h) of the General Financial rules for which a bidder or its successors can be debarred for up to two years as per rule 151 (iii) of the general Financial rules along with such other actions as may be permissible under the law.

Also, In case it comes to the notice of EMPLOYER/ Owner that we have given wrong declaration in this regard, the same shall be dealt as 'wrong declaration under fraudulent practices' and action shall be initiated as per the Procedure for action in case of Corrupt/Fraudulent/Collusive/Coercive Practices.

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(Signature and stamp (on each page) of Authorized Signatory of Bidding Company. Name: .....

Date: .....

Place: .....

Signature and stamp (on each page) of Statuary Auditor/Cost Auditor/ practicing cost accountant or practicing chartered accountant of Bidding Company.

Name: .....

Date: .....

Place: .....

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 14 of 57	<u>Signature of Bidder</u>
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**BIDDER'S EXPERIENCE**  
(To be submitted on the Letter Head of the Bidding Company)

Ref.No.

Date:

From: (Insert name and address of Bidding Company)

Tel.#:

Fax#:

E-mail address#

To

REC Power Development and Consultancy Limited  
Plot Number I-4, REC World Headquarters, D-Block,  
Sector-29, Gurugram – 122001, Haryana, India  
Website: [www.recpdcl.in](http://www.recpdcl.in)

Sub: Bid for "Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity

Dear Sir / Madam,

Sl. No	Description on of the Services	LOA /WO No. and date	Full Postal Address & phone nos. of Client. <i>Name, designation and address of Engineer/ Officer-in-Charge (for cases other than purchase)</i>	Value of Contract/ Order (Specify Currency Amount)	Date of Commencement of Services	Scheduled Completion Time (Mont hs)	Date of Actual Completion	Reas ons for delay in execu tion , if any
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)

Place:

[Signature of Authorized Signatory of Bidder]

Date:

Name:

Designation:

Se

**FORMAT OF CHARTERED ACCOUNTANT CERTIFICATE FOR FINANCIAL CAPABILITY OF THE**

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 15 of 57	<u>Signature of Bidder</u>
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**BIDDER**  
**(To be submitted on the Letter Head of the Chartered Accountant)**

Ref. No. \_\_\_\_\_

Date:

To

REC Power Development Consultancy Limited,  
Plot Number I-4, REC World Headquarters, D-Block,  
Sector-29, Gurugram – 122001, Haryana,  
India Website: [www.recpdcl.in](http://www.recpdcl.in)

Sub: Bid for “Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity

Dear Sir / Madam,

We have verified the Annual Accounts and other relevant records of M/s... (Name of the bidder) and certify the following

Further, we certify that the Financially Evaluated Entity (ies) had an Annual Turnover

**C. ANNUAL TURNOVER OF LAST 3 YEARS:**

Year	Amount (Currency)
Year 1:	
Year 2:	
Year 3:	

And

Net worth (strike out whichever is not applicable) of INR Crore computed as per instructions provided in this tender based on unconsolidated audited annual accounts as per last FY.

**D. FINANCIAL DATA FOR LAST AUDITED FINANCIAL YEAR:**

Description	Year _____
	Amount (Currency)
1. Current Assets	
2. Current Liabilities	
3. Working Capital (Current Assets- Current liabilities)	
4. Net Worth (As mentioned under Annexure to BDS)	

Yours faithfully

(Signature and stamp (on each page) of Authorized Signatory of Bidding Company.

Name: .....

Date: .....

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Place: .....

Signature and stamp (on each page) of Chartered Accountant/Statutory Auditors of Bidding Company.

Name: .....

Date: .....

Place: .....

**Notes:**

Audited consolidated annual accounts of the Bidder may also be used for the purpose of financial criteria provided the Bidder has at least 50% equity in each company whose accounts are merged in the audited consolidated accounts and provided further that the financial capability of such companies (of which accounts are being merged in the consolidated accounts) shall not be considered again for the purpose of evaluation of the Bid.

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**e-BANKING FORMAT  
(To be submitted on the Letter Head of the Bidder)**

- 1. Bidder/ Customer Name :
- 2. Bidder/ Customer Code :
- 3. Bidder/ Customer Address :
- 4. Bidder/ Customer E-mail ID :
- 5. Particulars of Bank Account
  - a) Name of Bank :
  - b) Name of Branch :
  - c) Branch Code :
  - d) Address :
  - e) Telephone Number :
  - f) Type of Account :
  - g) Account Number :
  - h) RTGS IFSC Code :
  - i) NEFT IFSC Code :
  - j) 9 digit MICR code :

I/ We hereby authorize REC Power Development Consultancy Limited to release any amount due to me/ us in the bank account as mentioned above. I/ We hereby declare that the particulars given above are correct and complete. If the transaction is delayed or lost because of incomplete or incorrect information, we would not hold the REC Power Development Consultancy Limited responsible.

(Signature of Vendor/ Customer)

**BANK CERTIFICATE**

We certify that ----- has an Account no with us and we confirm that the details given above are correct as per our records.

Bank stamp

Date

(Signature of authorized officer of bank)

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**LIST OF BANKS  
(For Reference Purpose)**

<b>SBI AND ASSOCIATES</b>	<b>OTHER PUBLIC SECTOR BANKS</b>
1. State Bank of India	1. IDBI Bank Limited
2. State Bank of Indore	<b>FOREIGN BANKS</b>
	1. Bank of America NA
	2. Bank of Tokyo Mitsubishi UFJ Ltd.
	3. BNP Paribas
	4. Calyon Bank
	5. Citi Bank N.A.
<b>NATIONALISED BANKS</b>	6. Deutsche Bank A.G
1. Allahabad Bank	7. The HongKong and Shanghai Banking Corpn. (HSBC) Ltd.
2. Andhra Bank	8. Standard Chartered Bank
3. Bank of India	9. Societe Generale
4. Bank of Maharashtra	10. Barclays Bank
5. Canara Bank	11. Royal Bank of Scotland (RBS)
6. Central Bank of India	12. Bank of Nova Scotia
7. Corporation Bank	13. Development Bank of Singapore (DBS)
8. Dena Bank	14. Credit Agricole Corporate and Investment Bank
9. Indian Bank	<b>SCHEDULED PRIVATE BANKS</b>
10. Indian Overseas Bank	1. Federal Bank Limited
11. Oriental Bank of Commerce	2. Kotak Mahindra Bank Limited
12. Punjab National Bank	3. Axis Bank Limited
13. Punjab & Sind Bank	4. ICICI Bank Limited
14. Syndicate Bank	5. HDFC Bank Limited
15. Union Bank of India	6. Yes Bank Limited
16. United Bank of India	7. IDFC Bank Limited
17. UCO Bank	8. IndusInd Bank
18. Vijaya Bank	9. Karur Vysya Bank
19. Bank of Baroda	10. South Indian Bank
	11. RBL

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**POWER OF ATTORNEY FOR BIDDING COMPANY**  
**(To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value should be in the name of the Bidder)**

Know all men by these presents, We (name and address of the registered office of the Bidding Company as applicable) do hereby constitute, appoint and authorize Mr./Ms. .... (name & residential address) who is presently employed with us and holding the position of as our true and lawful attorney, 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 ..... (insert details of Tender) in response to the Tender No..... dated issued by RECPDCL, New Delhi including signing and submission of the Bid and all other documents related to the Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which the RECPDCL may require us to submit. The aforesaid Attorney is further authorized for making representations to the REC Power Development Consultancy Limited, New Delhi and providing information/ responses to RECPDCL, New Delhi representing us in all matters before RECPDCL, New Delhi and generally dealing with RECPDCL, New Delhi in all matters in connection with Bid till the completion of the bidding process as per the terms of the above mentioned Tender.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney 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 Tender.

**Signed by the within named**

..... (Insert the name of the executant company) through the hand of Mr. ....

**duly authorized by the Board to issue such Power of Attorney**

**Dated this ..... day of ..... Accepted**

.....  
**Signature of Attorney**  
**(Name, designation and address of the Attorney)**

**Attested**  
..... (Signature of the executant)  
(Name, designation and address of the executant)

.....  
Signature and stamp of Notary of the place of execution

Common seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated.....

WITNESS

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1. .... (Signature)

Name.....

Designation .....

2. .... (Signature)

Name.....

Designation .....

Notes:

The mode of execution of the power of attorney should 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 should be under 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 the executant(s) in this regard.

The person authorized under this Power of Attorney, in the case of the Bidding Company/ Lead Member being a public company, or a private company which is a subsidiary of a public company, in terms of the Companies Act, 1956, with a paid-up share capital of more than Indian Rupees Five Crores, should be the Managing Director/ Whole Time Director/ Manager appointed under section 269 of the Companies Act, 1956. In all other cases the person authorized should be a director duly authorized by a board resolution duly passed by the Company.

Also, wherever required, the executant(s) should submit for verification the extract of the chartered documents and documents such as a Board resolution/ power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

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**Format for Cyber Security Agreement**

To be executed by the successful bidder and shall form part of the Contract Agreement.

This Non-Disclosure Agreement (“Agreement”) is made effective on this.....(“Effective Date”)

By and Between,

REC Power Development and Consultancy Limited, which expression includes its successors and assigns) having its Registered Office at Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi -110003, hereinafter referred as Disclosing Party / RECPDCL.

And

.....having its registered office at \_\_\_\_\_ which expression includes successors and assigns, hereinafter referred as Receiving Party / Contractor.

Both collectively referred to as “Parties” and individually as “Party”.

WHEREAS

A. REC Power Development and Consultancy Limited (RECPDCL), is a wholly owned subsidiary of REC Limited, a "Maharatna" Enterprise under the Ministry of Power, Government of India. The existing key services offered by RECPDCL include coordination of bid processes for Inter-State and Intra-State transmission projects, coordination of bid processes for flexibility in generation schemes, engagement as Project Implementation Agency (PIA) for Smart Metering projects, PIA services for Distribution Infrastructure projects, Project Management Consultancy (PMC) for various Government of India Schemes such as RDSS, DDUGJY, IPDS, and Saubhagya. Beyond the core services, RECPDCL is gearing for venturing into the Renewable Energy sector through diverse business models.

B. The Contractor is engaged in .....

C. RECPDCL and Contractor are desirous of pursuing a mutually beneficial relationship through the execution of Contract awarded by RECPDCL to the Contractor vide No.... Dated The Contractor agrees that in the course of their association for executing the said Contract Agreement, there may be sharing of confidential information between them. Through this Agreement, both parties define the obligations with respect to the confidential information.

D. Contractor may receive from the other Party i.e. RECPDCL certain technical, non-technical, financial, business and other proprietary and confidential information in relation to their respective businesses and contract specific tasks.

E. Due to various Information Security related risks associated with the execution of the contract, RECPDCL desires to mitigate the perceived risks and seeks to protect its physical and intellectual assets through defined agreements with the Contractor.

NOW THEREFORE, in consideration of the above premises the sufficiency of which is hereby acknowledged, the Contractor agrees as follows:

**1. Confidential Information**

“Confidential Information” shall mean any and all information disclosed to, or otherwise acquired or identified or observed by the Receiver including its subsidiaries and affiliates, and each of their respective directors, employees, representatives and agents from the Disclosing Party and its affiliated companies, relating to the business of the Disclosing Party, or received from others that the Disclosing Party is obligated to treat as confidential, and other materials and information of a confidential nature whether communicated in writing, orally, electronically, photographically, or recorded in any other form of media, including, but not limited to, all sales and operating information, contractor’s information, employee and other human resource information, existing and potential business and marketing plans and strategies, financial information, cost and pricing information, data media, know-how, designs, specifications, technical configurations, concepts, reports, methods, processes, techniques, operations,

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devices, , product schematics or drawings, descriptive material, patent and patent applications, trade secrets, trademarks, trade names, specifications, software (source code or object code) and the like, whether or not the foregoing information is patented, tested, reduced to practice, or subject to copyright or any other intellectual property right.

“Confidential Materials” shall mean all tangible materials containing Confidential Information, including without limitation drawings, schematics, written or printed documents, computer disks, tapes, and compact disks (CD), whether machine or user readable.

Notwithstanding the above, all Confidential Information shall be specifically marked as “CONFIDENTIAL” while disclosing the same to the Receiving Party. If the same is orally disclosed then the same to be reduced in writing and marked as “CONFIDENTIAL”. Supplier, sub-contractor and other parties engaged by the Disclosing party shall have the same rights and obligations for the Confidential Information.

## 2.Obligations of Receiving Party relating to Information Security

Contractor agrees to conform to the following requirements:

a) All intelligent electronic devices (IEDs), including devices with embedded software, Automation servers Controllers, HMIs and associated network components wherein the data is routable (equipped with Ethernet/optical Ethernet, Serial/Optical Serial) must have capabilities to exceed or meet applicable technical requirements under IEEE-1686:2013 for satisfying IEC/ISO:62443-2-3, IEC/ISO:62443-2-4 and IEC/ISO:62443-3-3 requirements.

b) Contractor agrees to submit required evidences for conformance to IEC/ISO:15408 for identified network-based systems such as routers, firewalls, SIEMs etc.

c) Contractor agrees to provide IT architecture details such as Firmware details, Operating System, databases, middle-ware, application frameworks and related third-party drivers, software component libraries, including usage of virtualization/container technologies, of all devices qualifying under clause (a) above to facilitate vulnerability analysis of the device. RECPDCL reserves the right to undertake appropriate black-box testing of any system, sub-system to independently ascertain vulnerability of the product/solution.

d) Contractor agrees to enable use of Indian Regional Navigational Satellite Constellation (IRNSS) based Time Synchronization signals through appropriate use of GPS technologies that support PTP (IEEE 1588) , if available commercially.

In case the same are not available commercially, Contractor may supply the GPS Clock as per their solution requirement. However, in case RECPDCL supply the Indian Regional Navigational Satellite Constellation (IRNSS) based Time Synchronization signals through appropriate use of GPS technologies that support PTP (IEEE 1588) during this contract period (up to start of the Factory System Test), Contractor shall replace the existing Clock with the RECPDCL supplied timing solution in the Control and Protection system, without any cost implication to RECPDCL.

e) Contractor commits to ensure, its adherence to secure software development life-cycle processes as per IEC/ISO:24748-1 or a similar standard and commits itself for voluntary disclosure of vulnerabilities in the system. Contractor agrees to develop and provide patches, including those of the third-party software components, for the Contractor disclosed vulnerabilities and also for the vulnerabilities discovered/ reported by any third party organization. The Contractor agrees to ensure supply and installation of patches up to the defectliability period of the system.

f) For all software, operating system, software patches, version upgrades, firmware images etc authorized by the Contractor to be installed during the Life-Cycle of the project, the Contractor agrees to inform RECPDCL through a digitally signed email, the SHA-256 checksum of all software components.

g) The Contractor agrees to provide a list of all equipment and processes where data encryption is used. All required details for Key Management shall be provided to RECPDCL. RECPDCL at its own cost, shall supply requisite digital certificates/keys for installation and configuration of such systems as may be required for securing its interest.

h) RECPDCL shall provision Notebook PCs as per recommendations of the Contractor, which shall be only authorized device from which access to the network in use by RECPDCL, shall be

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permitted for any preventive maintenance, update and configuration.

i) The Contractor agrees to sign an undertaking as per Annexure-A, for its commitment to ensure bug and malware-free software/ software patches/ embedded software/ firmware in systems such as PLC Cards/ Logic Cards/ other microprocessor based intelligent systems. The Contractor agrees to declare with each shipment, whether during initial supply stage or subsequent repairs, diagnostics or upgrades, that it shall be solely responsible for any Criminal and/ or Civil Liabilities arising from failures due to such malware/bug. The Contractor further agrees to send a digitally signed statement by email, detailing SHA-256 checksum of all firmware/software components installed during any field/factory activity.

j) The Contractor agrees not to access through use of WiFi/ Bluetooth based networking to any device anywhere in the controlled network. All Bluetooth/ WiFi devices shall be disabled from associated firmware and Operating System in applicable devices of the controlled network.

k) The Contractor agrees to submit details of all devices equipped with Serial Ports (RS232C/RS485/USB etc including with Optical interface), Virtual Serial Ports and Serial over Ethernet. Only RECPDCL permitted devices shall be attached to serial ports. The Contractor agrees to provide systems to log details of any serial devices connected during the operation of the equipment.

### 3. Protection of Confidential Information

#### tt. Use

The Receiving Party understands and acknowledges that the Confidential Information has been developed or obtained by the Disclosing Party by the investment of significant time, effort and expense, and that Confidential Information is a valuable, special and unique asset of the Disclosing Party. Therefore, the Receiving Party agrees to hold in confidence and not to disclose the Confidential Information, to any person or entity without similar obligations agreed between the Receiving Party and such person or entity. The Receiving Party will use the same standard of care it would use to secure and safeguard its own confidential information of similar importance, but in no event less than reasonable care.

#### uu. No copying.

The Receiving Party will not copy or modify any Confidential Information without the prior written consent of the Disclosing Party, except where such copy or modification is required for the purpose of the execution of the contract. Any permitted reproduction of confidential information must contain all confidential or proprietary legends which appear on the original. The Receiving Party shall immediately notify the Disclosing Party in the event of any loss or unauthorized disclosure or use of the confidential information.

#### vv. Permitted disclosures.

The Receiving Party shall permit access to the Disclosing Party's confidential information solely to the Receiving Party's Representatives and contractors who (i) have a need to know such information; and (ii) have signed the specified confidentiality agreement / similar contract conditions in favour of Receiving Party

All staff of Receiving Party (on-roll or outsourced) shall be bound by the terms of this Agreement. The Contractor agrees to individually authorize each of the member of staff assigned with the project, binding them individually with the terms of similar to this Agreement during and also post-employment.

#### ww. Additional obligations.

The Receiving Party shall

- (i) notify the Disclosing Party promptly of any material unauthorized possession, use or knowledge, or attempt thereof, of the Disclosing Party's confidential information by any person or entity which may become known to the Receiving Party;
- (ii) promptly furnish to the Disclosing Party full details of the unauthorized possession, use or knowledge, or attempt thereof;
- (iii) use reasonable efforts to assist the Disclosing Party in investigating or preventing the recurrence of any unauthorized possession, use or knowledge, or attempt thereof, of confidential information;

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- (iv) use reasonable efforts to cooperate with the Disclosing Party in any litigation and / or investigation against third parties deemed necessary by the Disclosing Party to protect its proprietary rights;
- (v) promptly use all reasonable efforts to prevent a recurrence of any unauthorized possession, use or knowledge of confidential information;
- (vi) comply with the directives of authorized agencies of Government of India, through appropriate technical configurations and custom modifications to achieve compliance as sought by them from time to time; and
- (vii) extend its services as may be required, at least once annually, during the Information Security audits.

**xx. Unauthorized Disclosure of Information.**

If it appears that the Receiving Party has disclosed (or has threatened to disclose) Confidential Information in violation of this Agreement, the Disclosing Party shall be entitled to an injunction to restrain the Receiving Party from disclosing, in whole or in part, the Confidential Information. The Disclosing Party shall not be prohibited by this provision from pursuing other remedies, subject to suitable notice of the same to Receiving Party and Receiving Party wilfully neglecting such notice or duties under the Agreement after such notice including a claim for losses and damages.

**yy. Exceptions**

The following shall not be considered as Confidential Information:

- (h) Any information that the Receiving Party can show by documentary evidence was in its possession prior to the disclosure to it hereunder; or
- (i) Any information that comes into the possession of the Receiving Party's Representatives, from another party who is under no obligation to the other to maintain confidentiality of such information; or
- (j) Any information that becomes generally known other than through the fault of the Receiving Party,
- (k) Any particular portion of the Confidential Information which was developed by Receiving Party's Representatives independently of and without reference to any Confidential Information or other information that the Disclosing Party has disclosed in confidence to any third party.
- (l) Information available in the public domain whether in tangible or intangible form.
- (m) Information that is not proprietary or confidential to the Disclosing Party but an information received from third party not connected to the Project.
- (n) Information that has not been marked by the Disclosing Party as "Confidential".

The burden of proving these exceptions to the provisions of this Agreement resides with the Receiving Party.

**4. Remote Support.** Remote Support shall be permitted only as per RECPDCL ISO27001 Policy and Procedures. Further, remote support will only be permitted from within geographical boundaries of India. RECPDCL reserves the right to only permit the remote support with the presence of RECPDCL's authorized representative at the remote end.

**5. Compelled Disclosure.** In the event that Receiving Party or any of Receiving Party's Representatives is requested or required (by oral questions, interrogatories, requests for information or documents, subpoena, civil investigative demand or similar incidents) to disclose any of the Confidential Information to the authorities as per mandatory law, it is agreed that Receiving Party or Receiving Party's Representatives, as the case may be, will provide Disclosing Party with prompt notice of such request(s) so that Disclosing Party may seek an appropriate protective order or other appropriate remedy and/or waive compliance with the confidentiality provisions of this Agreement. In the event that such protective order or other remedy is not obtained, or Disclosing Party grants a waiver hereunder, Receiving Party or Receiving Party's Representatives may furnish that portion (and only that portion) of the Confidential Information which Receiving Party is legally compelled to disclose and will exercise reasonable efforts to obtain assurance that confidential treatment will be accorded any Confidential Information so furnished.

**6. Information Security Audit.** RECPDCL reserves the right to undertake a second party / third party Information Security Audit at any point as may be required, to ascertain the risk/ vulnerability/ threats and the Contractor agrees to take necessary corrective measures in-situ or within a defined time frame, as the case may be.

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**7. Term and Termination**

This Agreement shall be valid during the contractual period w.e.f. the date of signing of the main contract agreement.

**8. Return of Confidential Information.**

Upon the written request of the Disclosing Party, the Receiving Party shall return to the Disclosing Party all written materials / digital media containing the Confidential Information to the extent possible by the Receiving Party. The Receiving Party shall also deliver to the Disclosing Party written statements signed by the Receiving Party certifying that all materials have been returned within five (5) thirty (30) days of receipt of the request. Any unreturned Confidential Information shall be required to be maintained with similar confidentiality obligation for 10 years or as per applicable law, whichever is longer.

**9. Remedies.**

Receiving Party acknowledges that money damages may be incalculable and an insufficient remedy for any breach of this agreement by Receiving Party and that any such breach may cause Disclosing Party irreparable harm. Accordingly, Receiving Party also agrees that, in the event of any breach or threatened breach of this Agreement, Disclosing Party, in addition to any other remedies at law or in equity it may have, shall be entitled, without the requirement of posting a bond or other security, to equitable relief, including injunctive relief and specific performance.

**10. Relationship of Parties**

Neither party has an obligation under this Agreement to purchase any service or item from the other party, or commercially offer any products using or incorporating the Confidential Information. This Agreement does not create any agency, partnership or joint venture.

**11. No Grant of Proprietary Rights**

The Receiving Party recognizes and agrees that, except as expressly and specifically set forth in this agreement, nothing herein shall be construed as granting any proprietary right, by license, implication, estoppel or otherwise, to any of the Disclosing Party's, confidential information, trade mark, trade name or to any invention or any patent right that has issued or that may issue based on such confidential information. All information disclosed is provided "as is" without any warranties of any kind.

**12. Governing Law**

This Agreement shall be governed by and interpreted in accordance with the Indian laws without regard to its conflict of law principles. In particular, the provisions of Information Technology Act 2000, and rules framed thereunder shall be applicable. Further the outline of system level requirements shall be in conformance to IS:16335-2015 standard. The applicable Information Security Policy shall be the ISO-27001:2013 policy and procedures of RECPDCL as modified from time to time.

**13. Jurisdiction and Venue.** In connection with any litigation arising hereunder, Parties hereby (iii) irrevocably and unconditionally submit to the exclusive jurisdiction of courts in Delhi and (iv) Further that disputes if any, shall be dealt with as per the provisions of the dispute settlement clause mentioned in the contract / General Conditions of Contract (GCC).

**14. General Provisions.**

(h) This Agreement sets forth the entire understanding of the Parties regarding confidentiality. Any amendments must be in writing and signed by both parties.

(i) This Agreement is intended to facilitate only the exchange of Confidential Information and is not intended to be, and shall not be construed to create a teaming agreement, joint venture association, partnership, or other business organization or agency arrangement and no Party shall have the authority to bind the other without the separate prior written agreement thereof.

(j) This Agreement contains the entire agreement and understanding between the Parties hereto relating to the subject matter hereof and supersedes all other prior agreements and understandings both written and oral, between the Parties with respect to the subject matter hereof. This Agreement may be executed in several counterparts, each of which will be deemed an original, and all of which taken together will constitute one single Agreement between the Parties with the same effect as if all the signatures were upon the same instrument.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement at ..... by their duly authorized representatives as of the date first set forth above.

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**REC Power Development and Consultancy  
Limited**

**Signature:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Name:**

**Name :**

**Title**

**Title :**

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**Pre-Contract Integrity Pact**

*[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 100/-) or appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting Bids are required to follow the applicable law in their country.]*

**General**

This pre-bid pre-contract agreement (hereinafter called the Integrity Pact) is made on ..... day of the ..... month of 2024, between, on one hand, the ..... (Name of Owner) acting through Shri..... (Name and designation of Project Manager) (hereinafter called the "BUYER", which expression shall mean and include, unless *the* context otherwise requires, his successors in office and assigns) of the First Part and M/s..... (Name of Bidder) represented by Shri , Chief Executive Officer (hereinafter called the "BIDDER/Seller" which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second Part.

WHEREAS the BUYER proposes to acquire an Operational RE Asset (Name of the Stores/Equipment/Item) and the BIDDER/Seller is willing to offer

and

WHEREAS the BIDDER is a private company/public company/Government undertaking/partnership/registered export agency, constituted in accordance with the relevant law in the matter and the BUYER is a PSU performing its functions on behalf of the ..... (Name of owner).

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the BUYER to obtain the desired said Asset at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDERS to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the BUYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:

**Commitments of the BUYER**

1.

1.1 The BUYER undertakes that no official of the BUYER, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the BIDDER, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the contract.

1.2 The BUYER will, during the pre-contract stage, treat all BIDDERS alike and will provide to all BIDDERS the same information and will not provide any such information to

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	Tender No. RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 29 of 57	Signature of Bidder
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any particular BIDDER which could afford an advantage to that particular BIDDER in comparison to other BIDDERS.

1.3 All the officials of the BUYER will report to the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.

2.0 In case any such preceding misconduct on the part of such official(s) is reported by the BIDDER to the BUYER with full and verifiable facts and the same is prima facie found to be correct by the BUYER, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the BUYER and such a person shall be debarred from further dealings related to the contract process. In such a case while an enquiry is being conducted by the BUYER the proceedings under the contract would not be stalled.

**Commitments of BIDDERS**

3. The BIDDER commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commit itself to the following: -

3.1 The BIDDER will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BUYER, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, and Signing of Definitive Agreement

3.2 The BIDDER further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BUYER or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other contract with the Government for showing or for bearing to show favour or disfavour to any person in relation to the contract or any other contract with Government.

3.3 BIDDERS shall disclose the name and address of agents and representatives and Indian BIDDERS shall disclose their foreign principals or associates.

3.4 BIDDERS shall disclose the payments to be made by them to agents/brokers or any other intermediary, in connection with this bid/contract.

3.5 The BIDDER further confirms and declares to the BUYER that the BIDDER is the legal owner of the proposed Asset and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the BUYER or any of its functionaries, whether officially 'or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

3.6 The BIDDER, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payments he has made, is committed to or intends to make to officials of the BUYER or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

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3.7 The BIDDER will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.

3.8 The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

3.9 The BIDDER shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the BUYER as part of the business relationship, regarding plans, technical proposals and business details, including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and adequate care lest any such information is divulged.

3.10 The BIDDER commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.

3.11 The BIDDER shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.

3.12 If the BIDDER or any employee of the BIDDER or any person acting on behalf of the BIDDER, either directly or indirectly, is a relative of any of the officers of the BUYER, or alternatively, if any relative of an officer of the BUYER has financial interest/stake in the BIDDER's firm, the same shall be disclosed by the BIDDER at the time of filing of tender.

3.13 The term 'relative' for this purpose would be as defined in Section 6 of the Companies Act 1956.

3.14 The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the BUYER.

**4. Previous Transgression**

4.1 The BIDDER declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify BIDDER's exclusion from the tender process.

4.2 The BIDDER agrees that if it makes incorrect statement on this subject, BIDDER can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

**5. Earnest Money (Security Deposit)**

5.1 the BIDDER shall deposit an amount..... (as specified IFB) as Earnest Money/Security Deposit, with the BUYER through any of the following instruments:

- (i) Bank Draft or a Pay Order in favour of
  - (ii) A confirmed guarantee by an Scheduled Commercial Bank, promising payment of the guaranteed sum to the BUYER on demand within three working days without any demur whatsoever and without seeking any reasons whatsoever. The demand for payment by the BUYER shall be treated as conclusive proof of payment.
- (iii) Any other mode or through any other instrument.

5.2 The Earnest Money/Security Deposit shall be valid upto a period of at least 30 (Thirty) Days beyond the validity of the bid or the complete conclusion of the contractual obligations to the

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complete satisfaction of both the BIDDER and the BUYER, including warranty period, whichever is later.

5.3 In case of the successful BIDDER a clause would also be incorporated in the Article pertaining to Performance Bond in the' Definitive Agreement that the provisions of Sanctions for Violation shall be applicable for forfeiture of Performance Bond in case of a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

5.4 No interest shall be payable by the BUYER to the BIDDER on Earnest Money/Security Deposit for the period of its currency.

## 6. Sanctions for Violations

6.1 Any breach of the aforesaid provisions by the BIDDER or anyone employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER) shall entitle the BUYER to take all or any one of the following actions wherever required:

- a. To immediately call off the pre-contract negotiations without assigning any reason or giving any compensation to the BIDDER. However, the proceedings with the other BIDDER(s) would continue.
- b. The Earnest Money Deposit (in pre-contract stage) and/or Security Deposit/Performance Bond (after the contract is signed) shall stand forfeited either fully or partially, as decided by the BUYER and the BUYER shall not be required to assign any reason, therefore.
- c. To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.
- d. To recover all sums already paid by the BUYER, and in case of an Indian BIDDER with interest thereon at 2% higher than the prevailing one year (1 year) Marginal Cost of fund based Lending Rate (MCLR) of State Bank of India, while in case of a BIDDER from a country other than India with interest thereon at 2% higher than the UBOR. If any outstanding payment is due to the BIDDER from the BUYER in connection with any other contract for any other stores, such outstanding payment could also be utilized to recover the aforesaid sum and interest.
- e. To encash the advance bank guarantee and performance bond/warranty bond, if furnished by the BIDDER, in order to recover the payments, already made by the BUYER, along with interest.
- f. To cancel all or any other Contracts with the BIDDER. The BIDDER shall be liable to pay compensation for any loss 'or damage to the BUYER resulting from such cancellation/rescission and the BUYER shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER
- g. To debar the BIDDER from participating in future bidding processes of the Government of India for a minimum period of five years, which may be further extended at the discretion of the BUYER.
- h. To recover all sums paid in violation of this Pact by BIDDER(s) to any middleman or agent or broker with a view to securing the contract.
- i. In cases where irrevocable Letters of Credit have been received in respect of any contract signed by the BUYER with the BIDDER, the same shall not be opened.
- j. Forfeiture of Performance Bond in case of a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

6.2 The BUYER will be entitled to take all or any of the actions mentioned at para 6.1(i) to (x) of this Pact also on the Commission by the BIDDER or anyone employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER), of an offence as defined in Chapter IX of the Indian Penal code, 1860 or Prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.

6.3 The decision of the BUYER to the effect that a breach of the provisions of this Pact has been committed by the BIDDER shall be final and conclusive on the BIDDER. However, the BIDDER can approach the Independent Monitor(s) appointed for the purposes of this Pact.

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**7. Independent Monitors**

7.1 The BUYER has appointed Independent Monitors (hereinafter referred to as Monitors) for this Pact in consultation with the Central Vigilance to as Monitors) for this Pact in consultation with the Central Vigilance Commission (Names and Addresses of the Monitors to be given).

7.2 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.

7.3 The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.

7.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.

7.5 As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the BUYER.

7.6 The BIDDER(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the BUYER including that provided by the BIDDER. The BIDDER will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER with confidentiality.

7.7 The BUYER will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such meetings.

7.8 The Monitor will submit a written report to the designated Authority of BUYER/Secretary in the Department/ within 8 to 10 weeks from the date of reference or intimation to him by the BUYER / BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

<b><u>Independent External Monitors</u></b>	
The IEMs appointed by REC Ltd. can be contacted as follows:	
<p>Shri Sudhir Bhargava, IAS (Retd.) Procurement and Contract Management (PCM) Division, REC Limited, I-4, Sector-29, Gurugram, Haryana, INDIA <b>Email: officesudhirbhargava@gmail.com</b></p>	<p>Dr. Varesh Sinha, IAS (Retd.) Procurement and Contract Management (PCM) Division, REC Limited, I-4, Sector-29, Gurugram, Haryana, INDIA <b>Email: vareshsinha@gmail.com</b></p>

**8. Facilitation of Investigation**

In case of any allegation of violation of any provisions of this Pact or payment of commission, the BUYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER and the BIDDER shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

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**9. Law and Place of Jurisdiction**

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the BUYER.

**10. Other Legal Actions**

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings

**11. Validity**

11.1 The validity of this Integrity Pact shall be from date of its signing and extend up to 2 years or the complete execution of the contract to the satisfaction of both the BUYER and the BIDDER/Seller, including warranty period, whichever is later. In case BIDDER is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

11.2 Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

12. The parties hereby sign this Integrity Pact at .....on.....

BUYER

BIDDER

Name of the Officer

Designation

Witness

Witness

1.....

2.....

2.....

3.....

\* Provisions of these clauses would need to be amended/ deleted in line with the policy of the BUYER in regard to involvement of Indian agents of foreign suppliers

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**FORMAT OF PAYMENT ON ORDER INSTRUMENT TO BE ISSUED BY IREDA/REC/PFC (IN LIEU OF BG TOWARDS EMD)**

No.  
RECPDCL,

Date  
Registered

Reg: M/s.....(insert name of the Bidder) – Issuance of Payment on Order Instrument for an amount of Rs.

Dear Sir,

1. It is to be noted that M/s.....(insert name of the POI issuing Agency) ('IREDA/REC/PFC') has sanctioned a non-fund based limit loan of Rs. (Rupees..... only) to M/s under the Loan Agreement executed on to execute Renewable Energy Projects
2. At the request of M/s , on behalf of (insert name of the Bidder), this Payment on Order Instrument (POI) for an amount of Rs. .... (Rupees (in words)). This Payment on Order Instrument comes into force immediately.
3. In consideration of the [Insert name of the Bidder] (hereinafter referred to as 'Bidder') submitting the response to tender document for Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity issued by REC Power Development and Consultancy Limited (hereinafter referred to as RECPDCL) and RECPDCL considering such response to the Tender of .....[Insert the name of the Bidder] as per the terms of the Tender, the [Insert name & address of IREDA/PFC/REC] hereby agrees unequivocally, irrevocably and unconditionally to pay to RECPDCL at [Insert Name of the Place from the address of RECPDCL] forthwith without demur on demand in writing from RECPDCL or any Officer authorized by it in this behalf, any amount upto and not exceeding Rupees .....

[Insert EMD amount as per the package capacity quoted in line with the tender document], only, on behalf of M/s..... [Insert name of the Bidder].

4. In consideration of the above facts, IREDA/REC/PFC, having its registered office at , agrees to make payment for the sum of Rs. lakhs (in words ) to RECPDCL on the following conditions: -
  - (a) IREDA/REC/PFC agrees to make payment of the above said amount unconditionally, without demur and without protest upon receipt of request from RECPDCL within the validity period of this letter as specified herein;
  - (b) The commitment of IREDA/REC/PFC, under this Payment of Order Instrument will have the same effect as that of the commitment under the Bank Guarantee issued by any Public Sector Bank and shall be enforceable in the same manner as in the case of a Bank Guarantee issued by a Bank and the same shall be irrevocable and shall be honored irrespective of any agreement or

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its breach between IREDA/REC/PFC or its constituents notwithstanding any dispute that may be raised by the against RECPDCL;

- (c) The liability of IREDA/REC/PFC continues to be valid and binding on IREDA/REC/PFC and shall not be terminated, impaired and discharged, by virtue of change in its constitution and specific liability under letter of undertaking shall be binding on its successors or assignors;
- (d) The liability of IREDA/REC/PFC shall continue to be valid and binding on IREDA/REC/PFC and shall not be terminated/ impaired/ discharged by any extension of time or variation and alternation made given or agreed with or without knowledge or consent of the parties (RECPDCL and Bidding Party), subject to the however to the maximum extent of amount stated herein and IREDA/REC/PFC is not liable to any interest or costs etc;
- (e) This Payment of Order Instrument can be invoked either partially or fully, till the date of validity;
- (f) IREDA/REC/PFC agrees that it shall not require any proof in addition to the written demand by RECPDCL made in any format within the validity period. IREDA/REC/PFC shall not require RECPDCL to justify the invocation of the POI against the bidder, to make any claim against or any demand against the bidder or to give any notice to the bidder;
- (g) The POI shall be the primary obligation of IREDA/REC/PFC and RECPDCL shall not be obliged before enforcing the POI to take any action in any court or arbitral proceedings against the bidder;
- (h) Neither RECPDCL is required to justify the invocation of this POI nor shall IREDA/REC/PFC have any recourse against RECPDCL in respect of the payment made under letter of undertaking;

5. Notwithstanding anything contrary contained anywhere in this POI or in any other documents, this POI is and shall remain valid upto \_\_\_\_\_ and IREDA/REC/PFC shall make payment thereunder only if a written demand or request is raised within the said date and to the maximum extent of Rs \_\_\_\_\_ and IREDA/REC/PFC shall in no case, be liable for any interest, costs, charges and expenses and IREDA's/REC's/PFC's liability in no case will exceed more than the above amount stipulated.

6. In pursuance of the above, IREDA/REC/PFC and RECPDCL have signed an Umbrella Agreement dated..... setting out the terms and conditions for issue of letter of undertaking by IREDA/REC/PFC to RECPDCL and the said terms and conditions shall be read as a part of this letter of undertaking issued for the project of the project of PP mentioned above.

Thanking you,

Yours faithfully  
For and on behalf of

M/s.....  
(Name of the POI issuing agency).

Copy to

( )  
General Manager (TS)

M/s. .... PP .....

.....As per their request

**Form F-15**

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 36 of 57	<u>Signature of Bidder</u>
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**FORMAT OF PAYMENT ON ORDER INSTRUMENT TO BE ISSUED BY IREDA/REC/PFC  
(IN LIEU OF PBG)**

No.  
RECPDCL,

Date  
Registered

Reg: M/s (insert name of the Bidder) (Tender No. (insert project ID issued by RECPDCL) – Issuance of Payment on Order Instrument for an amount of Rs.

Dear Sir,

1. It is to be noted that M/s ..... (insert name of the POI issuing Agency)('IREDA/REC/PFC') has sanctioned a non-fund based limit loan of Rs. (Rupees only) to M/s under the Loan Agreement executed on to execute Renewable Energy Projects.

2. At the request of M/s , on behalf of (insert name of the Bidder), this Payment on Order Instrument (POI) for an amount of Rs. (Rupees (in words)). This Payment on Order Instrument comes into force immediately.

3. In consideration of the [Insert name of the Bidder] (hereinafter referred to as successful Bidder) submitting the response to tender document for Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity capacity for the said tender in response to the Tender No. dated issued by REC Power Development and Consultancy Limited (hereinafter referred to as RECPDCL) and RECPDCL considering such response to the Tender of .....[insert the name of the successful bidder] (which expression shall unless repugnant to the context or meaning thereof include its executors, administrators, successors and assignees) and issuing Letter of Award No to (Insert Name of successful bidder) as per terms of Tender and the same having been accepted by the selected successful bidder for execution of supply [from successful bidder, M/s ]. As per the terms of the Tender, the [insert name & address of IREDA/PFC/REC] hereby agrees unequivocally, irrevocably and unconditionally to pay to RECPDCL at [Insert Name of the Place from the address of the RECPDCL] forthwith on demand in writing from RECPDCL or any Officer authorized by it in this behalf, any amount up to and not exceeding Rupees [Total Value] only, on behalf of M/s[Insert name of the successful bidder].

4. In consideration of the above facts, IREDA/REC/PFC, having its registered office at \_\_\_\_\_, agrees to make payment for the sum of Rs. \_\_\_\_\_ lakhs (in words \_\_\_\_\_) to RECPDCL on the following conditions:-

(a) IREDA/REC/PFC agrees to make payment of the above said amount unconditionally, without demur and without protest upon receipt of request from RECPDCL within the validity period of this letter as specified herein;

(b) The commitment of IREDA/REC/PFC, under this Payment of Order Instrument will have the same effect as that of the commitment under the Bank Guarantee issued by any Public Sector Bank and shall be enforceable in the same manner as in the case of a Bank Guarantee issued by a Bank and the same shall be irrevocable and shall be honored irrespective of any agreement or its breach between IREDA/REC/PFC or its constituents notwithstanding any dispute that may be raised by the against RECPDCL;

(c) The liability of IREDA/REC/PFC continues to be valid and binding on IREDA/REC/PFC and shall not be terminated, impaired and discharged, by virtue of change in its constitution and specific

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	Tender No. RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 37 of 57	Signature of Bidder
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liability under letter of undertaking shall be binding on its successors or assignors;

(d) The liability of IREDA/REC/PFC shall continue to be valid and binding on IREDA/REC/PFC and shall not be terminated/ impaired/ discharged by any extension of time or variation and alternation made given or agreed with or without knowledge or consent of the parties (RECPDCL and Bidding Party), subject to the however to the maximum extent of amount stated herein and IREDA/REC/PFC is not liable to any interest or costs etc;

(e) This Payment of Order Instrument can be invoked either partially or fully, till the date of validity;

(f) IREDA/REC/PFC agrees that it shall not require any proof in addition to the written demand by RECPDCL made in any format within the validity period. IREDA/REC/PFC shall not require. RECPDCL to justify the invocation of the POI against the successful bidder, to make any claim against or any demand against the successful bidder or to give any notice to the successful bidder.

(g) The POI shall be the primary obligation of IREDA/REC/PFC and RECPDCL shall not be obliged before enforcing the POI to take any action in any court or arbitral proceedings against the successful bidder;

(h) Neither RECPDCL is required to justify the invocation of this POI nor shall IREDA/REC/PFC have any recourse against RECPDCL in respect of the payment made under letter of undertaking.

5. Notwithstanding anything contrary contained anywhere in this POI or in any other documents, this POI is and shall remain valid upto and IREDA/REC/PFC shall make payment thereunder only if a written demand or request is raised within the said date and to the maximum extent of Rs.....and IREDA/REC/PFC shall in no case, be liable for any interest, costs, charges and expenses and IREDA's/REC's/PFC's liability in no case will exceed more than the above amount stipulated.
6. In pursuance of the above, IREDA/REC/PFC and RECPDCL have signed an Umbrella Agreement dated \_\_\_\_\_ setting out the terms and conditions for issue of letter of undertaking by IREDA/REC/PFC to RECPDCL and the said terms and conditions shall be read as a part of this letter of undertaking issued for the project of the project of PP mentioned above.

Thanking you,

Yours faithfully  
For and on behalf of

M/s.....  
(Name of the POI issuing agency).

( )  
General Manager (TS)

Copy to:-  
M/s.....PP .....

**Form F-16**

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 38 of 57	<u>Signature of Bidder</u>
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**UNDERTAKING REGARDING CONFIRMATION ON INSPECTION OF MODULE UNDER  
CONTRACTOR'S SCOPE**

**(To be submitted on the Letter Head of the Bidding Company)**

Ref.No.

Date:

From: (Insert name and address of Bidding Company)

Tel.#:

Fax#:

E-mail address# To

REC Power Development and Consultancy of Limited (A Government of India Enterprise)

Plot Number I-4, REC World Headquarters, D-Block,

Sector-29, Gurugram – 122001, Haryana,

India Website: www.recpdcl.in

Sub: Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity

Dear Sir / Madam,

We hereby confirm that the inspection of Module when supplied at site will be inspected by us in the presence of Owner. And hence inspection of Module at site will be under our scope.

Place:

[Signature of Authorized Signatory of Bidder]

Date:

Name:

Designation:

Seal:

Form F-17

**FORMAT FOR JOINT VENTURE AGREEMENT**

(To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value should be in the name of the Joint Venture)

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 39 of 57	<u>Signature of Bidder</u>
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THIS JOINT DEED OF UNDERTAKING executed on this..... day of..... Two Thousand and..... by ..... a company incorporated under the laws of ..... and having its Registered Office at .....(hereinafter called the "Party No.1" which expression shall include its successors, executors and permitted assigns) and M/s.....a company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party No.2" which expression shall include its successors, executors and permitted assigns) and M/s..... a Company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party No.3" which expression shall include its successors, executors and permitted assigns) for the purpose of making a bid and entering into a contract [hereinafter called the "Contract" {in case of award}] against the Tender No..... for ..... (insert name of the package alongwith project name) ..... of REC Power Development and Consultancy Limited (A Government of India Enterprise) incorporated under the Companies Act, 2013, having its Registered Office at Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003 (hereinafter called the "Employer").

WHEREAS the Party No.1, Party No.2 and Party No.3 have entered into an Agreement dated.....

AND WHEREAS the Employer invited bids as per the above-mentioned Specification for the design, manufacture, supply, erection, testing and commissioning including O & M of Equipment/ Materials stipulated in the Tender Documents under ..... (insert name of the package alongwith project name) .....

AND WHEREAS Clause 2, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in Annexure to BDS forming part of the Tender Documents, inter-alia stipulates that an Undertaking of two or more qualified manufacturers as partners, meeting the requirements of Qualification Criteria in Annexure to BDS, as applicable may bid, provided, the Joint Venture fulfills all other requirements under Qualification Criteria in Annexure to BDS and in such a case, the Bid Forms shall be signed by all the partners so as to legally bind all the Partners of the Joint Venture, who will be jointly and severally liable to perform the Contract and all obligations hereunder. The above clause further states that this Undertaking shall be attached to the bid and the Contract Performance Security will be as per the format F-9 enclosed with the Tender Documents without any restrictions or liability for either party.

AND WHEREAS the bid is being submitted to the Employer vide proposal No..... dated ..... by Party No.1 based on this Undertaking between all the parties; under these presents and the bid in accordance with the requirements of Clause 2, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in Annexure to BDS, has been signed by all the parties.

NOW THIS UNDERTAKING WITNESSETH AS UNDER:

In consideration of the above premises and agreements all the parties of this Deed of Undertaking do hereby declare and undertake:

1. In requirement of the award of the Contract by the Employer to the Joint Venture Partners, we, the Parties do hereby undertake that M/s..... the Party No.1, shall act as Lead Partner and further declare and confirm that we the parties to the Joint Venture shall jointly and severally be bound unto the Employer for the successful performance of the Contract and shall be fully responsible for the design, manufacture, supply and successful

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 40 of 57	<u>Signature of Bidder</u>
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performance of the equipment in accordance with the Contract.

2. In case of any breach or default of the said Contract by any of the parties to the Joint Venture, the party(ies) do hereby undertake to be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.
3. Further, if the Employer suffers any loss or damage on account of any breach in the Contract or any shortfall in the performance of the equipment in meeting the performances guaranteed as per the specification in terms of the Contract, the Party(ies) of these presents undertake to promptly make good such loss or damages caused to the Employer, on its demand without any demur. It shall not be necessary or obligatory for the Employer to proceed against Lead Partner to these presents before proceeding against or dealing with the other Party(ies), the Employer can proceed against any of the parties who shall be jointly and severally liable for the performance and all other liabilities/ obligations under the Contract to the Employer.
4. The financial liability of the Parties of this Deed of Undertaking to the Employer, with respect to any of the claims rising out of the performance or non-performance of the obligations set forth in this Deed of Undertaking, read in conjunction with the relevant conditions of the Contract shall, however not be limited in any way so as to restrict or limit the liabilities or obligations of any of the Parties of this Deed of Undertaking.
5. It is expressly understood and agreed between the Parties to this Undertaking that the responsibilities and obligations of each of the Parties shall be as delineated in Appendix - I (to be suitably appended by the Parties along with this Undertaking in its bid) to this Deed of Undertaking. It is further undertaken by the parties that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities of the Parties under the Contract.
6. It is also understood that this Undertaking is provided for the purposes of undertaking joint and several liabilities of the partners to the Joint Venture for submission of the bid and performance of the Contract and that this Undertaking shall not be deemed to give rise to any additional liabilities or obligations, in any manner or any law, on any of the Parties to this Undertaking or on the Joint Venture, other than the express provisions of the Contract.
7. This Undertaking shall be construed and interpreted in accordance with the provisions of the Contract.
8. In case of an award of a Contract, we the parties to this Deed of Undertaking do hereby agree that we shall be jointly and severally responsible for furnishing a Contract Performance Security from a bank in favour of the Employer in the currency/ currencies of the Contract.
9. It is further agreed that this Deed of Undertaking shall be irrevocable and shall form an integral part of the bid and shall continue to be enforceable till the Employer discharges the same or upon the completion of the Contract in accordance with its provisions, whichever is earlier. It shall be effective from the date first mentioned above for all purposes and intents.

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 41 of 57	<u>Signature of Bidder</u>
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IN WITNESS, WHEREOF, the Parties to this Deed of Undertaking have through their authorised representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above

Common Seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated .....

Name .....

Designation .....

Signature .....

WITNESS :

I. ....

II. ....

For Lead Partner (Party No.-1) For and on behalf of M/s .....

(Signature of the authorized representative)

Common Seal of ..... has been affixed in my/our presence pursuant to Board of Director's Resolution dated ..... Name ..... Designation .....

Signature .....

WITNESS :

I. ....

II. ....

For Party No.-2 For and on behalf of M/s..... (Signature of the authorized representative)

Common Seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated .....

Name .....

Designation .....

Signature .....

WITNESS :

For Party No.-3 For and on behalf of M/s. .... (Signature of the authorized representative)

I. .... II. ....

Note:

1. For the purpose of executing the Joint Deed of Undertaking, the non-judicial stamp papers of appropriate value shall be purchased in the name of Joint Venture.
2. The Undertaking shall be signed on all the pages by the authorized representatives of each of the partners and should invariably be witnessed

Form F-17A

**FORMAT FOR POWER OF ATTORNEY FOR JOINT VENTURE AGREEMENT**  
(To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value should be in the name of the Joint Venture)

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	Tender No. RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 42 of 57	Signature of Bidder
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KNOW ALL MEN BY THESE PRESENTS THAT WE, the Partners whose details are given hereunder ..... have formed a Joint Venture under the laws of ..... and having our Registered Office(s)/ Head Office(s) at ..... (hereinafter called the 'Joint Venture' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) acting through M/s ..... being the Partner in-charge do hereby constitute, nominate and appoint M/s..... a Company incorporated under the laws of ..... and having its Registered/ Head Office at ..... as our duly constituted lawful Attorney (hereinafter called "Attorney" or "Authorised Representative" or "Partner In-charge") to exercise all or any of the powers for and on behalf of the Joint Venture in regard to Tender No..... Package ..... the bids for which have been invited by REC Power Development and Consultancy Limited (A Government of India Enterprise) incorporated under the Companies Act, 2013, having its Registered Office at Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003 (hereinafter called the 'Employer') to undertake the following acts:

- i) To submit proposal and participate in the aforesaid Bid Specification of the Employer on behalf of the "Joint Venture".
- ii) To negotiate with the Employer the terms and conditions for award of the Contract pursuant to the aforesaid Bid and to sign the Contract with the Employer for and on behalf of the "Joint Venture".
- iii) To do any other act or submit any document related to the above.
- iv) To receive, accept and execute the Contract for and on behalf of the "Joint Venture".

It is clearly understood that the Partner In-charge (Lead Partner) shall ensure performance of the Contract(s) and if one or more Partner fail to perform their respective portions of the Contract(s), the same shall be deemed to be a default by all the Partners.

It is expressly understood that this Power of Attorney shall remain valid binding and irrevocable till completion of the Defect Liability Period in terms of the Contract.

The Joint Venture hereby agrees and undertakes to ratify and confirm all the whatsoever the said Attorney/ Authorised Representatives/ Partner in-charge quotes in the bid, negotiates and signs the Contract with the Employer and/or proposes to act on behalf of the Joint Venture by virtue of this Power of Attorney and the same shall bind the Joint Venture as if done by itself.

IN WITNESS, THEREOF the Partners Constituting the Joint Venture as aforesaid have executed these presents on this ..... day of ..... under the Common Seal(s) of their Companies.

for and on behalf of the  
  
Partners of Joint Venture  
.....  
.....  
.....

The Common Seal of the above Partners of the Joint Venture:  
The Common Seal has been affixed there unto in the presence of:

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 43 of 57	<u>Signature of Bidder</u>
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**WITNESS**

1. Signature.....  
 Name .....  
 Designation .....  
 Occupation .....
  
2. Signature.....  
 Name .....  
 Designation .....  
 Occupation .....

**Note:**

1. For the purpose of executing the Agreement, the non-judicial stamp papers of appropriate value shall be purchased in the name of Joint Venture.
2. The Agreement shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 44 of 57	<u>Signature of Bidder</u>
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**FORMAT FOR CONSORTIUM AGREEMENT**

(To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value should be in the name of the Consortium)

THIS JOINT DEED OF UNDERTAKING executed on this..... day of..... Two Thousand and..... by ..... a company incorporated under the laws of ..... and having its Registered Office at .....(hereinafter called the "Party No.1" which expression shall include its successors, executors and permitted assigns) and M/s.....a company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party No.2" which expression shall include its successors, executors and permitted assigns) and M/s.. ..... a Company incorporated under the laws of ..... and having its Registered Office at ..... (hereinafter called the "Party No.3" which expression shall include its successors, executors and permitted assigns) for the purpose of making a bid and entering into a contract [hereinafter called the "Contract" {in case of award}] against the Tender No..... for ..... (insert name of the package alongwith project name) ..... of ..... (hereinafter called the "Employer").

WHEREAS the Party No.1, Party No.2 and Party No.3 have entered into an Agreement dated..... AND WHEREAS the Employer invited bids as per the above-mentioned Specification for the design, manufacture, supply, erection, testing and commissioning including O & M of Equipment/ Materials stipulated in the Tender Documents under ..... (insert name of the package alongwith project name) .....

AND WHEREAS Clause 2, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in Annexure to BDS forming part of the Tender Documents, inter-alia stipulates that an Undertaking of two or more qualified manufacturers as partners, meeting the requirements of Qualification Criteria in Annexure to BDS, as applicable may bid, provided, the Consortium fulfills all other requirements under Qualification Criteria in Annexure to BDS and in such a case, the Bid Forms shall be signed by all the partners so as to legally bind all the Partners of the Consortium, who will be jointly and severally liable to perform the Contract and all obligations hereunder. The above clause further states that this Undertaking shall be attached to the bid and the Contract Performance Security will be as per the format F-9 enclosed with the Tender Documents without any restrictions or liability for either party.

AND WHEREAS the bid is being submitted to the Employer vide proposal No..... dated ..... by Party No.1 based on this Undertaking between all the parties; under these presents and the bid in accordance with the requirements of Clause 2, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in Annexure to BDS, has been signed by all the parties.

**NOW THIS UNDERTAKING WITNESSETH AS UNDER:**

In consideration of the above premises and agreements all the parties of this Deed of Undertaking do hereby declare and undertake

1. In requirement of the award of the Contract by the Employer to the Consortium Partners, we, the Parties do hereby undertake that M/s..... the Party No.1, shall act as Lead Partner and further declare and confirm that we the parties to the Consortium shall jointly and severally be bound unto the Employer for the successful performance of the Contract and shall be fully responsible for the design, manufacture, supply and successful performance of the equipment in accordance with the Contract:
2. In case of any breach or default of the said Contract by any of the parties to the

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 45 of 57	<u>Signature of Bidder</u>
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Consortium, the party(ies) do hereby undertake to be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.

3. Further, if the Employer suffers any loss or damage on account of any breach in the Contract or any shortfall in the performance of the equipment in meeting the performances guaranteed as per the specification in terms of the Contract, the Party(ies) of these presents undertake to promptly make good such loss or damages caused to the Employer, on its demand without any demur. It shall not be necessary or obligatory for the Employer to proceed against Lead Partner to these presents before proceeding against or dealing with the other Party(ies), the Employer can proceed against any of the parties who shall be jointly and severally liable for the performance and all other liabilities/ obligations under the Contract to the Employer.
4. The financial liability of the Parties of this Deed of Undertaking to the Employer, with respect to any of the claims rising out of the performance or non-performance of the obligations set forth in this Deed of Undertaking, read in conjunction with the relevant conditions of the Contract shall, however not be limited in any way so as to restrict or limit the liabilities or obligations of any of the Parties of this Deed of Undertaking.
5. It is expressly understood and agreed between the Parties to this Undertaking that the responsibilities and obligations of each of the Parties shall be as delineated in Appendix - I (to be suitably appended by the Parties along with this Undertaking in its bid) to this Deed of Undertaking. It is further undertaken by the parties that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities of the Parties under the Contract.
6. It is also understood that this Undertaking is provided for the purposes of undertaking joint and several liabilities of the partners to the Consortium for submission of the bid and performance of the Contract and that this Undertaking shall not be deemed to give rise to any additional liabilities or obligations, in any manner or any law, on any of the Parties to this Undertaking or on the Consortium, other than the express provisions of the Contract.
7. This Undertaking shall be construed and interpreted in accordance with the provisions of the Contract.
8. In case of an award of a Contract, we the parties to this Deed of Undertaking do hereby agree that we shall be jointly and severally responsible for furnishing a Contract Performance Security from a bank in favour of the Employer in the currency/ currencies of the Contract.
9. It is further agreed that this Deed of Undertaking shall be irrevocable and shall form an integral part of the bid and shall continue to be enforceable till the Employer discharges the same or upon the completion of the Contract in accordance with its provisions, whichever is earlier. It shall be effective from the date first mentioned above for all purposes and intents.

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 46 of 57	<u>Signature of Bidder</u>
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IN WITNESS, WHEREOF, the Parties to this Deed of Undertaking have through their authorized representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above. Common Seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated ..... Name ..... Designation ..... Signature ..... WITNESS :

I. .... For Lead Partner (Party No.-1)  
 For and on behalf of M/s ..... (Signature of the authorized representative)  
 Common Seal of ..... has been affixed in my/our presence pursuant to Board of Director's Resolution dated ..... Name ..... Designation ..... Signature ..... WITNESS : I. .... II. .... For Party No.-2 For and on behalf of M/s..... (Signature of the authorized representative) Common Seal of ..... has been affixed in my/ our presence pursuant to Board of Director's Resolution dated ..... Name ..... Designation ..... Signature ..... For Party No.-3 For and on behalf of M/s. .... (Signature of the authorized representative)

WITNESS :

I. ....  
 II. ....

Note:

1. For the purpose of executing the Joint Deed of Undertaking, the non-judicial stamp papers of appropriate value shall be purchased in the name of Consortium.
2. The Undertaking shall be signed on all the pages by the authorized representatives of each of the partners and should invariably be witnessed.

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 47 of 57	<u>Signature of Bidder</u>
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**FORMAT FOR POWER OF ATTORNEY OF CONSORTIUM AGREEMENT**

(To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value should be in the name of the Consortium)

KNOW ALL MEN BY THESE PRESENTS THAT WE, the Partners whose details are given hereunder ..... have formed a Consortium under the laws of ..... and having our Registered Office(s)/ Head Office(s) at ..... (hereinafter called the 'Consortium' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) acting through M/s ..... being the Partner in-charge do hereby constitute, nominate and appoint M/s..... a Company incorporated under the laws of ..... and having its Registered/ Head Office at ..... as our duly constituted lawful Attorney (hereinafter called "Attorney" or "Authorised Representative" or "Partner In-charge") to exercise all or any of the powers for and on behalf of the Consortium in regard to Tender No..... Package ..... the bids for which have been invited by REC Power Development and Consultancy Limited (A Government of India Enterprise) incorporated under the Companies Act, 2013, having its Registered Office at Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003 (hereinafter called the 'Employer') to undertake the following acts:

- i) To submit proposal and participate in the aforesaid Bid Specification of the Employer on behalf of the "Consortium".
- ii) To negotiate with the Employer the terms and conditions for award of the Contract pursuant to the aforesaid Bid and to sign the Contract with the Employer for and on behalf of the "Consortium".
- iii) To do any other act or submit any document related to the above.
- iv) To receive, accept and execute the Contract for and on behalf of the "Consortium".

It is clearly understood that the Partner In-charge (Lead Partner) shall ensure performance of the Contract(s) and if one or more Partner fail to perform their respective portions of the Contract(s), the same shall be deemed to be a default by all the Partners.

It is expressly understood that this Power of Attorney shall remain valid binding and irrevocable till completion of the Defect Liability Period in terms of the Contract.

The Consortium hereby agrees and undertakes to ratify and confirm all the whatsoever the said Attorney/ Authorized Representatives/ Partner in-charge quotes in the bid, negotiates and signs the Contract with the Employer and/or proposes to act on behalf of the Consortium by virtue of this Power of Attorney and the same shall bind the Consortium as if done by itself.

IN WITNESS, THEREOF the Partners Constituting the Consortium as aforesaid have executed these presents on this ..... day of ..... under the Common Seal(s) of their Companies.

for and on behalf of the

Partners of Consortium

.....  
 ..... The Common Seal of the above Partners of the Consortium: The Common Seal has been affixed there unto in the presence of:

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 48 of 57	<u>Signature of Bidder</u>
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WITNESS

- 1. Signature.....
  - Name.....
  - Designation.....
  - Occupation .....
- 2. Signature.....
  - Name.....
  - Designation.....
  - Occupation .....

Note:

- 1. For the purpose of executing the Agreement, the non-judicial stamp papers of appropriate value shall be purchased in the name of Consortium.
- 2. The Agreement shall be signed on all the pages by the authorized representatives of each of the partners and should invariably be witnessed.

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 49 of 57	<u>Signature of Bidder</u>
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**Performance Bank Guarantee**

M/s REC Power Development and Consultancy Limited (RECPDCL),  
D-Block, Plot No. I-4, Sector 29,  
Near IFFCO Chowk Metro Station,  
Gurugram, Haryana 122001 (INDIA)  
(With due stamp duty if applicable)

OUR LETTER OF GUARANTEE No.:

In consideration of RECPDCL, having its office at \_\_\_\_\_ (hereinafter referred to as "RECPDCL" which expression shall unless repugnant to the content or meaning thereof include all its successors, administrators and executors) and having entered into an agreement dated \_\_\_\_\_/ issued Purchase Order No. \_\_\_\_\_ dated \_\_\_\_\_ with/on M/s \_\_\_\_\_ (hereinafter referred to as "The EPC Contractor" which expression unless repugnant to the content or meaning thereof, shall include all the successors, administrators, and executors).

WHEREAS the EPC Contractor having unequivocally accepted to supply the materials as per terms and conditions given in the Agreement dated \_\_\_\_\_ /Purchase Order No. \_\_\_\_\_ dated \_\_\_\_\_ and RECPDCL having agreed that the EPC contractor shall furnish to RECPDCL a Performance Guarantee for the faithful performance of the entire contract, to the extent of 10% (ten percent) or prevailing percentage of performance security notified by Govt. of India /RECPDCL from time to time shall be applicable) (or the percentage as per the individual case) of the value of the Purchase Order i.e. for \_\_\_\_\_.

We, \_\_\_\_\_ ("The Bank") which shall include OUR successors, administrators and executors herewith establish an irrevocable Letter of Guarantee No. \_\_\_\_\_ in your favour for account of \_\_\_\_\_ (The EPC Contractor) in cover of performance guarantee in accordance with the terms and conditions of the Agreement/Purchase Order/Lol.

Hereby, we undertake to pay upto but not exceeding \_\_\_\_\_ (say \_\_\_\_\_ only) upon receipt by us of your first written demand accompanied by your declaration stating that the amount claimed is due by reason of the Supplier/EPC contractor having failed to perform the Agreement and despite any contestation on the part of above named supplier/EPC contractor.

This Letter of Guarantee will expire on \_\_\_\_\_ plus 60 (Sixty) days of claim period and any claims made hereunder must be received by us on or before expiry date/claim period after which date this Letter of Guarantee will become of no effect whatsoever whether returned to us or not.

Authorized Signature  
Chief Manager/ Manager  
Seal of Bank

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 50 of 57	<u>Signature of Bidder</u>
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**Advance Bank Guarantee**

M/s REC Power Development and Consultancy Limited (RECPDCL),  
D-Block, Plot No. I-4, Sector 29,  
Near IFFCO Chowk Metro Station,  
Gurugram, Haryana 122001 (INDIA)

(With due stamp duty if applicable)

OUR LETTER OF GUARANTEE No. : \_\_\_\_\_

In consideration of REC Ltd., having its office at \_\_\_\_\_ (hereinafter referred to as "RECPDCL" which expression shall unless repugnant to the content or meaning thereof include all its successors, administrators and executors) and having entered into an agreement dated \_\_\_\_\_ / issued Purchase Order No. \_\_\_\_\_ dated \_\_\_\_\_ with/on M/s \_\_\_\_\_ (hereinafter referred to as "The EPC Contractor" which expression unless repugnant to the content or meaning thereof, shall include all the successors, administrators, and executors).

WHEREAS the Supplier having unequivocally accepted to supply the materials as per terms and conditions given in the Agreement dated / Purchase Order No. \_\_\_\_\_ dated \_\_\_\_\_ and RECPDCL having agreed that the EPC Contractor shall furnish to REC an Advance Bank Guarantee for the advance taken, to the extent of \_\_\_\_\_% ( \_\_\_\_\_ percent) of the value of the Purchase Order i.e. for \_\_\_\_\_ .

We, \_\_\_\_\_ ("The Bank") which shall include OUR successors, administrators and executors herewith establish an irrevocable Letter of Guarantee No. \_\_\_\_\_ in your favour for account of \_\_\_\_\_ (The EPC Contractor) in cover of performance guarantee in accordance with the terms and conditions of the Agreement/Purchase Order.

Hereby, we undertake to pay up to but not exceeding \_\_\_\_\_ (say \_\_\_\_\_ only) upon receipt by us of your first written demand accompanied by your declaration stating that the amount claimed is due by reason of the Supplier having failed to perform the Agreement and despite any contestation on the part of above named supplier.

This Letter of Guarantee will expire on \_\_\_\_\_ plus 60 (Sixty) days of claim period and any claims made hereunder must be received by us on or before expiry date/claim period after which date this Letter of Guarantee will become of no effect whatsoever whether returned to us or not.

Authorized Signature

Chief Manager/ Manager  
Seal of Bank

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 51 of 57	<u>Signature of Bidder</u>
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**FORM OF UNDERTAKING BY BIDDER AND THE FIRM**

**Joint Undertaking by the Indian Bidder and the Firm, for Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity..**

We, M/s ..... a Company incorporated under the..... having its Registered Office at (The Firm) and M/s ..... a company incorporated under the ..... having its registered office at..... (The Bidder) jointly undertake the following on .....day of for the work of **“Grid Connected 1MW Ground Mounted Solar PV plant with arrangement of Land and ISTS Connectivity”** to REC Power Development and Consultancy Limited (A Government of India Enterprise) incorporated under the Companies Act, 2013, having its Registered Office at Core-4, SCOPE Complex, 7, Lodhi Road, New Delhi-110003.

REC Power Development and Consultancy Limited has invited bids for **setting up of Grid Connected 1 MW Ground Mounted Solar PV plant with arrangement of Land and ISTS Connectivity** vide its Tender No. \_\_\_\_\_ for Design, Engineering, Supply, Construction, Erection, Testing & Commissioning Grid Connected 1 MW Ground Mounted Solar PV plant with arrangement of Land and ISTS Connectivity having 5 Years Plant O&M. M/s. .... (Bidder) is submitting its proposal in response to the aforesaid Invitation for Development of grid connected Solar PV Project(s) of 1 MW capacity against Tender No. \_\_\_\_\_

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	Tender No. RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SFF Page 52 of 57	Signature of Bidder
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On letter Head of the Company/Agency)  
**Undertaking related to ESG**

1. Name of the Agency:
2. Address of Agency:

We herewith declare that –

1. We adheres to fair labour practices, ensuring a safe working environment, fair wages, and compliance with applicable labour laws.
2. We upholds ethical business conduct, including anti-corruption measures.
3. We provide products that are environmentally sustainable, have consciously minimised carbon footprints in the production or sourcing process and invariably incorporate a minimum percentage of recycled materials wherever applicable.
4. We encourage diversity and inclusion within its organization and supply chains and complies with health and safety regulations, ensuring the well-being of their employees It is certified that the information furnished above is true and correct.

(Signature of Authorized Signatory)  
(With Official Seal)

Date :-

Place :-

Note:

- For all procurement related to services and IT related equipment, all the ponits (1 to 4) will be applicable.
- For other goods, Point no. 1 & 2 will be applicable and point 3 & 4 has to be decided on case to case basis.

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**UNDERTAKING BY THE CONTRACTOR FOR THE PLANT HANDED OVER FOR THE OPERATIONAL PERFORMANCE**

This Undertaking is made this \_\_\_\_ day of \_\_\_\_\_, [Year], by [Contractor's Name], a company duly incorporated under the laws of [Jurisdiction], having its principal place of business at [Contractor's Address] (hereinafter referred to as the "Contractor").

**WHEREAS**

1. The Contractor has entered into a contract with [Owner's Name], herein referred to as the "Owner," for the performance of its obligations under the Contract, including the Scope of Project as outlined in Scope of Works to this Contract.

NOW, THEREFORE, the Contractor hereby acknowledges, agrees, and undertakes as follows:

**1. Responsibility for Performance of Obligations:**

The Contractor unequivocally acknowledges, agrees, and confirms that it shall be responsible for the performance of all obligations under its Scope of Project, as set out in Scope of Works to this Contract, to ensure seamless and uninterrupted interface among all obligations. This includes, without limitation, the following:

- (a) Achieving the milestones set out in the Contract in a timely manner and performing all obligations under the Contract;
- (b) Meeting the Technical Specifications and achieving Completion of the Works during the Construction Period in a cost-effective manner as per the terms and conditions of the Contract;
- (c) Correcting all defects during the Defect Liability Period.

**2. Liability for Coordinating Execution and Performance:**

Notwithstanding anything contained in this Contract, the Contractor agrees and undertakes the following:

- (a) The Contractor shall be solely responsible for coordinating the execution of the Works and for the overall performance of this Contract, and shall not deny such liability on the ground that the claim was not covered under its Scope of Project.
- (b) Should any gap, deficiency, or uncertainty arise with respect to the obligations of the Contractor under its Scope of Project, the Contractor shall promptly remedy (or cause to be remedied) such gap, deficiency, or uncertainty, at no cost or expense to the Authority.

**3. Guarantee of Due Performance of the Scope of Project:**

Notwithstanding the Contractor's diverse Scope of Project under the Contract, the Contractor agrees and undertakes to guarantee the due performance of its Scope of Project, as outlined in Scope of Works. The Contractor further agrees that in the event of non-performance or inadequate performance of the Scope of Project, it will perform (or cause the performance of) such obligations at no additional cost to the Authority.

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IN WITNESS WHEREOF, the undersigned, duly authorized by the Contractor, has executed this Undertaking on the day and year first above written.

For [Contractor's Name]

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

---

Witness:

1. \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

2. \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

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**Declaration by Contractor**

As per ITB in the letter head of contractor

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# SECTION-VII

## TECHNICAL SPECIFICATION

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# PART-A

## PROJECT INFORMATION

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**PART A: PROJECT INFORMATION**

**1.0 PROJECT INFORMATION**

**i) Introduction**

RECPDCL proposes to implement a 1 MW (AC) ground-mounted solar photovoltaic grid-connected power plant to harness solar energy. The solar projects will be executed as composite EPC package under domestic competitive bidding, based on PV modules from the latest Approved List of Models and Manufacturers (ALMM) issued by MNRE. Additionally, the PV modules shall be sourced from **Tier-1** PV module manufacturers.

This composite EPC package is proposed to be awarded to Single bidder(s) as complete package with suitable award criteria to be intimated separately in the bidding documents.

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# PART-B

## SCOPE OF SUPPLY AND SERVICES

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## 1.0 SCOPE OF SUPPLY AND SERVICES

### 1.0.1 Intent of specification

- 1.0.1.1 The scope of the proposal shall be Design, Engineering, Supply, Erection, Testing, and Commissioning of 1 MW Ground Mounted Solar Power Plant along with Land and STU connectivity and comprehensive Operation and Maintenance (O&M) of the solar PV plant for 5 years .
- 1.0.1.2 All Works to be carried out as per the Scope detailed in this specification shall be in accordance with the requirements, conditions, appendices etc. given in Technical Specifications 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.
- 1.0.1.3 It is not the intent to specify herein all aspects of design and construction nevertheless, the equipment and civil works shall conform to all aspects to highstandard of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the Employer, who will interpret the meaning of the Technical Requirements/ 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.
- 1.0.1.4 The Contractor 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 Solar PV Plant covered under this specification.
- 1.0.1.5 Bidders are requested to carefully examine and understand the specifications /Technical requirements 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.
- 1.0.1.6 Before submitting his bid, the Bidder should inspect and examine the site and its surroundings and should satisfy himself as to the nature of soil, the quantities and nature of work, materials necessary for completion of the work and their availability, means of access to site and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances

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

### 1.0.2 Scope of Supply and Services

The scope of Supply & Services shall include all Development of Land, Design, Engineering, Manufacture, Procurement of Equipment and material, Testing at Manufacturer's Works, Packing & Forwarding, Transportation, Supply, Receipt and Unloading at site, storage, Insurance at all stages, associated Civil, Electrical Works, Services, Permits, Licenses, Installation, Erection, Testing, Commissioning, Performance Demonstration and Operational Acceptance of capacity of **1 MW Ground Mounted Solar Power Plant along with Land and STU connectivity and Five (05) years comprehensive Operation and Maintenance (O&M) of the solar PV plant .**

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 system provided by State Electricity Authority (s).

### 1.0.3 Scope of Supply

The equipment and materials for Grid Interactive Solar PV Power Plant with all the associated evacuation system but not be limited to the Supply of the following:

#### 1.0.3.1 DC System

- 1.0.3.1.1 Solar PV Module from the latest ALMM list issued by MNRE time to time. Additionally, the PV modules shall be sourced from Tier-1 PV module manufacturers.
- 1.0.3.1.2 Module Mounting structures (MMS) including all necessary accessories.
- 1.0.3.1.3 String Monitoring System/String Monitoring Unit, String Fuses, Surge Protection System including all necessary accessories with String Monitoring capabilities..
- 1.0.3.1.4 DC Array Field Lightning Arrestors
- 1.0.3.1.5 Power Conditioning Unit (PCU) including all necessary accessories
- 1.0.3.1.6 Solar Cables along with lugs, glands, ferrules, straight/Y-connectors and other materials required for proper cable termination at both the ends.
- 1.0.3.1.7 Junction Boxes & all necessary accessories
- 1.0.3.1.8 DC Earthing system including all necessary accessories

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### 1.0.3.2 AC Systems

- 1.0.3.2.1 Power Transformer, Inverter Duty Transformers, Auxiliary Transformers including all necessary accessories
- 1.0.3.2.2 HT Switchgear
- 1.0.3.2.3 LT Switchgear
- 1.0.3.2.4 AC Cabling System-LT Power & Control, HT Cables, Cable Support System along with cable termination kits.
- 1.0.3.2.5 Switchyard
- 1.0.3.2.6 Transmission Line
- 1.0.3.2.7 Bay extension at Grid Sub-station (If Applicable)
- 1.0.3.2.8 Protection System
- 1.0.3.2.9 Energy Metering System (ABT Meters)
- 1.0.3.2.10 Earthing System & Lightning Protection System with all necessary accessories
- 1.0.3.2.11 Plant illumination system
- 1.0.3.2.12 Auxiliary Power Supply System
- 1.0.3.2.13 Battery System including all necessary accessories
- 1.0.3.2.14 UPS with battery bank of sufficient capacity.
- 1.0.3.2.15 SCADA System with all necessary accessories.
- 1.0.3.2.16 Data transmission from Main Control Room to SLDC along with communication system so as to meet statutory requirements and comply with CERC/UPERC code. All required hardware, Gateway Modem, Radio Link etc. required for data compliance with SLDC requirements.

### 1.0.3.3 General System

- 1.0.3.3.1 Weather Monitoring Station
- 1.0.3.3.2 Fire Detection and fire protection system in buildings, transformer yard, switchyard and pooling sub-station
- 1.0.3.3.3 Module Cleaning system
- 1.0.3.3.4 CCTV System for entire Solar PV Plant
- 1.0.3.3.5 The contractor shall make their own necessary arrangements to supply water from available Solar Park water source and its storage during construction and O&M period. Also, during operations and maintenance of the Solar Power Plant, internal water arrangement including suitable capacity borewell and storage tanks are to be arranged by the Bidder. Further, charges if any claimed by any competent authorities in future for usage of water shall be payable by the contractor.**

### 1.0.3.4 Tools & Tackles

The Contractor shall supply all necessary tools and tackles and other instruments required for the erection, assembly, disassembly, Commissioning, testing, operation and proper maintenance of the plant and equipment and

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systems (including software). These tools will also include special material handling equipment, jigs and fixtures for maintenance and calibration / readjustment checking and measurement aids etc. The price of each tool / tackle shall be deemed to have been included in the total bid price.

### 1.0.3.5 Spares

The Contractor shall supply and maintain adequate inventory of all the spares (including software's) required for safe, reliable and trouble free operation & maintenance of the complete Solar PV Plant during the period of contract. The price of these spares shall be deemed to be included in the contract price. List of spares has been attached in relevant clause of this technical specification. However, any additional spares as recommended by OEMs for safe and reliable operation of Solar PV plant shall be provided by the bidder.

### 1.0.4 Scope of Services

The scope of services shall include all associated works & services in respect of above supplies that are needed to make the system complete in all respect for its safe, reliable, efficient and trouble-free operation and shall not be limited to the following:

#### 1.0.4.1 Arrangement of Land

EPC Contractor shall find land suitable of Solar Power Plant and near to STU substation where connectivity is available.

The Land shall be on Lease basis with at least lease period of 29 Years and 6 months.

The Registration of Land lease shall be in the name of RECPDCL.

The Land should not be more than 10 KM from STU substation.

The land should be

#### 1.0.4.2 Assessment of site

The contractor is required to measure the Solar Radiation and other climatic conditions relevant to predict the plant performance. This is necessary to study solar parameters and Guaranteed Performance of the Solar Power Plant. The satellite-based analysis is to be combined with direct ground-based measurement equipment in order to achieve the necessary accuracy and level of detail in the assessment of solar, parameters and climatic conditions.

**Note: "The Contractor shall prepare a Detailed Project Report for the project & submit the same to RECPDCL within Thirty days (30) from Date of Issuance of LOA."**

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The major categories of site-specific assessment required shall include, but not limited to the following:

- 1.0.4.2.1 Global Solar Radiation (“GHI”) on horizontal plane
- 1.0.4.2.2 Global Solar Radiation (“GSR”) on Tilted plane equal to tilt of the modules
- 1.0.4.2.3 Temperature for ambient and module surface
- 1.0.4.2.4 Wind Speed and direction

**1.0.4.3 Design & Engineering**

Basic Engineering, Detailed Design and Engineering of Grid Interactive Solar PV Plant and its associated Civil, Electrical & Mechanical auxiliary systems including 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.

1.0.4.3.1 The Contractor shall submit to the Employer necessary documents, drawings, data design and engineering information in 3 (three) Hard & Soft copies from time to time as per the Engineering Information Schedule. The Engineering Information Schedule shall be finalized in consultation with the Employer. The indicative list of documents to be submitted in the Engineering Information Schedule is mentioned in the clause 4.4.10.

**1.0.4.3 Design Memorandum/Design Basis Report**

The Contractor shall prepare and submit to the Employer a “Design Memorandum/ Design basis Report” of the Plant fulfilling the contract specification/requirement. The memorandum shall include the design philosophy, methodology, system description, input parameters for design, major technical features, basic arrangement/ layout etc. The observations /comments of the Employer (if any) should-be duly incorporated by the contractor.

**1.0.4.4 Finalization of Sub-Contractors/Sub-vendors**

The Contractor shall be responsible for the finalization of sub-contractors/Sub-vendors for all the Supplies & services as required to make the system

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complete in all respect for its safe, reliable, efficient and trouble-free operation. The list of such sub-contractor's /Sub vendors shall be provided by the Contractor with the Bid.

Further, the contractor shall ensure that vendors/Suppliers for Modules, Inverters, MMS, Cables, Switchyard & Transformers are complying with the requirements of respective clauses of Technical Specifications

For all other items / services, Bidder shall furnish the list of sub-vendors approved by the Bidder's organization approved vendor selection/assessment policy.

**1.0.4.5 Mobilization at site**

**Workforce:** Accommodation for the workforce required for construction is in the contractor's scope.

**Electricity:** Construction Electricity will be provided by Solar Park authority arrangements to bring power at plant is I scope of contractor and charges for usage will be borne by the Contractor.

**1.0.4.6 Packaging, Transportation, Unloading and Storage**

Packing and Transportation from the manufacturer's works to the site including customs clearance & port clearance, payment of port charges, (if any), Receipt, Unloading, storage, preservation and conservation of equipment at the site shall be in the scope of the Contractor.

Heaviest package to be transported with suitable number of axles for safe transportation of consignment in accordance with specifications of class 70R road and bridge capacity.

**1.0.5 Civil Works**

The scope of civil construction work shall include all Works required for the Solar PV Project but not limited to the following:

- a. Topographic Survey
- b. Geo-technical Investigation at site
- c. Site Preparation: Site grading including slope protection, ground preparation/ filling/ leveling (if required) of the identified area and cutting, clearing and transporting of bushes/ vegetation/ trees etc.
- d. Foundation: Construction of foundation and Mounting structures as required for the equipment.
- e. Rooms/Cabins: Construction of Control room, Inverter room (if applicable)

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/Pre-Engineered Building (PEB), Store Room, security room/Cabins, Gate complex, Equipment Rooms etc., as required along with requisite furniture, workstations, Air Conditioning and other equipment as per specifications.

- f. Roads & Pathways: Construction of internal roads/service roads and pathways.
- g. Construction of toilets along with Sewage disposal system such as Septic Tank & soak pit for all toilets.
- h. Drains: Design, construction, and maintenance of drainage system shall be in the scope of the contractor. Design and construction of internal plant drainage system and its interface/connection with the Main Drainage System shall be in the scope of the contractor.
- i. Cable Routing: Requisite cable routing through cable trenches/trestle and/ or cable tray, wherever required. **Cable routing shall be done as per drawing approved by RECPDCL, however minor changes in the routing may be done at site to meet the site condition in consultation with RECPDCL (site).**
- j. Power cables laying with proper cable tray arrangements.
- k. Construction of Switchyard for **Inverter Output Voltage/Switchyard Output voltage system** including all equipments, panels and protection system.
- l. Rainwater Harvesting for Control Room and other Building.
- m. **Fencing: Fencing along the periphery of the land for Solar Power Project.**
- n. Other Miscellaneous Civil works.

### 1.0.6 Installation, Erection, Testing, Commissioning

The scope of the contractor shall have deemed to include Design, Engineering, Supply, Erection, Testing, Commissioning of all the equipment including successful completion of **Performance Guarantee Test** of Solar PV Project. The synchronization shall be done in accordance with the then applicable Grid Code and the state & central authority regulations or UPPTCL respectively.

### 1.0.7 Performance Guarantee Test

Bidder has to quote the first-year annual generation in the relevant section of the bidding document. The same has to be demonstrated during the performance guarantee 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.

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The performance guarantee tests shall be carried out as specified in 4.0.20 of the Technical Specification/Requirement

**1.0.8 Testing**

- a. During detailed engineering, the contractor shall submit to the Employer the valid type tests reports for approval/review. These tests should have been conducted on the equipment similar to those proposed to be supplied under this contract at an independent laboratory or should have been witnessed by a client. However, if the contractor is not able to submit valid type test report(s) or in the case of type test report(s) are not found to be meeting the specification requirement, the contractor shall conduct all such tests under this contract at no additional cost to the employer.
- b. All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Quality Assurance Plan and reports which shall be submitted to Employer.

**1.0.9 Warranty**

The contractor shall provide the warranty for the equipment as mentioned below:

- a. PV modules used in grid connected solar power plants must be warranted for peak output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.
- b. The modules shall be warranted for at least 10 years for failures due to material defects and workmanship.
- c. The mechanical structures, electrical works and overall workmanship of the grid connected solar power plants must be warranted for a minimum of 5 years.
- d. The Inverters/PCUs installed in the solar power plant must have a warranty for 5 years with extendable warranty of extra 5 years.
- e. The Transformers, HT Panel and other panels installed in the Solar Power Plant must have a warranty of 5 Years.
- f. All warranties shall be in the name of RECPDCL.

**1.0.10 Approvals and Licenses**

1.0.10.1 The Contractor, on behalf of the Employer, shall obtain all **applicable** statutory approvals / clearances required from Government

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Departments/regulatory Authority including but not limited to the following:

- STU Connectivity in the name of RECPDCL
- Land Lease registration in the name of RECPDCL.
- Pollution control board clearance, if required
- CEIG/CEA
- System Studies (if any)
- Power Evacuation
- Environment Clearance (if applicable)
- CT, PT and Metering System testing at Authorized lab as per
- Requirement of the concerned Agencies.
- SLDC Data Transmission/Integration at SLDC t .
- Any other approvals and permissions not specifically mentioned
- but maybe required for smooth Construction and Operation & Maintenance of the Plant

**1.0.10.2 Payment for System Study Charges (If Any) shall be in the scope of the Contractor.**

Bidder shall apply for necessary approvals, permits and clearances not more than 90 days from the issuance of LoA, which shall be complete in all respects, incorporating the clarifications/changes as required by the concerned authorities.

1.0.10.3 All Construction and O & M of the Plant shall be carried out through appropriate relevant Standards, regulations and procedures laid by IMPLEMENTING AGENCY/MNRE/CEA/CERC/SERC/CEIG and other statutory and regulatory authorities as and when applicable. Further, this shall comply the applicable labour laws. The Contractor shall make himself aware of the same and shall not solely depend upon the Employer.

1.0.10.4 The Contractor shall make all required Liaisoning/co-ordination with the concerned agencies for obtaining such approvals including Chief Electrical Inspector General, STU, Statutory Authorities, concerned power utilities etc. for interconnection/synchronization of the solar power plant with the State Grid, so as to commence utilization of power generated from solar power plant soon after its commissioning.

1.0.10.5 The Employer will obtain approvals and other necessary clearances from the concerned authorities related to land including allotment of land, its possession etc., for the project.

1.0.10.6 The Contractor, in its own interest, is advised to get fully acquainted with the

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approvals and clearances within the state where the Solar Power Project is to be developed and obtain for himself on its own all information that may be necessary for such approvals and clearances.

**1.0.11 Training of Employer’s Personnel**

The contractor shall provide training free of cost to the personnel of Employer for 7 man-days on Design/manufacturing/ erection/ testing/commissioning and O&M. Expenses towards travel, lodging, and boarding and other expenses for the personnel shall be borne by the Employer.

**1.0.12 Insurance Coverage**

The Contractor shall provide all the adequate insurances during EPC and O&M period to cater all Construction and O&M of the plant to indemnify the Employer.

**1.0.13 Scope of Operation & Maintenance (O&M)**

Comprehensive O&M of the solar PV plant (s) for a period of Five (05) years from the COD is in the scope of the Contractor. The Detailed scope of O&M Services has been specified in 4.4.8 of this section.

**1.0.14 Energy estimation and scheduling**

The work regarding the Estimation, Scheduling & Forecasting on daily basis in form of day ahead schedule as per applicable guidelines shall be in the scope of contractor without any additional cost to Employer during period of O&M Contract. Coordination with concerned Agencies (UPCL/SLDC/HLDC etc.) for the above shall also be in the scope of the contractor. The Contractor shall be required to Schedule its power as per the applicable regulations /requirements / guidelines of CERC / SERC /SLDC / RLDC or any other competent agency and same being recognized by the SLDC or any other competent authority /agency as per applicable regulation/ law / direction and maintain compliance to the applicable Codes/ Grid Code requirements and directions, if any, as specified by concerned SLDC/RLDC from time to time. Any deviation from the Schedule will attract the provisions of applicable regulation / guidelines / directions and any financial implication on account of this shall be borne by the contractor.

**1.0.15 Performance Monitoring**

The performance monitoring of the system shall be as per the terms & requirements of RECPDCL.

- a. The Contractor shall maintain the list of Module IDs along with performance characteristic data for each module (information stored in RF Identification Tags). This data shall be submitted to MNRE/RECPDCL.

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- b. The Contractor must install necessary equipment to continuously measure solar radiation on module plane, ambient temperature, wind speed and other weather parameters and simultaneously measure the generation of DC power as well as AC power generated from the plant. They will be required to submit this data to State Agency and MNRE on line and/or through a report on regular basis every month for the entire duration of O&M Period.
- c. The Contractor shall provide access to MNRE/RECPDCL/State Agency or their authorized representatives for installing any additional monitoring equipment to facilitate on-line transfer of data. All data shall be made available as mentioned above for the entire duration of the O&M Period.
- d. The SCADA System shall be built over Industrial IoT architecture with integrated Analytics, secure web access, enterprise software and Database in accordance with respective clause No. of TS. It shall be able to provide real time online data (including but not limited to irradiance, plant generation (instantaneous/daily/monthly/yearly), daily peak generation, temperature, wind speed etc.) to MNRE/RECPDCL/State Agency or any other Regulatory Agency as per requirement.

**1.0.16 Handing over of the Plant**

At the end of the contract period, the contractor shall hand over the plant and equipment back to the Employer in completely safe and healthy condition and without any pending defect. The items supplied by the Employer on returnable basis, such as spares parts, consumables, tools and plants, documents etc. shall be returned back to the Employer, else, suitable recoveries shall be made from the Contractor’s bills.

**1.0.17 Terminal point for the EPC Project**

The terminal point under the scope of this assignment shall be up to termination and Integration of power transmission system at interconnecting substation(s) end as per Scope of Work.

Bidder shall furnish all relevant data required by the employer at interface points within schedule as agreed prior to award of contract.

**DELIVERY POINT / INTERCONNECTION POINT:**

**Delivery Point/interconnection Point:** shall mean the point of Interconnection at Pooling Substation at 11/33KV . All costs and losses up to that point will be to the account of the Bidder.

**Metering:** Metering shall be done at above mentioned interconnection /delivery point (s) where the power is injected into. For interconnection with Transmission system and metering, the SPD shall abide by the relevant CERC/SERC

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Regulations, Grid Code and Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 as amended and revised from time to time or orders passed thereunder by the appropriate commission or CEA.

**Metering Point:** The point at which energy supplied to UPPCL shall be measured and shall be the Interconnection Point.

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# PART C: GENERAL TECHNICAL REQUIREMENTS

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## 2.0 GENERAL TECHNICAL REQUIREMENTS

### 2.0.1 Introduction

This part covers general technical requirements, which will form an integral part of the Contract. The following provisions shall supplement all the detailed technical requirements brought out in this section.

### 2.0.2 Completeness of the Facilities

Contractors may note that this is a contract inclusive of the scope as indicated elsewhere in the specification. Each of the plant shall be engineered and designed in accordance with the specification requirement. All engineering and associated services are required to ensure that a completely engineered plant is provided.

All equipment furnished by the Contractor shall be complete in every respect, with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or those needed for erection, completion and safe operation & maintenance of the equipment and for the safety of the operating personnel, as required by applicable codes, though they may not have been specifically detailed in the respective specifications, unless included in the list of exclusions.

All similar standard components/ parts of similar standard equipment provided, shall be interchangeable with one another.

### 2.0.3 Codes and Standards

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

Unless covered otherwise by Indian codes & standards and in case nothing to the contrary is specifically mentioned elsewhere in the specifications, the latest editions (as applicable as on date of Issue of NIT), the International/ National standards such as JIS, ISO, SEL, SEW, IEC, & EN shall also be considered as far as applicable for Design, Manufacturing and Testing of the respective equipment.

2.0.3.2 In addition to the codes and standards specifically mentioned in the relevant technical specifications for the equipment / plant / system, all equipment parts, systems and works covered under this specification shall comply with all statutory regulations and safety codes as applicable in India as well as of the locality where they will be installed including the following:

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- 2.0.3.2.1 Bureau of Indian Standards (BIS)
- 2.0.3.2.2 Indian electricity act
- 2.0.3.2.3 Indian electricity rules
- 2.0.3.2.4 Indian Factories Act and State Factories Act
- 2.0.3.2.5 Regulations of the Central Pollution Control Board, India
- 2.0.3.2.6 Regulations of the Ministry of Environment & Forest (MoEF), Government of India
- 2.0.3.2.7 Pollution Control Regulations of Department of Environment, Government of India
- 2.0.3.2.8 State Pollution Control Board.
- 2.0.3.2.9 Rules for Electrical installation by Tariff Advisory Committee (TAC).
- 2.0.3.2.10 Indian Electricity Grid Code (IEGC), CEA/CERC /SERC Regulations and other statutory regulations as applicable.
- 2.0.3.2.11 Any other statutory codes / standards / regulations, as may be applicable.

**2.0.4 Instruction Manuals**

The Contractor shall submit to the Employer, Instruction Manuals for all the equipment covered under the Contract. The manuals shall be specifically compiled for this project. The Contract shall not be considered to be completed for purposes of taking over until the Instructions manuals have been supplied to the Employer. The Instruction Manuals shall include (but not limited to) the following:

**2.0.4.1 Erection & Commissioning Manuals/Checklists**

The erection & Commissioning Manuals/Checklists shall be submitted prior to the commencement of erection activities of particular equipment/system. The Erection Manual should include Erection strategy, Sequence of erection, Erection instructions, Critical checks and permissible deviation/tolerances, Bill of Materials, Procedure for erection, General safety procedures, Procedure for initial checking after erection, testing and acceptance norms, Procedure/ Check list for pre-commissioning & Commissioning activities.

**2.0.4.2 Operation & Maintenance Manuals**

The operating and maintenance instructions together with drawings (other than shop drawings) of the equipment, as completed, shall be in sufficient detail to enable the Employer to operate, maintain, dismantle, reassemble and adjust all parts of the equipment. These shall give a step by step procedure for all operations likely to be carried out during the life of the plant / equipment including, operation, maintenance, dismantling and repair including periodical

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maintenance activities to be carried out for smooth functioning of the plant.

List of spare parts along with their drawings and catalogues shall also be provided in the Manuals.

**2.0.5 Progress Reports**

The Contractor shall furnish to the Employer, Progress Reports with periodicity as decided by the Employer detailing out the progress achieved in the execution of the project including status of supply of material, progress on all erection activities as compared to the schedules. Colour photographs and video in VCD/DVD indicating various stages of erection and the progress of the work done at Site shall supplement this. The report shall also indicate the reasons for the variance between the scheduled and actual progress and the action proposed for corrective measures, wherever necessary.

**2.0.6 Project Completion Report**

The Contractor shall submit a Project Completion Report at the time of handing over the plant. Before the final acceptance of individual equipment /system by the Employer, the Contractor will update all original drawings, documents and BOM for the equipment/ system to "as built" conditions and submit these as built drawings/documents to the Employer. The Works shall not be considered complete for purposes of taking over under the terms of the General Conditions of the Contract until the Contractor has supplied the above documents.

**2.0.7 Technical/Contract Co-ordination Meeting**

The Contractor shall organize and attend progress Meetings (at least one monthly or as decided by the Employer) with the Employer/Employer's representatives during the period of Contract at mutually agreed venues for review of progress & resolving technical clarifications, if any. The Contractor shall attend such meetings at his own cost and fully co-operate with such persons and agencies involved during the discussions. The Contractor shall ensure availability of the concerned experts / consultants/ personnel who are empowered to take necessary decisions during these meetings.

**2.0.8 Design of Facilities/Maintenance & Availability Considerations**

The Contractor shall execute the basic and detailed design and the engineering work in compliance with the provisions of the Contract, or where not so specified, in-accordance with good engineering practice.

The Contractor shall be responsible for the selection and design of appropriate equipment to provide the best coordinated performance of the entire system. The basic requirements are detailed out in various clauses of the Technical Requirements/ Specifications. The design of various components, assemblies and subassemblies shall be done so that it facilitates easy field assembly and dismantling. All the work shall be done while complying fully to or above minimum standards specified in this specification.

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**2.0.9 Design of Facilities, Specifications and Drawings**

All the design procedures, systems and components proposed shall have already been adequately developed and shall have demonstrated good reliability under similar conditions elsewhere.

The Contractor shall be responsible for the selection and design of appropriate equipment to provide the best coordinated performance of the entire system. The basic requirements are detailed out in various clauses of the Technical Specifications. The design of various components, assemblies and subassemblies shall be done so that it facilitates easy field assembly and dismantling.

The Contractor shall furnish engineering data/drawings for entire equipment covered under this specification in accordance with the schedule of information as specified in Technical Specification and Data sheets.

The Contractor shall be responsible for any discrepancies, errors or omissions in the specifications, drawings and other technical documents that it has prepared and ensure that the discrepancies are removed, before their submission to the employer.

Any changes of the design of any part of the Works, which may become necessary after signing the Contract, have to be submitted in writing to the Engineer in-Charge for approval, being sufficiently substantiated and justified. However, there shall not be any cost implication due to these deviations on the employer.

**2.0.10 Standardization of Works**

Every effort shall be made to standardize parts and spares so as to minimize costs throughout the Works in order to facilitate keeping stocks, maintenance, replacement, inter changeability, etc.

**2.0.11 Availability and reliability**

The Contractor shall design each equipment, system or subsystem to provide 99 % availability, reliability, low maintenance and ease of maintenance. The Contractor shall optimize the various systems and subsystems to minimize the number of different components and associated spare parts. The Contractor shall also furnish details of availability records in the reference plants stated in his experience list

**2.0.12 Material of Construction**

All materials used for the construction of the equipment shall be new and shall be in accordance with the requirements of this specification. Materials utilized for various components shall be those, which have established themselves for use in such applications.

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**2.0.13 Safety**

- 2.0.13.1 **Handling provision:** Lifting lugs, brackets, eyes, and other items required for attaching lifting devices shall be provided on all the major components of the equipment for safe handling. Lifting devices like lifting tackles, slings, etc. to be connected to hook of the hoist / crane shall be provided by the contractor for lifting the equipment and accessories covered under the specification.
- 2.0.13.2 **Safety of operation:** All equipment and services provided under this contract shall abide by commonly accepted standards for safety of operation.

**2.0.14 Rating Plates, Name Plates & Labels**

Each main and auxiliary item of plant including instruments shall have permanently attached to it in a conspicuous position, a rating plate of noncorrosive and non-hygroscopic material upon which shall be engraved manufacturer's name, equipment, type or serial number together with details of the ratings, service conditions under which the item of plant in question has been designed to operate, and such diagram plates as may be required by the Employer.

**2.0.15 Protection and preservative shop coating**

- a. All coated surfaces shall be protected against abrasion, impact, discolouration and any other damages. All exposed threaded portions shall be suitably protected with either metallic or a non-metallic protection device. All primers/paints/coatings shall take into account the hot humid, corrosive & alkaline, subsoil or over ground environment as the case may be. The Contractor's scope of work includes painting of all equipment and structures. The quality and finish of paints shall be as per standards of BIS or approved equivalent.
- b. **Preservative Shop Coating:** All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. All surfaces which will not be easily accessible after the shop assembly, shall be treated beforehand and protected for the life of the equipment. The surfaces that are to be finish-painted after installation or require corrosion protection until installation, shall be shop painted with at least two coats of primer.
- c. Transformers and other electrical equipment if included shall be shop finished with one or more coats of primer and two coats of high grade resistance enamel. The finished colors shall be as per manufacturer's standards, to be selected and specified by the Employer at a later date.
- d. Shop primer for all steel surfaces, which will be exposed to operating temperature below 95°C shall be selected by the Contractor

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**2.0.16 Mechanical Works and Steel structures**

**2.0.16.1 Materials**

2.0.16.1.1 Materials shall be new and of high-grade quality, suitable for the purpose, free from defects and imperfections, and of the classifications and grade meeting specification requirement. Material specifications, including grade or class shall be shown on the appropriate drawings.

2.0.16.1.2 All materials or parts used in the equipment shall be tested in conformity with the standards.

2.0.16.1.3 Certified Material Test Report for the materials of major/important components and/or materials for special application shall be furnished to the Employer as soon as possible after the tests are performed. Each test certificate shall identify the components for which the materials are used and shall contain all information necessary to verify compliance with the contract.

**2.0.16.2 Metal Work**

2.0.16.2.1 The contractor shall supply & install all anchors, fasteners, embedded metal work, piping, & sleeves associated with & required for the equipment to be installed under this contract, except if otherwise mentioned in the specifications.

2.0.16.2.2 The Contractor shall be responsible for the determination and details of all loads and forces exerted by his equipment and transferred to the foundation.

2.0.16.2.3 **Galvanizing:** Unless otherwise specified, all structural steel including ladders, platforms, hand rails and the like and all exterior and interior steel surfaces of outdoor Works, as well as bolts and nuts associated with galvanized parts shall be hot-dip galvanized, electrolytically galvanized or standardized, as may be appropriate to the particular case.

**2.0.17 Instrumentation & Control**

All instrumentation and control systems/ equipment/ devices/ components, furnished under this contract shall be in accordance with the requirements stated herein, unless otherwise specified in the detailed specifications.

All instrument scales and charts shall be calibrated and printed in metric units and shall have linear gradation. The ranges shall be selected to have the normal reading at 75% of full scale.

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All scales and charts shall be calibrated and printed in Metric Unit

**2.0.18 Pre-Commissioning & Commissioning Facilities**

- a. The pre-commissioning and commissioning activities of the equipment/systems furnished and installed by the contractor shall be the responsibility of the Contractor. The Contractor upon completion of installation of equipment and systems, shall conduct pre-commissioning and commissioning activities, to make the equipment/systems ready for safe, reliable and efficient operation on sustained basis at his expense. All pre-commissioning/commissioning activities considered essential for such readiness of the equipment/systems including those mutually agreed and included in the Contractor’s quality assurance programme as well as those indicated in the technical Requirements/ specifications shall be performed by the contractor. The Contractor must strictly adhere to the Commissioning procedure as stipulated in NHPC.
  
- b. The contractor shall give the concerned RLDC/SLDC/IMPLEMENTING AGENCY, RECPDCL & PGCIL (if applicable) at least sixty (60) days advanced preliminary written notice and at least thirty (30) days advanced final written notice, of the date on which it intends to synchronize the Power Project to the Grid System. The synchronization equipment and all necessary arrangements / equipment including RTU for scheduling of power generated from the Project and transmission of data to the concerned authority as per applicable regulation shall be responsibility of the Contractor.
  
- c. The capacity of DC arrays and commissioning thereof shall be as per the terms & requirements of RECPDCL

**2.0.19 Packaging & Transportation**

The Contractor is solely responsible for transporting the equipment/material, machinery with proper packaging and labour at his own cost and is also obliged to arrange for and obtain all necessary permissions, permits, consents and licenses. All the equipment shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at Site till the time of erection. The Contractor shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. Upon indicating the items for which the contractor requires the C-forms if applicable, the employer may issue the C-form. Also arrangement of safe storage facility for preservation & conservation of all the incoming material is in the scope of the contractor.

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# Part – D

## Detailed Technical Requirement

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**4.0 DETAILED TECHNICAL REQUIREMENTS**

**4.0.1 CIVIL WORKS**

**4.0.1.1 Topographical Survey**

Topographic Survey shall be done by the Contractor himself or through a reputed agency to ascertain topographical and other general features of the site and its surroundings as are pertaining to and needed for the performance of the work.

Based on the above, the Contractor shall prepare topographical report along with contour maps and a detailed general layout clearly marking the scope to be undertaken by the Contractor, with clear demarcation showing boundary wall, boundary pillars, location of control room, PV array yard, main roads, internal roads and general drainage etc. for complete solar PV Plant.

The work shall be executed according to the specifications and good engineering practices necessary to fulfill the objectives of the survey work.

**4.0.1.2 Geo-Technical Investigations and Testing.**

Geo-Technical Investigations and Testing of the proposed site shall be done by the Contractor at his own cost. All testing shall be done in a NABL accredited / Govt. Laboratory. This includes reputed government / autonomous laboratories / organizations, and other reputed testing laboratories. The test samples for such test shall be jointly selected and sealed by the contractor, in the presence of the Employer’s representative and shall be sent to the concerned laboratory. The interim and final reports shall be made available as and when received, to the Employer.

Contractor is required to consider the Geo-Technical parameters of the proposed site as per the final Geo-Technical Investigations and Testing report vis-à-vis locations of various structures required for the project to design suitable foundations for the respective structures. Further, based on the Geo-Technical Investigations and Testing report, the Contractor shall arrange for Geo- Technical improvement wherever necessary.

**4.0.1.3 Other Investigations**

The contractor shall be responsible for collecting necessary data (earth quake data, wind velocity data, weather related data like Temperature, humidity, flood, rainfall etc.) and carry out all other necessary studies/investigations (Shadow Analysis etc.) as required for construction, execution and smooth operation of the plant.

**4.0.1.4 Planning and Designing**

4.0.1.4.1 The solar plant shall be designed so as to conform to the latest engineering designs, architectural values and aesthetic features etc.

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- 4.0.1.4.2 The Contractor has to plan and design all the Civil Engineering structures/works as per the topographical survey, Geo-Technical Investigations, Other Investigations/studies, Test reports etc.
- 4.0.1.4.2 The Contractor shall develop general layout drawing for the complete solar PV Plant including but not limited to plant array field, internal roads and pathways, drainage system (ensuring no water logging in the plant premises) along with sanitary plumbing layout etc. All details related to internal electrification, water supply and sewerage system should be clearly shown in the drawings. Basic and Layout design of the project shall be in accordance with nationally/internationally accepted practice. Appropriate IS Codes (latest version) shall be used wherever available.
- 4.0.1.4.3 All designs & drawings have to be developed based on specifications given in the Bid documents, soil report and relevant IS codes unless otherwise specified.
- 4.0.1.4.4 All structures for civil works shall be designed for severe combination of loads, considering wind seismic loads etc. and as per the relevant IS codes or international practices.
- 4.0.1.4.5 The Contractor should be able to provide various international and national references, when required by employer, to substantiate his design.

**4.0.1.5 Site Development**

Before commencement of work including land development of the project site, the Contractors should take into account the drainage, water runoff and general slope/gradient of the terrain and plant area. As far as possible the excavated material, which is suitable for fill, shall be used in project area itself. In case the earth filled is brought from outside the plant, the contractor shall provide the necessary royalty challan. Waste material shall be disposed-off in sites to be identified and arranged by contractor himself at his own cost.

**4.0.1.6 Site Leveling and Grading**

The EPC contractor is responsible for making the site ready and easily approachable by clearing of bushes, felling of trees (if required with appropriate approval from concerned authority), leveling of ground (wherever required) etc. for commencing the project. It is to ensure that land must be graded and leveled properly for the flow of water. It is advisable to follow the natural flow of water at the ground. If the land pocket needs any filling of sand, it is to ensure that the filled earth must be well compacted as per the relevant IS standards.

**4.0.1.7 Fencing of the Project**

The complete project area shall be protected from foreign ingress and unauthorized access by fencing all along its periphery. The Contractor shall provide Pre Fab RCC Slab with PCC Foundation of M20 grade all along the periphery of the plant. The height of fencing shall be at least 2m above the finished ground level with Barbed wire mesh of 500 mm above the fencing

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tightened with MS angles. The construction of peripheral fencing and main entry gate shall conform to the relevant IS Standards and practices.

Fencing of Switchyard and Transformer Yard: The fencing work required for electrical Switchyard and Transformer Yard shall be of G.I. Chain link in accordance with relevant IS Standards, CEIG and other statutory requirements (if any).

The complete design, materials and the erection of chain link fencing shall be done as per standard engineering practices.

#### 4.0.1.8 Foundations

The contractor is responsible for the detailed soil investigation and subsequent foundation design of the structures and equipment in the plant. The foundation design and drawing of the module mounting structures, buildings and other important equipments and structures shall be submitted to the employer for review & reference as per Engineering Information Schedule.

The foundation system shall be made which transfer loads safely to the soil for the module mounting structures, depending on Geotechnical Investigation, geographical condition, regional wind speed, bearing capacity, slope stability etc. The support structures & foundation shall be designed with reference to the existing soil conditions, Geotechnical investigation, geographical conditions, slope stability etc. and shall be capable to withstand wind speed applicable for the zone whichever is higher, using relevant Indian wind load codes. The structures and foundations shall also conform to the seismic conditions pertaining to the zone (using relevant Standards and codes).

Civil foundation design for Module Mounting structures (MMS), Control Room, Inverter Room, Equipment Room and other equipment's shall be made in accordance with the National Building Code, relevant BIS Codes and as per site conditions.

In general, the MMS foundation shall be constructed using RCC/Concrete Pile foundation of required diameter and depth as per approved design.

#### 4.0.1.9 Pathways and Roads

Main road and internal roads shall be made to carry safe and easy transportation of equipment and material at the project site. These roads shall provide easy and fast approach to each location of the plant. Main road from nearest approach road

to control room shall be flexible type bituminous road and shall be constructed with sufficient width (minimum 3.0 m with 0.5 m wide shoulder on both side). The road must be well compacted as per the latest relevant IS codes and MORTH updated till date.

All Peripheral roads and internal/ service roads with sufficient width (minimum 3.0 m) shall be provided for easy access and shall be hard rolled with any suitable

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material which shall ensure availability of these roads during the O&M Stage of the project.

For illumination of all approach roads and peripheral pathways, reference shall be made to relevant Electrical Specifications.

#### 4.0.1.10 PLANT DRAINAGE SYSTEM

4.0.1.10.1 Surface drainage system shall be designed considering 'Heaviest rainfall in one hour in mm'. The minimum value of surface run off coefficient shall be considered as 0.6 in the design of drainage system. The drainage system shall be designed as per the IRC specifications and prevailing industry practices.

4.0.1.10.2 The drainage scheme shall be designed considering the catchment areas contributing to the existing drains, solar plant gradients and solar PV array layout. As per plant drainage requirement, a network of open drains shall be designed & provided to carry surface runoff. The drains shall be trapezoidal, triangular rectangle section made of earthen type lining (Compacted Earth Lining) and hard surface lining (stone masonry/pitched, Boulder, Precast cement concrete/stone slab, in-situ cement lime/concrete lining, soil cement lining, etc.)

4.0.1.10.3 Bidders can also propose suitable detention pond, recharge dug wells, recharge pits, recharge trenches, and recharge soakaways for quick disposal of storm water in the vicinity of the solar block/plot.

4.0.1.10.4 Bidder shall also ensure that drainage from his plot does not encroach/flood in to the adjacent property and adjacent solar plots (if any). Bidder shall try to maintain existing natural drain and shall remodel the natural drains in case of any disturbance made. The same shall be as per the technical/design requirements without affecting the drainage pattern. The bidder plot drainage scheme shall include to drain out the drainage of the allotted plot and shall include contributing catchment area consisting of adjoining plots and nearby catchment area.

4.0.1.10.5 Provision of culverts and their design to be submitted separately. The road on the culvert portions of the drains shall be concrete road.

4.0.1.10.6 All Buildings shall be provided with plinth protection all around, sloped towards side drains. Plinth Protection shall be 75mm mm thick PCC laid over well compacted 75mm well grades brick ballast base. Building peripheral drains shall be stone masonry/brick masonry/concrete works. These side drains shall be connected to area drains by either open drains

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or combination of open drains and underground pipes.

4.0.1.10.7 Grade level shall be fixed with due reference to highest high flood level of the receiving body of water. Laying of Hume pipe shall be in line with IS: 783.

Drainage philosophy based on site area levels and invert levels of drains shall be developed by the contractor to ensure no water stagnation in the plant. Contractor shall design and construct suitable drainage system for rain & storm water, flood water etc. Also, cross drainages shall be designed and constructed by contractor, if required and shall be designed as per site rainfall data flood data and other standard criteria and shall be constructed with brickwork/RCC/RR masonry as suitable for the site conditions. The construction shall include dressing of sides and ramming of bottoms including mucking of the excavated soil and disposal of surplus excavated soil as directed by the employer. The drains outfall shall be connected to the nearest main drain.

**4.0.1.11 Entry Gates**

The Contractor shall provide **at least one (1)** number of Gates at suitable locations so as to ensure the safety of the plant as well as easy movement of the vehicles carrying equipment's, material etc. during execution and O & M of the plant. The gate shall be provided with required paint and accessories necessary for smooth operation of gate. The main gate shall be of overall size of minimum 5m width by 3m height. The location, number and exact size of these gates shall be decided in consultation with employer during detailed engineering to meet site requirements.

**4.0.1.12 Security Cabin/Guard Room**

Security cabin/Guard room provided at entrance gate shall be of RCC/PEB type. Dimensions of security cabin shall be minimum 3m x 3m. In addition to this, Indian type W/C including wash basin and accessories shall be provided attached to the security cabin. All the necessary plumbing and sanitary lines shall be drawn. Necessary electrical connections for lighting and exhaust fan in W/C shall be provided.

**4.0.1.13 Control Room, Inverter room and Equipment Room (As applicable)**

The contractor shall construct Control Room, Inverter room, Equipment Room and Buildings based on the Geotechnical Investigation, site conditions as per the system design for smooth execution as well as O & M of the Solar PV Plant. The Grade slab level of the Buildings shall be Minimum 600 mm above the surrounding ground level.

**The control room for operation of the Solar PV Plant shall be made up of RCC structures as per relevant Codes and site conditions.** The layout, general arrangement etc. shall be designed as per system requirement. Control Room shall also have the provision of Store room of adequate size for proper storage of Inventory/Spares/ Tools/ Tackles etc.

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The building shall be constructed for housing Electrical MCC, Panels with space for Maintenance, Office Space with adequate furniture, SCADA Room, Battery Room, Conference Room suitable for minimum 5 persons, Rest Room for 04 persons, Toilet Block, Pantry and all other facilities and amenities required for smooth Operation & Maintenance of the Plant. The office space in the control room must have at least 6 Chairs of industry standard revolving chairs with wheels and with provision for adjustment of height (hydraulically/gas lift), a 5 seater conference table of min Width\* Depth\* Height dimensions as 700\*1500\*745 mm, adequate no. of fans, tube lights/LED(s), at least 2 storage cabinets etc.

The Control Room shall have minimum 02 numbers of Overhead tanks of minimum 2000 litre capacity of reputed make for proper water storage, one over the control Room and the other shall be for Toilet Block and Pantry Room with proper fresh water and sewage arrangement and septic tank with Soak pit shall be provided.

Electrical Panel Room shall have provision of ramp of adequate slope and width as well as rolling shutters of adequate size for loading and unloading of Electrical panels and machinery.

Inverter room (if applicable) shall be located at suitable locations corresponding to solar arrays. The number of Inverter room (if applicable), layout etc. shall be designed as per system requirement and the same submitted by the contractor for the review of the employer before commencement of work.

**Inverter room (if applicable) shall be Pre-Engineered Building (PEB) or standard RCC** framed structures as per requirement with cable trench arrangement located in the PV array field and shall be constructed as per National Building Code and as per relevant BIS Codes. Further, for outdoor inverter suitable RCC platform and canopy arrangement of adequate strength is to be provided by the bidder for safe operation of the equipment.

The layout of Inverter room (if applicable) shall be designed so as to divert the heat generated from each inverter outside the room. The contractor shall have to get the structural design done as per the prevailing IS codes.

Adequate nos. of split AC of reputed make units shall be provided by the Contractor in the Control Room & Inverter Room (if applicable) to maintain the required operating temperature and ensure trouble free operation of the equipment installed.

The Contractor shall submit Preliminary Drawings/Execution Drawings with Architectural and Structural design and details for review/approval of the Employer. The Employer reserves the right to modify the layout as per requirements. Based on any modifications/recommendations, the Contractor shall submit the Final Drawings for review/approval of the Employer. All kind of

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works shall be carried out as per the relevant standards.

#### 4.0.1.14 Specifications

The specifications for RCC works, Masonry work, Glazing, Plastering, Roofing, Painting, water supply, plumbing & sanitary, electrification of building and stairs shall be as detailed below:

##### I. RCC Works

- a. RCC Frame structures shall have adequate size of footing (suitable for soil conditions), columns, Plinth beam, grade slab, lintel beam, Roof Slab, etc.
- b. All RCC works shall be design mix as per IS: 456-2000. For structural concrete items, Ordinary Portland Cement (43 Grade) conforming to IS: 8112 and Fly ash based Portland pozzolana cement conforming to IS: 1489 (Part-1) shall be used for superstructures. Cement used shall meet the requirements of IS: 383. Sand shall be hard, durable, clean and free from adherent coatings of organic matter and clay balls or pellets. Sand, when used as fine aggregate in concrete shall conform to IS: 383. For plaster, it shall conform to IS:1542 and for masonry work to IS: 2116. Reinforcement steel shall be of high strength deformed TMT steel bars of grade minimum Fe- 500 and shall conform to IS: 1786. Ductile detailing in accordance with IS:13920 shall be adopted for superstructures and substructures of all RCC buildings / structures.
- c. M-25 – All RCC structural elements above and below ground level, MMS foundation, cable trench, oil pit, Grade slab, Foundation for Power, Inverter & Auxiliary Transformers and Foundation for Switchyard Equipment.
- d. M-20 (Equivalent nominal mix of 1:1.5:3) - Fencing work, leveling course & other important PCC works.
- e. The Contractor shall carry out the design mix of M-25 and M-20 grade concrete on priority. The design mix shall be reviewed by Employer before start of work.
- f. All loads shall be considered in line with IS: 875. Seismic loads for design shall be in accordance with IS: 1893 and relevant standards.
- g. IS: 2502 Code of Practice for Bending and Fixing of bars for concrete Reinforcement must be compiled for reinforcement. IS: 5525 and Sp:34 shall be followed for reinforcement detailing. A minimum 75 mm thick PCC shall be provided below RCC wherever RCC is laid over the ground. Proper and sufficient formwork/shuttering shall be provided for the required period as per IS: 456. Grouting Cement mortar (1:2) grout with non-shrink additives shall be used for grouting below base plate of column. The grout shall be high strength grout having a sufficient characteristic compressive strength as per requirement. The grout

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shall be chloride-free, cement based, free flowing, non-metallic grout.

**II. Specification for Pre-Engineering Building**

- a. The PEB shall be made of structural steel construction with double skinned metal roofing and wall cladding of approved profile. It shall be designed, manufactured, supplied and erected by the Contractor/PEB agency. PEB shall be complete with painting, metal facia, metal gutter, rain water down comers, sun-shades, openings, etc., along with associated structural steel, cladding and roofing work insulation, Trims & Flashings. Each item of PEB like panels, masonry, plastering, flooring, foundation, fittings etc. shall be suitable for complete life of solar plant. The construction methodology for PEB shall also be submitted for RECPDCL review before start of works.
- b. The layout of building shall be designed so as to divert the heat generated from the building outside the room. The building shall be designed for a life of 25 years. The successful Contractor shall have to get the structural design done as per the prevailing Indian standard codes and International Standard. The PEB shall have a robust water tightness at all joints and connections. The building shall have a high class durability and performance during the adverse weather conditions

**III. Masonry Work**

All brick works shall be using at least Class designation 7.5 of approved quality as per IS: 1077, IS: 2212 and IS: 3495

**IV. Doors & Windows**

Steel framed doors, Windows and ventilators shall conform to IS – 1081

with necessary glass panels including of all fixtures and painting etc. complete. Doors and windows shall be made of aluminium sections. Sections of doorframe and window frame shall be adopted as per industrial standards. Door shutters shall be made of aluminium sections and combination of compact sheet and clear float/ wired glass.

**V. Glazing:**

All accessible ventilators and windows of all buildings shall be provided with min. 4mm thick float glass, plain or tinted for preventing solar radiations, unless otherwise specified. For single glazed aluminium partitions and doors, float glass shall be used.

**VI. Plastering:**

Plastering in cement mortar 1:5, 1:6 and 1:3 shall be applied to all internal, external walls and ceiling of slab respectively as per IS 154.

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**VII. Flooring:**

Flooring for stores shall be of cement flooring in concrete mix 1:2:4 using 10 mm aggregates as per IS 2571. Flooring for control building, equipment room and other places, if needed, shall be of vitrified tiles.

**VIII. Roofing:**

Roof of the main control room Building shall consist of Cast-in-situ RCC slab treated with a water proofing system which shall be an integral cement based treatment conforming to CPWD specification (item no. 25.8 of DSR 1997 or equivalent in latest version of DSR).

**IX. Painting of Walls & Ceilings:**

White washing and colour washing work shall be conforming to IS 6278.

**X. Plinth Protection:**

Plinth protection shall be provided around all the buildings with Brickbats and PCC M20A20 of at least 150mm thickness & 1000 mm width with smooth finish of top surface.

**XI. Water Supply:**

GI pipes of Medium quality conforming to IS: 1239 (Part I) and IS: 1795 for Mild Steel pipes shall be used for all water supply and plumbing works. The PVC storage water storage tank(s) conforming to IS: 12701 shall be provided over the roof of the main control room with adequate capacity to meet requirement, complete with all fitting including float valve, stop cock etc. Required water connection to service the main control room shall be in the scope of the Contractor.

**XII. Plumbing And Sanitary:**

Sanitary fittings, which includes water closet (EWC/IWC), Wash Basins, Sink, Urinal Fittings including Flushing Tank and necessary plumbing lines shall be provided for Office cum Stores, stores Building, security house.

**XIII. Electrification of Building:**

Electrification of building shall be carried out by the Contractor as per IS: 732, IS: 4648 and other relevant standards. The lighting design of the buildings shall be carried out as per IS 3646. The building shall be provided with adequate quantity of light fittings, 5A/ 15A 1 phase sockets, fans etc., controlled by required ratings of MCBs and MCB, DBs. It is encouraged that Contractor shall use the latest energy efficient equipment for the electrification and illumination.

**4.0.1.15 Cable Trenches**

In Main Control room, Inverter rooms & Switchyard area cables shall be laid in

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concrete cable trenches. Cable trenches of suitable dimensions with GI cable trays shall be provided. The trench cover in Main Control room and Inverter rooms shall be of steel grating type. The trench cover in Switchyard area shall be of concrete.

All other cables in the project area shall be buried cables with a provision for culvert/Hume pipe for protection of cables under the motorable roads. The details of buried cables are provided in the Electrical Specifications in this contract and the same shall be followed.

#### 4.0.1.16 Switchyard Civil Works

4.0.1.16.1 Switchyard civil works include step up transformer plinth, HT Switchgear kiosk plinth, two pole 4 pole structure foundation, earth pits, metal spreading curb wall. The transformer/ HT switchgear kiosk plinth shall be made of brickwork or Random Rubble masonry conforming to relevant standards. The height of transformer /HT Switchgear kiosk plinth shall be decided based on **Inverter Output Voltage/33 KV** ground clearance. Earth pit construction shall be of brickwork covered with RCC (1:2:4) heavy duty pre cast slabs. Cable Trench in Switchyard shall be RCC of M25 grade concrete. Switchyard/ double pole area must be surrounded by chain link fencing with pre-cast RCC post/ galvanized MS angle of suitable size with double leaf gate as per CEIG Requirements. Earthing of Fencing shall be done through flexible wire or through GI Plates. Area enclosed within this perimeter must be filled with 100mm thick gravel.

4.0.1.16.2 Switchyard foundations shall be RCC of Minimum M25 grade and structures shall be provided strictly as per CEIG/STU /CTU Norms/ requirements/design as applicable.

4.0.1.16.3 Transformer and equipment's foundations shall be designed based on the final geotechnical investigation report. Transformer foundations shall have its own pit which would cover the area of the transformer and cooler banks, so as to collect any spillage of oil or oil drainage in case of emergency. The oil pit shall be filled with granite stones of 40 mm size uniformly graded. The individual oil pits shall be connected to an oil collection pit which shall be sized to accommodate oil volume of the transformer connected to it, without backflow. The oil pit shall be connected to oily water drainage system. Dimensions of the discharge pipe shall consider rainfall intensity also. The water shall be discharged into the nearest drain by gravity flow or pumping.

4.0.1.16.4 Transformer track rails shall conform to IS:3443. The requirement of fire barrier wall between transformers shall be as per Electricity Rules and IS:1646 recommendations.

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## 4.0.2 DC SYSTEMS

### 4.0.2.1 SOLAR PHOTOVOLTAIC (SPV) MODULES

#### 4.0.2.1.1 SPV Module

1. The Solar PV module comprises of PV cells connected in series combination to achieve the required module power output. PV cells directly produces DC power on receipt of solar irradiation. **Solar Photovoltaic Module shall be Monoperc Bifacial Module/Topcon of size more than 540Wp.**
2. Further, the contractor shall make all efforts to add DC Capacity in order to achieve optimum generation as declared by Contractor in the Bid.

#### 4.0.2.1.2 Rating & Functional Characteristics

- 4.0.2.1.2.1 Peak power rating of the individual module shall not be less than **540 W<sub>p</sub>**. The allowable tolerance in STC Power rating for each individual module shall be 0W to +5W<sub>p</sub>. No negative tolerance is permitted. The value of positive power tolerance of each module shall not be added/considered in peak power rating of the individual module.
- 4.0.2.1.2.2 The cell should have minimum fill factor of 0.72.
- 4.0.2.1.2.3 Modules shall be designed for rugged design to with stand tough environmental conditions and Maximum static load, front & maximum static load, back shall be as per IEC-61730-2)
- 4.0.2.1.2.4 Electric Cables for photovoltaic systems with a voltage rating of 1.5kV<sub>DC</sub>.  
The system voltage shall be 1500V DC or higher.
- 4.0.2.1.2.5 Power temperature Coefficient for modules shall be greater than (-) 0.43% per °C for better yield.
- 4.0.2.1.2.6 Nominal operating cell temperature (NOCT) shall be 45°C ± 2°C.
- 4.0.2.1.2.7 The current mismatch of the modules connected to an inverter should be less than 2%.
- 4.0.2.1.2.8 SPV module shall have module safety class-II and should be highly reliable and must have minimum operating life of 25 years.
- 4.0.2.1.2.9 The I-V characteristics of all modules as per specifications to be used in the systems are required to be submitted at the time of supply.

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#### 4.0.2.1.3 General requirements of Module

- 4.0.2.1.3.1 The materials used for manufacturing solar PV module shall have a proven history of reliability and stable operation in external applications. It shall perform satisfactorily in relative humidity up to 95% with ambient temperature between -10°C to +60°C and shall withstand adverse climatic conditions, such as high speed wind, blow with dust, sand particles, saline climatic / soil conditions and for wind 180 km/hr on the surface of the panel.
- 4.0.2.1.3.2 Modules shall consist of 72 cells, connected in series using four (4) or more bus bars. The glass used to make the crystalline silicon modules shall be of toughened low iron glass with minimum thickness of 3.2 mm **(2.5 mm for glass-to glass frameless & 2.0 mm for glass to glass framed modules)** or more for 72 cell module. The glass used shall have transmittance of above 90% and bending less than 0.3% to meet the specifications.
- 4.0.2.1.3.3 The back sheet used in the crystalline silicon based modules shall be of 3 layered structures. Outer layer of fluoropolymer, middle layer of Polyester (PET) based and Inner layer of fluoropolymer or UV resistant polymer. Back sheet with additional layer of Aluminium also will be considered. The thickness of back sheet should be of minimum 300 microns with water vapour transmission rate less than 3g/m<sup>2</sup>/day. The Back sheet shall have voltage tolerance of minimum 1000 V.
- 4.0.2.1.3.4 The module frame shall be made of corrosion resistant materials, preferably having aluminium anodized finish. The anodizing thickness shall be 15 micron or better.
- 4.0.2.1.3.5 The module frame shall be made of anodized Aluminium or corrosion resistant material, which shall be electrically & chemically compatible with the structural material used for mounting the modules. In case of metal frames for modules, with sufficient number of grounding installation points. Module frame thickness/Height should be minimum 35 mm, the anodization thickness shall not be less than 15 micron. The adhesion strength with encapsulate shall be greater than 70 N/cm.
- 4.0.2.1.3.6 Each module should have two 4 sq.mm stranded UV resistant cables as per of TUV specification **2 Pfg 1169/08.2007/EN 50618** and terminated with connectors adaptive to MC4 type connector directly. MC4 type connector should be **TUV/EN 50618** certified.
- 4.0.2.1.3.7 The EVA used for the modules should be of UV resistant in nature. No yellowing with prolonged exposure in the field shall occur. The modules

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shall be uniformly laminated without any lamination defects.

4.0.2.1.3.8 The solar cell shall have surface anti-reflective coating to help to absorb more light in all weather conditions.

4.0.2.1.3.9 The sealant used for edge sealing of PV modules shall have excellent moisture ingress protection with good electrical insulation (Break down voltage >15 kV/mm) and with good adhesion strength.

**4.0.2.1.3.10 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:**

- i. Name of the manufacturer - PV Module & PV Cells
- ii. Month and year of the manufacture (separately for solar cells and module)
- iii. Country of origin (separately for solar cells and module)
- iv. I-V curve for the module at Standard Test Condition (1000 W/m<sup>2</sup>, AM1.5, 25°C)
- v. Wattage, I<sub>m</sub>, V<sub>m</sub> and FF for the module
- vi. Unique Serial No and Model No of the module
- vii. Date and year of obtaining IEC PV module qualification certificate
- viii. Name of the test lab issuing IEC certificate
- ix. Other relevant information on traceability of solar cells and module as per ISO 9000

**Note: Contractor would be required to maintain accessibility to the list of Module IDs along with above parametric data for each module.**

4.0.2.1.3.11 The crystalline silicon-based modules supplied should be of Potential Induced Degradation (PID) free modules and the test certificate from third party lab complying with the same shall be provided.

4.0.2.1.3.12 The modules must qualify to the latest edition of the following IEC PV Module qualification test or equivalent BIS standards: -

- i. IEC 61215 2<sup>nd</sup> Edition or latest: Design qualification and type approval for Crystalline Si modules).
- ii. IEC61730 Part 1 &2: PV module safety qualification testing @ 1000 V DC or higher).

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- iii. IEC 61701: Salt Mist corrosion testing of PV Module for highly corrosive environment, (Severity-6)
- iv. IEC 62716: Ammonia Resistant certified, if applicable
- v. IEC 62804 (draft std.) or equivalent TUV Rhineland std.: PID (Potential Induced Degradation) free Module.
- vi. The PV modules deployed must have valid test certificates as per above specified IEC Standards by one of the NABL Accredited Test Centers in India. In case of module types/ equipment for which such Test facilities may not exist in India at present, test certificates from reputed ILAC Member body accredited Labs abroad will be acceptable.

The contractor shall submit the above compliance certifications for approval of RECPDCL.

4.0.2.1.3.13 The junction box used in the modules shall have suitable numbers of bypass diodes to prevent hot spots in case of cell mismatch or shading. The material used for junction box shall be made with UV resistant material to avoid degradation during module life and the Junction Box shall comply IP67 degree of protection or higher protection class. The Junction Box shall consist of semi permeable membrane to allow entry /escape of air in /from the Junction Box, but block the entry of moisture in module. Junction Box shall be weather proof.

4.0.2.1.3.14 Modules of same rating and manufacturer shall be connected to any single inverter.

4.0.2.1.3.15 The Contractor shall maintain the list of Module IDs along with performance characteristic data for each module. This data shall be submitted to IMPLEMENTING AGENCY/MNRE/RECPDCL.

4.0.2.1.3.16 It is the responsibility of the Contractor to maintain a RFID reader at the site and submit the data stored in RFID to Employer after the work of installation of modules is completed.

4.0.2.1.3.17 The Contractor shall submit the Data sheet, Drawings, Flash reports and compliance certificates of the offered modules for review/approval of RECPDCL/Implementing Agency and supply should start thereafter. Also, CDF (Construction Data Form) for the SPV Module, approved by any reputed agency shall be submitted as per Engineering Information Schedule.

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4.0.2.1.3.18 **Only valid type tested, as per respective clauses of TS, crystalline modules with Peak power rating of the individual module not less than 540 W<sub>p</sub>** shall be considered for this Project. On this account, the Contractor shall provide full information, to the satisfaction of RECPDCL.

4.0.2.1.3.19 The Modules must mandatorily meet the requirements laid by MNRE/ NHPC as mentioned at Appendix -VIII, Annexure-1 (**Technical Parameters of PV Module and various other components for use in Grid Connected Solar Power Plant**).

4.0.2.1.3.20 The Contractor has to ensure that all the Solar PV MODULES after their “END of Life” (When they become defective/non-operational/no reparable) are disposed in accordance with the “E-Waste (Management & Handling) Rules, 2011” notified by the Government and as revised and amend from time to time.

4.0.2.1.3.21 As per the Solar Photovoltaics, Systems, Devices and Components Goods (Requirements for Compulsory Registration) Order, 2017, PV Modules used in the grid connected solar power projects shall be registered with BIS and bear the Standard Mark as notified by the Bureau of Indian Standards. Further, PV Modules used for the Project should have been included in the ALMM List as per MNRE Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order as on date of Invoicing. Additionally, the PV modules shall be sourced from Tier-1 PV module manufacturers.

4.0.2.1.3.22 Transportation, handling, storage and installation of modules shall be in accordance with the manufacturer manual so as not to breach warranty conditions. The Standard Operating Procedure (SOP) for the same shall be shared by the Contractor prior to dispatch for review.

4.0.2.1.3.23 The Employer shall perform material inspection at the Manufacturer's factory before the start of proposed manufacturing schedule. Proof of procurement of components as per the approved BOM mentioning manufacturer name, manufacturing date and relevant test certificate shall be submitted during material inspection for verification.

**4.0.2.1.4 Routine Testing & Inspection**

All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer.

The Employer reserves the right to inspect the modules at the manufacturer's site prior to dispatch.

**4.0.2.1.5 Type Test**

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SPV modules supplied must be of type tested design and certified by any of the accredited certifying agencies according to International standards mentioned in respective clause of TS, above and the type test reports shall be submitted to the Employer for approval.

**Further, Bidder shall submit the following:**

- i. Third Party verified PAN files for any one module, if bidder is offering three wattage bins or less. In case the bidder is offering more than three wattage bins, additional wattage bin need to be submitted.**
- ii. Self-certified Electro-Luminescence (EL) Test Report of all the Crystalline Silicon based PV modules being offered to RECPDCL.**

**4.0.2.1.6 Warranty for Modules**

- a. Performance Warranty:** Power output at STC for modules shall not be less than 97 % rated power output at STC during the first year after year of completion.
- b. PV modules must 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 date of successful completion of COD.**
- c. Product Warranty:** The modules shall be warranted for at least 10 years for failures due to material and workmanship.
- d. All warranties shall be in the name of RECPDCL.**

**4.0.2.1.7 Module performance Insurance:**

To ensure faithful performance of PV modules, Bidder must submit an insurance with a coverage of minimum 6 % of value of the PV Module supplies envisaged under the contract for 25 years, with the employer as its beneficiary. Any financial implication encountered due to insurance shall be borne by the bidder. The Bidder’s insurance liabilities pertaining to the scope of works are detailed out in elsewhere in Bidding Document.

- i. Insurance to be provided through any agency in MNRE approved list, issued vide OM Dated 07.01.2020.**
- ii. In case of insolvency of the contractor, the Employer under the terms of the insurance policy against Module Performance and Warranty shall be entitled to raise a claim against the Module Warranty Insurance Policy and in order to benefit from the coverage provided by the aforementioned policy. The Contractor shall be responsible for maintaining the coverage provided under the Module Warranty Insurance Policy at all times, at its cost and expense.**
- iii. Further, the Contractor to note that Employer requires the following to be complied while covering the Warranty/Guarantee/Performance of the supplied goods under the insurance:**
  - a. Single Insurance Policy for Product Warranty/Guarantee and performance**

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before dispatch of the first lot of PV Modules Insurance.

- b. The Insurance Policy shall be valid for a minimum period of twenty-five (25) years from the date of receipt of last batch/lot of equipment at site.
- c. The premium charges, recurring charges, any other expenditure under the Insurance Policy shall be covered by the Contractor.
- d. The insurer must continue to compensate end users for warranty claims for the product quality and/or performance even if contractor ceases to exist as an independent operating company.
- e. The insurance shall be non-cancellable by the insurer and shall provide third party bankruptcy rights.
- f. Coverage under the insurance policy shall be immediate, without any waiting period.

### 4.0.3 MODULE MOUNTING STRUCTURES (MMS)

#### 4.0.3.1 Module Mounting structures (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. Modules shall be mounted on non-corrosive support structures.

**The Contractor may provide 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.
- Automatic motor-powered **Real-time East-West (Single Axis) tracking**

The Bidder can also provide, the combination of the above arrangements in order to achieve the quoted energy yield. However, all modules corresponding to any inverter shall have the similar type of arrangements.

#### 4.0.3.1 Technical Requirements Fixed/Seasonal Tilt Mounting Arrangement

1. The MMS structures and foundation shall be designed considering total project life of at least 25 years. The structures design shall be appropriate and innovative. It must follow the existing land profile. The foundation system for MMS shall be designed as per geo technical investigation report.
2. The structures shall be designed to allow easy replacement of any modules and easy access for safe and trouble-free operation & maintenance of the plant.
3. The array structures shall be so designed that it will occupy minimum

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space without sacrificing the output from SPV panels at the same time.

4. The design calculations shall be as the codes & standards as mentioned in relevant sections in this document. The Contractor shall submit to the employer the detailed foundation & structural design drawings along with calculations and bases/ standard, Bill of Materials, entire specifications, STAAD PRO Analysis Report, Shadow analysis report showing the effect of shadow of various structures and buildings on the energy output of PV Array as per the Engineering Information Schedule.
5. The structures shall be designed for simple mechanical and electrical installation. It shall support SPV modules at a given orientation & tilt, absorb and transfer the mechanical loads to the ground properly.
6. Design shall be in such a manner that, there are minimum requirements of sub-parts. Further, all the sub-parts used in the Module Mounting structures like purlins, rafters, bracings, C-clits etc. shall be designed to ensure easy replacement. The contractor shall ensure that, the design of the mounting holes of MMS structures is in accordance with the dimensions of the SPV Module to be used in the project.
7. The thickness of the members shall be arrived by structural analysis after considering combination of all possible loads.
8. The primary loads and load combinations for design of MMS structures shall be as specified as under:
  - i. **Primary Loads:**
    - Dead Load (DL)
    - Live Load (LL)
    - Wind Load (WL) – Both along X&Z directions
    - Seismic Load (EL)- Both along X&Z directions
  - ii. **Wind Load (WL) for MMS design**
9. Load due to fair (positive pressure) wind direction on design tilt angles of MMS members.
10. Load due to adverse (negative pressure) wind direction on design tilt angles of MMS members.
11. Load due to wind on side face of MMS members.
12. In case, String Combiner Box (SCB) is mounted on the Module Mounting structures, the contractor shall to take into consideration the load of SCB

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during design of MMS. Further suitable supporting members for mounting the SCB on the MMS shall also be in the scope of the Contractor. Separate structures for the mounting of SCB can also be proposed.

13. The contractor shall design the structures height considering highest flood level at the site. The minimum clearance between the lower edge of the module and the ground shall be the higher of (i) highest flood level at the site + 100 mm and (ii) 500 mm.
14. The support structures design & foundation shall be designed with reference to the existing soil conditions in order to withstand wind speed applicable for the zone (Site Location), whichever is higher, using relevant Indian wind load codes. The structures and foundations shall also conform to the seismic conditions pertaining to the zone using relevant Standards and codes.
15. Modules shall be mounted on a non-corrosive support structure. Mounting structures shall be designed to withstand the extreme weather conditions in the area. The terrain factor K2 and topography factor K3 shall be as per IS 875 (Part 3).
16. MMS frames, post, base plate, assembly of the array structures, etc. shall conform to IS-Standards mentioned in this document. The column post of the MMS structures shall be made of hot dipped galvanized steel with minimum GSM 610 kg/sqm and/or minimum coating thickness of 70 microns. The rafter and Purlins used for the array structures shall be of galvalume type. It is to be ensured that galvanization process is done as per relevant standards. Galvanization shall confirm to IS-2629, 4759 & 4736 as applicable. The galvanization shall be done after fabrication of members and cutting of holes to ensure galvanization of all cut/exposed edges. Purity of Zinc to be used for galvanizing shall be 99.5% as per the IS: 209. Before the galvanizing the steel section shall be thoroughly cleaned of any paint, grease, rust, scale, acid or alkali or other foreign matters. The galvanized steel member shall withstand minimum four (4) dips of one (1) minute duration each in copper sulphate solution as per IS: 2633.
17. Details of fasteners

Sl. No	Connection	Grade
a.	Solar PV module to purlin/structure connection.	

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Sl. No	Connection	Grade
b.	Bolts required to loose and tighten seasonally for seasonal tilting in the module mounting structure.	SS304/SS306, A2-70
c	Other structural fixed connections.	HDG 5.6 & 8.8
d	Foundation Anchoring.	HDG 4.6

Fasteners shall conform to IS: 1367

SS304/SS306 Fasteners (nuts, bolts, washers and U-bolts) shall be of corrosion-resistant austenitic steel. SS 304/ SS 306 Fasteners shall have a good anti-seize finish with proper wax coating for better durability and firm resistance to all types of failure including seasonal removal and re-fixing of bolts.

All fasteners shall be provided according to the connection design requirement. All bolts shall be tightened with designed torque mechanically immediately after the erection of MMS to avoid any possible damage due to any incidental storm during the erection stage

One set of fastener shall consists of one hexagonal head nut, one hexagon shape bolt, and two washers. The bolts and nuts with inbuilt washers may also be provided

18. Welding of the structures at site shall not be allowed and only bolted connections shall be used.
19. For multiple module mounting structures located in a single row, the alignment of all modules shall be within an error limit of maximum 10mm.
20. Cable should pass from Pipes and Cable-ties shall be used to hold and guide the Pipes (cables/wires) from the modules to inverters or junction boxes. All the cables were aesthetically tied to module mounting structures.
21. The structures must be designed considering 1.1 times factor of safety, taking into account the provision in relevant IS Codes.
22. Modules shall be clamped/bolted with the structures properly. The material of construction shall be AL/S.S. Clamps/Bolts with or without EPDM rubber shall be designed in such a way so as not to cast any

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shadow on the active part of a Modules.

23. Cutting, welding, drilling etc. at site is not allowed for MMS. Contractor shall carry out all correction in structures (if required) at his works.
24. Contractor must submit all the quality test documents and test certificates complying with requirement of the structures.
25. **Mounting of PV Modules:** PV Modules will be supplied in the pallets each arranged with colour coding to minimize module mismatch losses. Contractor should select the modules from a single pallet for mount them in the same array so as to minimize module mismatch loss.

#### 4.0.3.2 TRACKING SYSTEM (IF APPLICABLE)

##### 4.0.3.2.1 GENERAL

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. Modules shall be mounted on non-corrosive support structures with Automatic motor powered **Realtime East-West (Single Axis) tracking.**

##### 4.0.3.2.2 TRACKER SYSTEM

The Tracker System shall be of proven design capable of tracking Sun's path actively, intended to maximize the energy output from PV Module. Design shall be based in accordance with the site climatic conditions and seismic loads, soil characteristics, thermal loads caused by expected fluctuations of materials and ambient temperatures and the minimum required design wind speed.

##### 4.0.3.2.3 STANDARDS

- a. UL 2703: Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-
- b. Plate Photovoltaic Modules and Panels.
- c. UL 3703: Standard for Solar Trackers
- d. EEC TS 62727: Photovoltaic systems - Specification for solar trackers
- e. IEC 62817:2014+AMD1:2017 CSV: Photovoltaic systems – Design qualification of solar trackers.

##### i. DESIGN

1. Only single axis East-West real time tracking.
2. Configuration - Both, single and multi-rows options are accepted.

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3. Tracker Range of suitable Movement (ROM)
4. DC Self-powered drive system with battery backup.
5. Individual row-level bi-directional control.
6. Redundant communication (wireless) through meshed network topology for individual Trackers.
7. Stow configuration: optimal Angle, as per aero elastic instability analysis.
8. Design wind speed as per site condition, basic wind speed as per wind map of India from IS 875 Part 3: 2015.
9. Suitable material for corrosion category compliance as per Corrosion map of India, EN ISO 14713, EN ISO 1461, EN ISO 12944-5 or ASTM 123.
10. Operational temp: -10 to 55 degree Celsius.
11. Integration to Plant SCADA.
12. Cleaning - Compliant with robotic module cleaning.

#### 4.0.3.2.4 REQUIREMENTS

- 4.0.3.2.4.1.1 Tracking system shall be followed by either means of sun's positioning algorithm or backtracking philosophy or optimization algorithm with a minimum tracking accuracy of  $\pm 2^\circ$  between the pointing vector of the sun and the pointing vector of the modules.
- 4.0.3.2.4.1.2 The algorithm shall optimize irradiance for both row avoidance shading and diffuse light optimization
- 4.0.3.2.4.1.3 All local tracking controls shall be mounted on the tracking structure. A suitable arrangement/bellows shall be provisioned to protect actuator assembly from extreme outdoor harsh condition, dust and UV rays.
- 4.0.3.2.4.1.4 In case of failure of supply, the arrays should return to the stow position. Bidder shall supply a tracking mechanism with an inbuilt feature for meeting the requirement
- 4.0.3.2.4.1.5 All modules associated with a specific tracking system should be connected to a common inverter.
- 4.0.3.2.4.1.6 Suitable redundancy in sensing and auxiliary power supply shall be provided for fail-safe stowing of trackers. Redundancy in control is also desirable for the safe operation of trackers. VRLA battery shall not be accepted for tracker operation/control. Detail of the scheme for various redundancy shall be finalized at the time of detailed engineering
- 4.0.3.2.4.1.7 Safety measures such as stop devices shall be applied to ensure personal safety.
- 4.0.3.2.4.1.8 Tracker shall be equipped with safety features like, lightning protection, auto high wind stow to the designed angular position and shall have uninterrupted communication with monitoring console/station. It should be capable of sending alarms to the monitoring station in case of failure or abnormal

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operations of the tracking systems.

- 4.0.3.2.4.1.9 For each row an earthing cable shall be installed to interconnect all metallic parts of foundation, tracker structure and FEV modules of each table.
- 4.0.3.2.4.1.10 Tracker design shall also include a provision for fastening DC cables to the structure each 500mm without causing tearing or fluttering of cables. A minimum ground clearance of 500mm at maximum inclination shall be provided
- 4.0.3.2.4.1.11 Trackers shall be able to track normally until service wind speed of 16m/s (3 sec gust, 10 m height).
- 4.0.3.2.4.1.12 Tracker Torque Tubes should be batch hot-dip galvanized in accordance with the relevant standard.

#### 4.0.3.2.5 MODULE MOUNTING ARRANGEMENT

Module mounting structures shall be designed to withstand the extreme weather conditions in the area. The site design wind speed factors  $k_1$ ,  $k_2$ ,  $k_3$  and  $k_4$  and pressure coefficient shall conform to IS 875 (Part-3):2015 or as per a Wind Tunnel Study from a reputed national/international facility, for the design of MMS. However, design wind pressure to be considered for design shall not be taken less than the minimum wind pressure "pd" as mentioned in the Technical Specification.

- a. If the Bidder is going for wind tunnel test for the design and analysis of complete MMS and solar tracking system following shall be ensured:
  - b. It must be done from an institute of repute (IITs/SERC or equivalent) in India/ international facility
  - c. Bidders must ensure that offered tracker has proven design with wind tunnel test simulating actual site conditions. The analysis and design shall be completed within two months from the actual date of issue of LOA.
  - d. Test results and design must comply with relevant Indian/ International codes
  - e. The design shall be shown in STAAD pro or similar commercially available software for further checking of employer as and when required.
- 1. The structural material, corrosion protection and design, shall be as per Design Criteria for Module Mounting Structures (MMS) described elsewhere in this specification (Civil part). Material Yield Strength and Minimum Design Thickness can be as per "Proprietary Design" of Tracker supplier but in case Yield Strength / Minimum thickness are different than specified in Technical Specifications (NUS), same should be certified for successful performance of MMS and tracker system by designer for its design life of 25 Years after COD

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2. The design and the calculations for the MMS and the foundation system shall be submitted for prior approval of Employer before the commencement of construction and shall be based on the soil Geotechnical Investigation report
3. Further details related to structures and foundations have been mentioned in this Technical Specification.
4. The Structure shall be designed and analyzed in accordance with finite element method, the fundamental principles of Engineering using commercially available software (such as STAAD pro or similar), with dead load and wind load considered as per IS: B75 (Part 1 & 3 respectively) or as per Wind Tunnel study done from a reputed national/international facility. Analysis shall be done as per appropriate load combinations preferably as per IS codes.
5. The Structure must be provided with limit switches to control the rotation of the frame
6. All nuts and bolts shall be of SS type for a module to structure connection and other structural bolts shall be of grade HDG 5.6 or 8.8 according to the connection design requirement.

#### 4.0.3.2.6 PROTECTION AGAINST CORROSION & UV

Appropriate measures shall be considered, as required, to protect the structure, foundation, and all components against corrosion during the expected lifetime of the Plant. Structural steel shall be hot dip galvanized as per ISO 1461 (or BS 729) and corrosion protection as per ISO 9223.

Non-metallic materials placed outdoors shall be UV and sand resistant and withstand high ambient temperature operation regimes as per the climatic conditions over the whole Plant design lifetime, and where materials are specified in any part of this RFP, those characteristics are to be considered as a minimum requirement. Metallic materials are not explicitly required to be UV resistant but in case protective coating is required, this shall be UV and sand resistant.

All materials used for concrete, reinforced concrete structures, steel structures, aluminum structures or structural elements or any other building material shall be of high quality, free from defects likely to undermine the Strength and duration of service of the Plant.

#### 4.0.3.2.7 BEARING

- 4.0.3.2.7.1.1 The bearing should be type tested for operation cycles which solar plant will go through in its life of 25 years.
- 4.0.3.2.7.1.2 Preferably there should not be any lubrication in the bearing, but if there is any, then it should be maintenance free. No cleaning should be needed.
- 4.0.3.2.7.1.3 The bearing should also be resistant to dust, water and any other external parameters.

#### 4.0.3.2.8 MOTOR AND ACTUATOR

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- 4.0.3.2.8.1.1 The motor should be IP 65 or better and it should be powered by reliable supply to drive the link through gear or hydraulic/electric actuator.
- 4.0.3.2.8.1.2 The temperature rises in the motor during operation specified in IS 12802: 1989 should not be more than approximately 10°C.
- 4.0.3.2.8.1.3 The location and moisture or fumes shall not seriously interfere with the operation of the motor.
- 4.0.3.2.8.1.4 The severity of vibration for the motors shall be within the limits specified in IS 12075: 1987

#### 4.0.3.2.9 CONTROLLERS

- 4.0.3.2.9.1.1 Trackers should have an industrial grade system for its automatic control and operations. For all outdoor controllers, it should be housed in IP-65 enclosure.
- 4.0.3.2.9.1.2 Battery back-up should be provided for Controller and motor for at least 15 minutes with power pack cum UPS. Alternatively, the bidder can provide backup power from the UPS of inverter room or CMCS room.
- 4.0.3.2.9.1.3 The controller must be enabled with a feature of stowing during high-speed winds.
- 4.0.3.2.9.1.4 The Real Time Clock (RTC) of the trackers shall have a facility to be time synchronized with SCADA on Network Time Protocol (NTP).
- 4.0.3.2.9.1.5 A suitable communication link between the master controller of tracker and tracker SCADA system shall be arranged. The software for communication and analysis shall be provided by the tracker supplier. Tracker SCADA shall be interfaced with solar SCADA on an open protocol such as MODBUS.

#### 4.0.3.2.10 STUDIES/REPORTS

The following studies, and reports shall be submitted by the Bidder for the offered solution. The studies and reports shall provide a positive outcome of the respective tests, designs, and concepts for the utilization of the proposed single axis tracking system in the Project:

1. Stow strategy control system The Tracker supplier is solely responsible for the definition and implementation of a proper stow strategy, which clearly demonstrates and guarantees the safe operation of the tracker during all wind events with speed up to and including the maximum one defined as per local structural code. The following points, including but not limited to, should be made available as part of the safety stow strategy:
  2. Tracker inclination and orientation at safety stow position
  3. Maximum wind speed in [m/s] as [3-sec gust / 10min average] defined at 10m height which the tracker can withstand in working position
  4. Stow alarm function and wind speed at which it is triggered

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5. Safety strategy during installation/commissioning
6. In case that batteries are used, which is the minimum charge level required in order to reach safety stow position
7. Security of communication protocols required for the active stow
8. Time requirement to move the tracker from working position into stow position considering also safety factors
9. System redundancies that help to minimize risk of failure.
10. Emergency system in case of tracking or measurement defects
11. Dynamic analysis and tests along with static coefficients based on the actual tracker configuration, stiffnesses and geometry
12. Aero-elastic instability analysis for the proposed tracker structure to show that the stow angle will not result in aero-elastic instability
13. Definition of tolerances, maximum terrain inclinations North-South,
14. East West
15. Wind tunnel tests from a recognized wind expert institute (CPP Wind Engineering, RWDI or an alternative experienced institute subject to approval by the Off taker).
  - a. Independent Engineers Bankability review report from reputable agencies like Black and Veatch, DNV, IITs or other premier institutions/agencies.
16. Structure design review document from any IIT civil/Structural certifying department, if required.

#### 4.0.3.2.11 WARRANTY

- 4.0.3.2.11.1.1 25-year lifetime design (at least) considering local ambient conditions and in respect of all standards for the PV modules support structures and foundations
- 4.0.3.2.11.1.2 5-year warranty starting with the Project Commercial Operation Date (COD) for the complete mounting structure including but not limited to the design, material, and installation of the tracker, substructure, powerunit, piles, and foundations
- 4.0.3.2.11.1.3 25 years for corrosion protection.

#### 4.0.3.2.12 Standards & Codes

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable standards. In the event of other standards being applicable they will be compared for specific requirement and specifically approved during detailed engineering for the purpose:

Standards	Description
IS 800: 2007	Code of Practice for use of structural steel in general building construction of steel

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IS 875: Part 1 & 2	Code of Practice for Design Loads for Buildings and structures.
IS 875: Part 3	Code of Practice for the Design Loads for Building and structures –Wind Loads
IS 1893: 2002	Criteria for earthquake resistant design of structures -General provisions and buildings
IS 513: 1994	Cold-rolled low carbon steel sheets and strips
IS 814	Covered electrodes for manual metal arc welding
IS 3043 - 1987	Grounding of mounting structures
IS 4759	Hot Dip Zinc coating on Structural Steel and other allied products
IS 4736	Hot Dip Zinc coating on mild steel tubes
IS 2062	Hot Rolled Medium and High Tensile Structural Steel
IS 811	Cold Formed Light Gauge Structural Steel Sections
IS 1161	Steel Tubes for Structural Purpose
IS 4923	Hollow Steel Sections for Steel Structural use

#### 4.0.3.2.13 Routine Testing & Inspection

All the acceptance tests and Routine Tests, inspection at Manufacturers works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer or its authorized representative reserves the right to inspect the MMS at the manufacturer's site prior to dispatch.

#### 4.0.4 String Monitoring Unit (SMU)

##### 4.0.4.1 GENERAL

4.0.4.1.1 SMU shall communicate over RS485 or any other compatible networking system. The protocol and speed of the communication line shall allow the Monitoring system of the plant to collect all data. Shunt Characteristic shall be employed for sensing current & voltage of string.

4.0.4.1.2 At least following parameters shall be available at SCADA for monitoring the health of SCB:

1. String(s) Current
2. Voltage of SMU
3. Total Current of SMU

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4. Total Power of SMU
5. Status of Disconnecter Switches
6. Cabinet Temperature
7. SPD operating status

#### 4.0.4.2 CODES AND STANDARDS

Connectors, Junction Boxes, Surge Protection Devices, etc. must also conform to the relevant international/ national Standards. The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable standards

Standard	Description
IEC/EN 62262	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts
IEC/EN61439- 1 & 2	Low-voltage switchgear and control gear assemblies
IEC/EN 60529/IS 2147	Enclosure protection
UL-94V	Fire Resistant/Flammability
UL-746C	UV Resistant
EN50539-IEC 61643-12	Surge protection
IEC 60269- 6/UL- 2579	Solar PV application string fuses
IEC 62208	Enclosure for Low Voltage Switchgear and Control gear assemblies
IEC 60695-2-11	Fire Hazard Testing

#### 4.0.4.3 GENERAL REQUIREMENT

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

- i. DC Disconnecter /Breaker to disconnect the PV strings from the Inverter for maintenance purpose as per specification mentioned in this chapter.
- ii. All component in the SMU shall be suitable for operation within temperature range of 0-65 Deg C.
- iii. Fuse in each SMU 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 SMU.
- iv. Surge Protection Devices 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.
- v. 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

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operating limits.

- vi. 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.
- vii. All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer or its authorized representative reserves the right to inspect the SMUs at the manufacturer's site prior to dispatch.

**4.0.4.4 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 1500 Volt DC. During fault and failure of MOV, the SPD shall safely disconnect the healthy system. SPD shall have thermal disconnecter 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 disconnecter, the SPD shall be able to extinguish the arc. SPD shall have local visual indication and potential free contact for remote indication.

**4.0.4.5 STRING FUSES**

In order to provide protection to all cables and modules, string fuses shall be provided with strings. String fuses shall be of gPV category and dedicated to solar applications and conform to IEC 60269-6 or UL-2579 standards and fuse base shall comply with 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 1500 Volt for crystalline module. For Thin film modules, fuse rating shall be decided during detail engineering. In case of negative grounded system, requirement of string fuses as well as inverter input fuses on negative side shall be decided based on the recommendation of Inverter (PCU) manufacturer. There should be minimum 10 mm gap between two fuses (fuse holders).

**4.0.4.6 SMU ENCLOSURE AND ASSEMBLY**

SMU shall satisfy the following requirement:

- i. The enclosure shall be made of UV Protected, Halogen Free, and Fire-

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- retardant GRP/FRP/Polycarbonate material with self-extinguishing property.
- ii. 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.
  - iii. The mechanical impact resistance of enclosure shall be IK 07 or better.
  - iv. The size of the enclosure and general arrangement of the component shall be designed in such a way that the average temperature of enclosure shall not exceed 62 degree C and operating temperature of the components used in the enclosure shall not exceed 72 deg C or OEM recommended temperature limit at ambient temperature of 50 deg C for rated load conditions along with spare. The components mounted inside the SMU shall have higher temperature withstand capability and operation/performance of should not be affected due to de-rating by temperature.
  - v. Complete assembled SMU shall be subject to heat run type test to be witnessed by owner after manufacturing. The heat run test to be carried out at 1.25 times the rated current i.e.  $1.25 \times (\text{Imp of PV Modules}) \times (\text{no. of string inputs} + \text{spare})$ . 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 temperature rise is within acceptable limit.
  - vi. In each SMU 5 % spare terminals along with cable glands and fuse rounded off to next higher integer shall be provided to connect the PV strings.
  - vii. All terminals blocks shall be rated for min 1000V/1500 V and rated continuously to carry maximum expected current.
  - viii. SMU shall be mounted under the PV module or under proper shed with minimum 150mm extension at all sides of SMU for protection from direct radiation. Design and dimensions of SMU structure must be such that minimum 400 mm (bending of DC cable also to be considered) of ground clearance is available below SMU at site for repair and maintenance. 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 and shall not fall off when the wire is disconnected from terminal blocks.

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- 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 screw don't fall off when cover is opened. Screw 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 SMU 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 RECPDCL. Vendor shall submit a sample Internal GA drawing with aforementioned components for future use of RECPDCL in addition to the drawing/document(s) for inspection and dispatch of offered assembly for RECPDCL approval.

#### 4.0.4.7 DC On-load Isolator

Solar PV On-load Isolator shall be suitable for 1500Vdc operational voltage having minimum Insulation voltage of 1500 V dc, in true 2 pole or 3 pole construction with 500Vdc per pole breaking. Any multipolar device achieving this configuration with shorting link (with less than 500Vdc per pole), will not be acceptable. The Isolators shall be type tested to carry the nominal current at rated Voltage till ambient Temperature of 60 Deg C without any de-ration, inside the String Junction box. The Switching part shall necessarily contain reinforced break with an integrated magnetic arc-extinguishing system for the PV arc. The PV isolator need to positive break indication given through a position indication window. The PV Isolator terminals need to be silver plated, and shall comply with IEC 60947-3 and tested for PV application. These shall withstand any PV current and should have no critical current.

#### 4.0.4.8 TYPE TEST

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

- a. Temperature rise test on complete assembled Box as per acceptable limit mentioned in relevant clause.
- b. Type test for enclosure as per code and standard mentioned in relevant clause.
- c. Thermal ageing at 70 Deg C for 96 hours as per IEC 60068-2
- d. HV Test

### 4.0.5 POWER CONDITIONING UNIT (PCU)

#### 4.0.5.1 Power Conditioning Units (PCU)

Power Conditioning Unit (PCU) shall consist of an electronic inverter along with associated control, protection and data logging devices. The system shall incorporate a uni-directional inverter designed to supply the AC power to the

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grid at load without any disturbance. The power-conditioning unit shall automatically adjust the voltage & frequency levels to suit the Grid. All three phases shall be supervised with respect to rise/fall in programmable threshold values of frequency. The model offered should have operating capability to operate under the existing environmental conditions in India. Only **Indoor/Outdoor** type **Central/String** PCU shall be accepted.

#### 4.0.5.2 General Requirements

4.0.5.2.1.1 PCU shall confirm to IEC 61000 or equivalent international standard for compliance to requirements for Electromagnetic compatibility and to IEC60068-2 or equivalent international standard for requirement of environmental testing. The rating of PCU/Inverter shall not be less than 1MW. Block wise installation should have to be adopted.

4.0.5.2.1.2 Maximum PCU DC overloading shall be limited to its design PV Array power to PCU nominal AC power ratio. Bidder needs to submit all the relevant technical documents/test report from PCU manufacturer (OEM) during detailed engineering stage in support of declared PCU design DCoverloading capacity. Contractor shall also submit maximum overloadingcapacity of the PCU at ambient temperature of 50°C along with the PCU data sheet. In case, the rated capacity is mentioned in KVA, the certificate of OEM declaring the power factor of the Inverter/PCU at 50°C has to besubmitted and the power factor shall be multiplied by the KVA rating to achieve the rated capacity of the Inverter in KW.

4.0.5.2.1.3 PCU shall also confirm to IEC 62109 or IEC 62103 or equivalent international standard for compliance to requirement for the design and manufacture of PCU for protection against electric shock, energy, fire, mechanical and other hazards.

4.0.5.2.1.4 Only those PCU's/Inverters models/capacity which are supplied and installed (as on the original date of submission of Bid) for more than 50 MW capacity Solar PV projects in India shall be considered for this project.The Contractor must provide all the relevant data sufficing the above requirement to the Employer.

4.0.5.2.1.5 All the PCUs shall consist of associated control, protection and data logging devices and remote monitoring hardware and compatible with software used for string level monitoring.

4.0.5.2.1.6 The rated power /name plate capacity of Inverter shall be AC Output of the Inverter at 50°C ambient temperature. Hence, the maximum AC Power Output at 50°C ambient temperature should not be less than the

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rated capacity of the Inverter.

**4.0.5.2.1.7 Grid Connectivity:** Relevant CERC regulations and grid code as amended and revised from time to time shall be complied. The system shall incorporate a uni-directional inverter and should be designed to supply the AC power to the grid at load end. The power conditioning unit shall adjust the voltage & frequency levels to suit the grid. The inverter output shall always follow the grid in terms of voltage and frequency. This shall be achieved by sensing the grid voltage and phase by the feedback control loop of the inverter and the inverter shall always remain synchronized with the grid.

**4.0.5.2.1.8** PCU must have provision to be isolated from grid through Circuit Breakers, which shall be inbuilt with the inverter or located in separate standalone panel. In case of grid failure, the PCU shall be re-synchronized with grid after revival of power supply. Vendor to furnish the time taken by PCU to be re-synchronized after restoration of grid supply during detailed engineering. PCU and its components shall be designed accordingly and parallel operation equipped with advanced/dynamic grid support & monitoring features. Suitable synchronizing methodology shall be provided for synchronizing the AC output from the inverters.

**4.0.5.2.1.9** The PCU must have the feature to work in tandem with other similar PCU's and be able to be successively switched "ON" and "OFF" automatically based on solar radiation variations during the day. The PCU shall be capable of controlling the power factor dynamically.

**4.0.5.2.1.10** The minimum euro efficiency of the PCU as per IEC 61683 shall be 98% at 100 % load. The Contractor 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.

**4.0.5.2.1.11** The PCU shall have protection against any sustained fault in the feeder line and against lightning discharge in the feeder line. PCU should be equipped with space heater in each cabinet to control through hygostat and thermostat.

**4.0.5.2.1.12** The PCU shall also have the adequate protection against earth leakage faults. The incoming DC feeder of PCU shall have suitably rated isolators to allow safe start up and shut down of the system and its terminals should be shrouded. The DC feeder shall terminate in the fuse box through a suitable fuse rating. The PCU fuse box shall have one spare terminal with fuse and holder for the future use. The connection between

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the fuse box and inverter shall be through copper bus bars or copper cable.

- 4.0.5.2.1.13 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 as per IEC 61643-12. During earth fault and failure of MOV, the SPD shall safely disconnect the healthy system. SPD shall have thermal disconnecter 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 disconnecter, the SPD shall extinguish the arc.
- 4.0.5.2.1.14 The PCU inverter shall be Transformer-less. However, adequate grounding for the DC side shall be provided.
- 4.0.5.2.1.15 Each solid-state electronic device shall have to be protected to ensure long life as well as smooth functioning of the inverter.
- 4.0.5.2.1.16 The PCU shall have anti-islanding protection as per IEC 62116 or equivalent international standard.
- 4.0.5.2.1.17 The PCU shall have required protection arrangements against reverse polarity of DC connection and remains in standby mode.
- 4.0.5.2.1.18 PCU shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.
- 4.0.5.2.1.19 The PCU shall be tropicalized and design shall be compatible with conditions prevailing at site. Provision of exhaust fan with proper ducting for cooling of PCU's should be incorporated in the PCU's, keeping in mind the extreme climatic condition of the site.
- 4.0.5.2.1.20 It should have local display with keypad for system control including start & stop, monitoring instantaneous system data, event logs, data logs with date & time and configuration settings. Control and readout should be provided on an indicating panel integral to the inverter.
- 4.0.5.2.1.21 **Display:** The PCU shall have local LCD (Liquid crystal display) and keypad for system control, monitoring instantaneous system data, event logs, data logs and changing set points. PCU front panel shall be provided with display (LCD or equivalent) to monitor the following Instantaneous DC power input:
1. DC input voltage
  2. DC Current
  3. Instantaneous active AC power output

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4. Instantaneous reactive AC power output
5. AC voltage (all the 3 phases and line)
6. AC current (all the 3 phases and line)
7. Power Factor
8. KWh produced during entire day
9. Total kWh produced during its life time
10. Thermal loading (percentage)

4.0.5.2.1.22 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.

4.0.5.2.1.23 All the cables from the array strings to the solar grid inverters shall be connected/terminated in the DC Distribution Box with suitable rated GPV type fuse conforming to IEC 60269-6 or UL- 2579 Standards.

4.0.5.2.1.24 In case external auxiliary power supply is required, Standalone UPS shall be used to meet auxiliary power requirement of PCU, it shall have a backup storage capacity of at least 120 minutes.

4.0.5.2.1.25 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 station shall be adequately ventilated. The Ventilation plant capacity and air quality of inverter room shall be as per inverter and other auxiliaries manufacturer's recommendations. Filter banks at the air inlet of the inverter room shall be provided to prevent dust ingress.

4.0.5.2.1.26 The Contractor 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 islander 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 contractor to rectify the design and carry out required modification in the equipment of his supply.

### 4.0.5.3 STRING INVERTER (IF APPLICABLE)

- i. The string inverter enclosure protection class shall be IP 65 or better protection.

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- ii. 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.
- iii. String inverter shall have suitable communication port (TCP-IP/PLC) for SCADA integration. All necessary hardware, software and accessories used for communication with SCADA (including smart logger Data logger) at both the ends shall be provided by the bidder. String Inverters system shall support dual master communication.
- iv. String inverter shall have string monitoring (MPPT level) capability and reporting to SCADA system. Any special software if required for this purpose shall be provided for local and remote monitoring and report generation.
- v. 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.
- vi. 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.
- vii. Provision for AC and DC electrical isolation device (such as MCB/MCCB/Isolator) inside string shall be as per string inverter manufacturer practice.
- viii. Local Display unit 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 (2 sets for complete plant) for interface with inverter or facility for mobile viewing and configuration with laptop.
- ix. LT Junction box, switchboard, and switchgear requirement for string inverter system as per chapter C-1 (LT Switchgear).

#### 4.0.5.4 Maximum Power Point Tracker (MPPT)

Maximum power point tracker (MPPT) shall be integrated in the power conditioner unit to maximize energy drawn from the Solar PV array. The MPPT should be microprocessor based to minimize power losses. The contractor shall submit the details of working mechanism of MPPT during detail engineering. The operating range of PCU and the MPPT shall be large enough such that it satisfactorily operates for PV Modules exposed to the maximum ambient temperature of 50°C. The MPPT Unit shall conform to IEC 62093 for

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design qualification.

- a. **Low Power Mode (Auto):** The system shall automatically ‘wake up’ in the morning and begin to export power provided there is sufficient solar irradiation and the grid voltage and frequency are in range.
- b. **Standby Mode:** The control system shall continuously monitor the output of the solar power plant until pre-set value is exceeded & that value to be indicated in data sheet.
- c. **Basic System Operation (Full Auto Mode):** When solar radiation increases further, the PCU shall adjust the voltage of SPV array to maximize solar energy fed into the grid. When the solar radiation falls below threshold level, the PCU shall enter in low power mode/standby mode.
- d. The PCU control shall prevent excessive cycling of shut down during insufficient solar radiance
- e. **Sleep Mode:** Automatic ‘sleep’ mode shall be provided so that unnecessary losses are minimized at night. The PCU must also automatically re-enter standby mode when threshold of standby mode reached.

#### 4.0.5.4.1 Other Technical Features

PCU Mounting	As per Design
Wave Form	Pure Sine wave
MPPT Voltage (Max. & Min.)	As per standard manufacturing norms
Minimum Efficiency at 100% load	> 98%, measured as per IEC 61683
No load loss	<1% of rated power maximum loss in sleep mode shall be less than 0.05%
Output frequency	50 Hz
Power Factor Control Range	>=0.95 lead or lag
Maximum Input voltage	1000 V <b>or 1500V as per application</b>
THD	Less than 3 % of rated power
Ambient temperature	0 to (+) 55°C
Humidity	95 % non- condensing or more

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Encloure (type)	Minimum IP 21 (Indoor rated) & <b>Minimum IP 54 (Outdoor rated)</b>
DC injection	Less than 0.5% of nominal load current
Maximum Noise Level	75 dB
Flicker	As per IEC 61000

The inverter /PCU shall meet the following requirements.

4.0.5.5 Inverter shall be equipped with Voltage Ride-Through (VRT) capabilities to stay online during grid disturbance as per IEC 61727 or equivalent standard. Inverter shall be able to support low and high frequency ride through and reactive power compensation as response to abnormally low or high grid voltage.

1. Sinusoidal current modulation with excellent dynamic response.
  2. Unit wise & integrated Data logging.
- b. Dedicated open protocol modbus / RS 485 or any other compatible networking.
- c. The Inverter/PCU shall have protection against various faults including but not limited to following:
1. AC/DC Over current
  2. Sync loss
  3. Over temp.
  4. Line to ground fault
  5. Short circuit
  6. Surge voltage induced at output due to external source
  7. AC/ DC bus over/under voltage
  8. Cooling System failure
  9. Anti-islanding
  10. Unbalance Protection
  11. A under & over frequency
  12. AC & DC Short Circuit
  13. Over load Protection
  14. AC & DC Lightning/surge Protection
  15. Power regulation in the event of thermal overloading.
  16. Set point pre-selection for VAR control.

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17. Remote control via telephone modem or mini web server & SCADA.

18. Insulation monitoring of the PV array with sequential fault location.

19. Ground fault detector to sense discharge current with respect to ground

d. Inverters shall offer the possibility to set a constant reactive power mode to absorb or inject reactive power during night time.

e. Overvoltage protection against atmospheric lightning discharge to the PV Array.

1. Inverter shall offer provision for both local and remote emergency stop

**4.0.5.6 Earthing of Inverter:** DC side of each inverter shall be earthed to distinct earth pit through adequate size conductor as per IS 3043-1987. The size of conductor shall be as per the maximum fault current of DC.

a) The contractor shall submit to the Employer the Drawings, design calculations, the temperature versus output characteristics' of the Inverter Operation & Maintenance manual and other information as per Engineering Information schedule during detailed engineering.

b) The Inverters/PCUs installed in the solar power plant must have a warranty for 5 years

**4.0.5.7 Standards and Codes:**

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable standards. In the event of other standards being applicable they will be compared for specific requirement and specifically approved during detailed engineering for the purpose:

Standard	Description
IEC 61727 or Equivalent Standard.	Photovoltaic (PV) System – Characteristics of utility interface
IEC 61683	Photovoltaic systems – Power conditioners – Procedure for measuring efficiency
EN 50530	MPPT efficiency of grid connected photovoltaic inverters
IEC 60068-2/IEC 62093	Environmental testing
IEC 61000-6-2, IEC 61000-6-4	Electromagnetic compatibility (EMC)
IEC 62109-1&2/IEC 62103 or equivalent standard.	Electrical Safety of power converters for use in photovoltaic power systems – Particular requirements for inverters
Standard	Description

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IEEE Standard 929-2000 or equivalent	Recommended practice for PV Utility interconnections
IEEE 1547/UL1741/IEC 62116 or equivalent EN/BIS Standards	Protection against islanding of Grid
Grid Connectivity	Relevant CERC/CEA regulations (including LVRT Compliance) and grid code as amended from time to time
BDEW 2008 or Latest	Technical guidelines for generating plant connected to medium voltage network
IEEE 519	Recommended practices and requirements for harmonic control in electrical power system.
IEC 62093	Reliability test standards
As per the Solar Photovoltaics, Systems, Devices and Components Goods (Requirements for Compulsory Registration) Order, 2017, Inverters used in the grid connected solar power projects shall be registered with BIS and bear the Standard Mark as notified by the Bureau of Indian Standards.	

#### 4.0.5.8 Routine Testing & Inspection at Work

All the Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per the Final Quality Assurance Plan and reports shall be submitted to Employer. All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer reserves the right to inspect the modules at the manufacturer's site prior to dispatch.

##### 4.0.5.8.1 Type Test:

PCU supplied must be of type tested design and certified by any of the accredited certifying agencies in accordance with relevant standards /codes and the type test reports shall be submitted to Employer for approval. If the type tests are not done previously, then they shall be conducted without any additional cost to the Employer and the type test report shall be submitted before supply of PCUs.

#### 4.0.6 SOLAR & DC CABLES

##### 4.0.6.1 Solar Cables

The Solar Cables in a solar PV plant shall be used in the following areas

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- i. Interconnecting SPV modules
- ii. From SPV Modules up to String Monitoring Unit (SMU)

**4.0.6.2 DC Cables**

- i. From SCB up to the Inverter.

**4.0.6.3 Solar Cables**

- a. All cables and connectors for use in installation of solar field must be of solar grade which can withstand harsh environment conditions for 25 years and shall conform to the requirements of **TUV specification 2 Pfg 1169/08.2007/EN 50618** for DC cable for photovoltaic system.

**Note:** IEC Standard for DC cables for PV systems is under development. It is recommended that in the interim, the Cables of 600-1800 Volts DC for outdoor installations should comply with the **EN50618/TUV 2Pfg 1169/08.2007/EN 50618** equivalent IS for service life expectancy of 25 years.

- b. These cables shall meet the fire resistance requirement as per **TUV specification 2 Pfg 1169/08.2007/EN 50618** and shall be electron beam cured. In case higher system voltage (>1000 V) are used, the Module Interconnecting wires shall be as per 2 Pfg 1190/05.12.
- c. The Cables used for (+) ve and (-) ve shall have distinct colour identification on outer sheath of the cable.
- d. DC Plug in connectors used for connecting SPV Modules and SCBs shall be in accordance with DIN EN 50521. Connector shall be of plug and socket design to be plugged together by hand but can be separated again using tool only.  
Cable used for module interconnection shall also be referred as Solar Cables.

**4.0.6.4 DC Cables**

Cables used between SCB's and Inverters shall be of min. 1.5 kV (DC Grade). In case Contractor offers 1500V DC system, 3.3 kV (E) grade cables shall be provided. These Power cables shall have compacted Aluminium/copper conductor, XLPE insulated, PVC inner-sheathed (as applicable), Armoured/Unarmoured, FR PVC outer sheathed conforming to IS: 7098 (Part-I/II/Latest). These cables shall conform to the requirements of the standards & codes specified in 4.4.3.4 i.e. cabling system of Technical specifications

**4.0.6.5 DC Cables Sizing Criteria**

The Maximum voltage drop of DC Cables (SPV Modules to Inverters) shall be limited to 2% and shall submit the same for the Employer's review & reference.

**4.0.6.6 Drawings**

The Contractor shall submit all the drawings and documents in respect of cabling system such as DC Cable layout drawing, DC cable trench, and other

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relevant drawings during the time of detailed engineering for employer's review as per the Engineering information Schedule.

**4.0.6.7 Routine Testing & Inspection at Works**

All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer or its authorized representative reserves the right to inspect the modules at the manufacturer's site prior to dispatch.

**4.0.6.8 Type Test Reports**

DC Cables must be tested and certified by any of the accredited certifying agencies according to **TUV specification 2 Pfg 1169/08.2007/EN 50618** and the type test reports shall be submitted to Employer for approval. If the type tests are not done previously, then they shall be conducted without any additional cost to the Employer and the type test report shall be submitted before supply of DC Cables.

**4.0.6.9 Cable Installation**

- a. Cable installation shall be as per IS 1255.
- b. Solar cables shall be provided with UV resistant printed ferrules and DC cables shall be provided with punched/ embossed aluminium tags. The marking shall be done with good quality letter and numbers of proper size so that the cables can be identified easily.
- c. Cable terminations shall be made with properly crimped lugs and passed through cable glands at the entry & exit point of the cubicles.
- d. A.C and D.C cables shall be kept in separate trenches. The horizontal and vertical clearances between power and communication cable shall not be less than 300mm.
- e. Solar cables shall be aesthetically tied to Module Mounting structures using UV resistant cable-ties suitable for outdoor application.

**4.0.7 AC SYSTEMS**

**4.0.7.1 Transformers**

**4.0.7.2 Power transformer (Not applicable)**

**4.0.7.3 Inverter Transformers & Auxiliary Power Transformer**

- i. The Contractor shall provide Inverter Transformers as per system requirement, complete with cubicles and all necessary accessories such as bushings, off-circuit tap changer, CTs, instrumentation, fittings etc. They shall be compatible with offered model of grid connected PCU inverters.

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- ii. The total kVA capacity of Inverter transformer shall not be less than cumulative kVA capacity of PCU connected to all the LV windings of Inverter Transformer. The overall cumulative capacity of Inverter Transformer(s) shall **not be less than total rated kVA capacity of respective Inverters**. The overall number of the Inverter transformers depends on the plant layout design.
- iii. Auxiliary Transformer (s) shall be connected Low voltage side of the Inverter Transformer through XLPE cable. A suitable Oil / Air bushing at HV end of the transformer shall be provided. LV side shall be connected to AC distribution board(s) through suitable size cables.
- iv. The Contractor shall provide suitable capacity of Auxiliary Transformer(s) complete with cubicles and all necessary accessories such as bushings, off-circuit tap changer, CTs, instrumentation, fittings etc. The Contractor shall make detailed calculations based on the actual power consumption of the connected equipment to check the adequacy of capacity and submit these data to the Employer's review & reference. In case actual power consumption comes out to be more, the Contractor shall have to supply the transformer(s) as per actual requirement.
- v. The Inverter Transformers and Auxiliary Transformers shall be of proven design for intended duty specified to ensure a high reliability and availability. The transformers shall be suitable and design shall be capable to withstand frequent start and stop sequence.

**b) Rating and Functional Characteristics – Inverter Transformers & Auxiliary Power Transformer**

Sl. No.	Parameter	Inverter Transformer	Auxiliary Transformer
1	kVA Rating	As per system requirement	
2	Quantity	As per system requirement	
3	Voltage Ratio (KV)	As per system requirement	
4	No. of Winding	As per system requirement	2 (Two)/3 (Three) Nos.
5	Frequency	50 Hz	50 Hz
6	Service & Duty	Continuous Solar Application and Converter Duty (Outdoor)	Outdoor/Indoor & Continuous
7	Nos. of Phase	THREE	THREE
8	Vector Group & Neutral earthing	As per system requirement	
9	Cooling	ONAN	ONAN/AN
10	Tap Changer	As per System Requirement	

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Sl. No.	Parameter	Inverter Transformer	Auxiliary Transformer
11	Impedance at 75 degree C a) Principal Tap b) Other Taps	AS PER IS 2026 and system requirement	AS PER IS 2026
12	Permissible Temperature rise over an ambient of 50 deg C (irrespective of tap) a) Top Oil b) Winding	50 deg.C 55 deg.C	
13	SC withstand time	2 sec.	
14	Fault Level & Bushing CT	As per system requirement	
15	Termination	As per system requirement	
16	Bushing rating, Insulation class	As per relevant IS/IEC	
17	Noise level	AS PER NEMA TR-1	
18	Loading Capability	Continuous operation at rated KVA on any tap with voltage variation of +/- 10%, also transformer shall be capable of being loaded in accordance with IS:6600/IEC60076-7.	
19	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 overfluxing 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. Contractor shall furnish over fluxing characteristic up to 150%	
20	Air Clearance	As per CBIP	

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#### 4.0.7.4 General Requirement (Applicable to Power Transformer, Inverter Transformers & Aux. Power Transformer)

1. Adequate set of rails with all related embedment and hardware for handling and installation of all the above transformers in switchyard shall be provided by the Contractor.
2. Adequate set of piping required for oil water separator and soak pit shall be provided by the Contractor.
3. Coordination and provision of necessary contacts and/or ports for integration with plant SCADA system.
4. The inverter transformers shall be suitable and design shall be capable to withstand frequent start and stop sequence as per system requirement.
5. Inverter Transformer shall be designed for at least 5% total harmonic distortion (THD) to withstand distortion generated by the inverter as well as possible outside harmonics from the network.
6. The transformer shall be suitable for continuous operation with a frequency variation of  $\pm 2.5\%$  from nominal frequency of 50 Hz without exceeding the specified temperature rise.
7. All the control and instrumentation panels / devices shall be so arranged that these are easily visible and conveniently and safely accessible from the front.
8. Normal operation shall be defined as operation with operating parameters within the following ranges:

Sl. No.	Grid Parameter	Normal Range
1	HV and LV side voltage	90 % to 110 % of rated value
2	Frequency	47.5 Hz to 52.5 Hz

9. **Core:** The cores shall be constructed from high grade Cold Rolled Non-Ageing Super Grain Oriented Silicon Steel Laminations equivalent to M4 grade steels or better. Adequate lifting lugs shall be provided to enable the core and windings to be lifted. Core insulation level shall be 2 kV (RMS) for 1 minute in air.

#### 10. Windings:

- a. The winding shall be designed to withstand the highest system voltage continuously and shall have uniform insulation.
- b. The conductor shall be of electrolytic grade copper free from scales and burrs for all Power Transformers (including Auxiliary Transformer). For inverter Transformers, the conductor shall be of Electrolytic Grade copper/Aluminium free from scales and burrs.
- c. The coil clamping arrangement and the finished dimensions of any oil ducts shall be such that, it will not impede the free circulation of oil through the ducts. The edges of copper conductor shall be smooth so as to ensure that the vibrations do not damage the paper wrapped leading to a fault.

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- d. Tappings shall be so arranged as to preserve the magnetic balance of the transformers at all voltage ratios.
  - e. The Transformer shall be oil insulated type and class of insulation should be “A”.
11. **Bushings:** All the HV, LV & Neutral bushing shall be supplied as per system requirement. A stress shield shall be considered as an integral part of bushing assembly.
12. **Termination arrangement:** The Contractor shall be responsible for the termination arrangement /interface arrangement for the transformers.
13. **Tank:**
- a. The transformer tank and cover shall be fabricated from good commercial grade low carbon steel. The tank construction shall be welded type and the cover shall be bolted to the tank. Stiffeners of structural steel for general rigidity shall reinforce the tank.
  - b. The transformer tank shall be equipped with all necessary valves of appropriate size with standard screw connections for external piping for reliable operation and maintenance of transformer.
  - c. Suitable inspection holes with welded flange and bolted covers shall be provided on the tank cover. The inspection holes shall be of sufficient 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.
  - e. The transformer tank, fittings and all accessories shall be designed to withstand seismic acceleration.
  - f. All bolts and nuts used in connection with the tank and fittings shall be hot dip galvanized /electro-galvanized.
14. **Conservator vessel, oil gauge and breather:**
- a. Conservator tank will have adequate capacity to meet Oil preservation system and volumetric expansion of total transformer oil during operation of transformer. The conservator shall have sufficient strength to withstand, without permanent distortion, during filling under vacuum.
  - b. The conservator shall have two filter valves one at the bottom at one end and other at the top on the opposite end. One number Magnetic Oil Gauge (MOG) with low-level alarm contacts shall be provided.
  - c. Each conservator vessel shall be fitted with indicating type silica gel

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breather. Silica gel shall be isolated from atmosphere by an oil seal.

15. **Gas and oil actuated relay (Buchholz relay):** Each transformer shall be fitted with gas and oil actuated Buchholz relay having alarm and trip contacts.
16. **Current transformer:** Bushing or turret mounted current transformers shall be provided. It shall be possible to remove the CTs from the transformer tank without removing the transformer cover. CT secondary leads shall be brought out to a weather-proof terminal box near the bushings and the wiring from terminal box to marshalling box shall be done.
17. **Neutral formation:** Neutral Earthing shall be done as per system requirement. 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 two numbers copper flat strips, for connection to ground network (as applicable).
18. **Valves:** All valves shall be heavy duty Gate type made of stainless steel material. Means shall be provided for pad-locking the critical valves in the open and close positions.
19. **Pressure relief device:** The pressure relief device, specifically designed for transformer protection, shall be provided for protection from internal overpressure. The no. of devices shall be worked out according to the volume of oil. The discharge of PRD shall be properly taken through pipes and directed away from the transformer / other equipment
20. Transformers shall have Oil Temperature Indicator (OTI) and Winding Temperature Indicator (WTI) with accuracy class of +/- 2°C
21. **Marshalling box:** Marshalling Box shall be of Sheet steel, vermin proof, weather and dust proof provided with proper lighting and thermostatically controlled space heaters. The degree of protection shall be IP65. The Marshalling Box shall be capable of accommodating various Instruments (OTI, WTI, Relays, Selector switches etc.), Electrical Wiring, Terminals, CT

Connections, TBs and other equipments as per system design. Sufficient spare Terminals shall be provided with each Marshalling Box. Wiring scheme shall be engraved in a stainless steel plate with viewable font size and same shall be fixed inside the Marshalling Box door. Marshalling Box of all transformers shall be preferably Tank Mounted and shall be at sufficient height above the ground level for safe operation.

22. **Control wiring:** All controls, alarms, indicating and relaying devices and secondary terminals of CTs provided with the transformer shall be wired up to the terminal blocks inside the marshalling box. The wiring shall be from PVC insulated copper cable of 1100V grade. All the control wiring shall be properly routed through perforated & covered cable tray fixed on the tank
23. **Joints and gaskets:** All gaskets used for making oil tight joint shall be of proven material such as granulated cork, bonded with synthetic rubber. The gasket used shall be of neoprene rubber.
24. **Insulating oil:** The oil supplied with Transformers shall be new and previously unused and must confirm to the relevant IS Standards while

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tested at Supplier's premises. The oil shall be free from moisture and have uniform quality throughout. The parameters of new oil at the time of dispatch of oil from refinery/manufacturer works shall confirm to IS 335- 1994, IEC 60296-2003 wherever applicable, considering stringent values in case of overlapping standard/ references. No inhibitor shall be used in oil.

25. Continuous on-line dissolved gas analyzer with moisture-in-oil indicator system (capable to have sensitivity for minimum 3 gases) of reputed make shall be provided by contractor. The type of gas shall be decided during detailed engineering.

**26. Internal Earthing arrangement:**

**a. Earthing of core clamping structures:** The top & bottom of main core clamping structures shall be connected to the tank body adopting standard practice.

**b. Earthing of magnetic circuit:** The magnetic circuit shall be earthed to the clamping structures at one point only, through a link placed in an accessible position beneath an inspection opening in the tank cover. The connection to the link shall be on the same side of the core as the main earth connection. The connections are to be brought out through a bushing for the convenience of measurements

**c. Earthing terminal:** Two earthing terminals capable of carrying the short circuit current of the transformer shall be provided.

**d. Earthing of coil clamping rings:** Where coil-clamping rings are of metal at earth potential, each ring shall be connected to the adjacent core clamping structures on the same side of transformer as the main earth connections.

27. **Locking arrangement:** The Contractor shall ensure that all valves, ladder and other devices shall be suitable for safety of installation. Locking with the help of nuts, bolts and other hardware shall be provided for authorized operation of devices.

28. **Guaranteed losses:** The no load loss in kilowatts at rated voltage and rated frequency, load losses and total loss in kilowatts at rated output, rated voltage and rated frequency shall be guaranteed. The contractor shall submit the detailed losses calculation of the transformer for the Employer's review at the time of detailed engineering.

29. **Termination arrangement:** The Contractor shall be responsible for proper termination/interface arrangement for transformers.

30. **Transformer movements:** The transformers shall be provided with Bi-directional Wheel/Skids, jacking pads, lifting lugs, towing holes, core and

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winding lifting lugs and other necessary fittings so as to allow complete transformer to be lifted and permit movement of the transformer along its longitudinal or transverse axis on standard broad gauge tracks and allow trouble free operation and maintenance of the transformers.

31. The Contractor shall submit to the Employer for review the Drawings, design calculations and other relevant information as per Engineering Information Schedule during detailed Engineering.
32. All external surface of the transformer shall be painted with two coats of epoxy-based paint of colour shade RAL 7032. Internal surface of cable boxes and marshalling box shall be painted with epoxy enamel white paint.
- 33. Transportation:**
  - a) The prospective bidders are advised in their interest to inspect the road conditions upto project site before submitting the bid.
  - b) Maximum weight and size of a single package should be such that the same can be transported in the easily available standard wagons or can be transported by road.
  - c) The Supplier shall dispatch the Power Transformer filled with nitrogen at positive pressure. Necessary arrangement shall be provided by the Supplier to take care of pressure drop of nitrogen during transit and storage till completion of oil filling during erection/ storage. A gas pressure testing valve with necessary pressure gauge and adaptor valve shall be provided. The representative of bidder escorting the Transformers during transportation shall maintain logbook for actual nitrogen pressure readings taken in 8 hours interval and shall be submitted to the EIC of the Project. The readings of nitrogen pressure on alternate day basis shall be provided by the supplier to purchaser from commencement of GT transportation upto receipt at site. The surprise check may be made by the customer to verify the actual nitrogen pressure readings during transportation.
  - d) Each transformer shall be fitted with impact recorders (on returnable basis for each Power Transformer) during transportation to measure the movement due to impact in all three directions. The recording shall commence in the factory before dispatch and must continue till the unit is installed on its foundation. The data of electronic impact recorders shall be downloaded at site and a hard/ soft copy of it shall be handed over to EIC.

#### 4.0.7.5 Codes & Standards:

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable standards:

Sl. No.	Standard	Description
1	IEC 60076, IS 2026	Power/Inverter transformers
2	IEC 60137, IS 2099	Insulated bushings for alternating voltages above 1000 V

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3	IEC 60296, IS 335	Specification for unused mineral insulating oils for transformer and Switchgear.
4	IS 3639	Fittings and accessories for Power/Inverter Transformers
5	IS 2544	Porcelain insulators for system above 1000 V
6	IS 5350	Part-III Post Insulators for system greater than 1000 V
7	IS 5621	Hollow Insulators for use in electrical equipment
8	IS 5556	Serrated lock washers-specification
9	IEC 60354, IS 6600	Loading guide for oil immersed power/Inverter transformers
10	IEC 60185, IS:2705,	Bushing CTs
11	Indian Electricity Act, CEA Notifications	As applicable

#### 4.0.7.6 Routine Testing & Inspection at Works

All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer reserves the right to inspect the Equipment at the manufacturer's site prior to dispatch.

The Contractor shall carry out the following Routine Tests but not limited to the following:

##### Routine Tests

All the routine test shall be done in accordance with IEC 60076.

- a. Measurement of Voltage Ratio and Phase displacement. (as per IEC 60076-1)
- b. Measurement of winding resistance on all taps. (as per IEC 60076-1)
- c. Vector Group and Polarity Check (as per IEC 60076-1) Magnetic Balance and Magnetizing Current Test
- d. Measurement of no load current with 415 V, 50 Hz AC Supply.
- e. Measurement of no load losses and current at 90%, 100% & 110% of rated voltage
- f. IR Measurement Test (as per IEC 60076-1)
- g. Measurement of Capacitance & tan delta to determine a capacitance between winding & earth
- h. IR Measurement on wiring of Marshalling Box.
- i. Induced over voltage withstand test

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- j. Separate Source voltage withstand test
- k. Breakdown voltage test on transformer oil as per IS 335
- l. Measurement of short circuit impedance and load loss

### Installation & Commissioning

Mainly following activities are required to be carried out before the commissioning of Power/Inverter Transformers: -

Assembling of Power/Inverter Transformers accessories and testing activities including the following

- a. Ratio Test
- b. Megger Value
- c. Magnetic Balance
- d. Check of vector group
- e. Oil BDV
- f. Earth Resistance
- g. Bucholz relay checking
- h. WTI/OTI/MOLG(OIL level) checking
- i. Checking of points of leakage of oil from Transformer body/Radiator Valve
- j. Setting of relays in the panel
- k. DGA of Oil before charging and also after charging.

#### 4.0.7.7 Type Test

Transformers supplied must be of type tested design and certified by any of the accredited certifying agencies in accordance with relevant standards /codes and the type test reports shall be submitted for employer’s review. If the type tests are not done previously, then they shall be conducted by the Contractor without any additional cost to the Employer and the type test report shall be submitted before supply of Transformers.

Type Test Reports to be submitted by the Contractor shall be including but not limited to the following:

- a. Temperature Rise test at a tap corresponding to maximum losses as per IEC 60076.
- b. Measurement of harmonics of no load current.
- c. Measurement of acoustic noise level as per NEMA TR-1.
- d. Tank Vacuum & Pressure Test (as per CBIP Norms).
- e. Dielectric test

**Type test reports for Auxiliary items of Transformers such as Bushings, Tap changers etc. shall also be submitted.**

### 4.08 HIGH VOLTAGE (HV) SWITCHGEAR

4.0.8.1 The Contractor shall select the voltage level of HV Switchgear as per the system requirement. The indoor/outdoor switchgear system shall include

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Requisite nos. incoming panels from field units, and outgoing panels to Power/Inverter transformers or the outgoing lines depending on the evacuation voltage & system requirement, panels for HV/415 V Auxiliary Transformer, Bus couplers breakers and associated equipment.

4.0.8.2 The HV switchgear panels located indoor/outdoor shall be complete with cubicles, protection, metering, bus-bar system, cabling, wiring and other accessories, comprising of HV Vacuum/SF6 circuit breaker, AC bus bars (including N-bus bar), Current transformers, Potential transformers, Multifunction meters and other necessary equipment as per system requirements. The HV Switchgear panel if placed outdoor at inverter station shall be placed on the platform and shall be of outdoor duty with IP-54. The quantities shall be finalized during detail engineering based on the proposed configuration.

#### 4.0.8.3 Rating and Functional Characteristics

Sl. No.	System	Description
1	Nominal System Voltage	As per system requirement
2	Highest System Voltage	As per IEC/IS Standards
3	Rated Frequency	50 Hz
4	No. of Phases/poles	Three (3)
5	System Neutral Earthing	Solidly earthed
6	One minute power frequency withstand voltage -for Type Tests -for Routine Tests	As per relevant IEC/IS standards
7	1.2/50 microsecond Impulse withstand voltage	As per Fault Level calculation/system requirement
8	Minimum system fault level	As per requirement
9	Short time rating for Bus Bars, circuit breakers, transformers and switchgear assembly	As per system requirement
10	Dynamic Withstand Rating	As per system requirement
11	Control Supply Voltage	As per system requirement
12	Maximum Ambient air temperature	50°C
13.	<b>Bus Bars</b>	

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i.	Continuous current rating at 50°C at ambient	As per system requirement
ii	Temperature rise allowed above ambient	As per system requirement
<b>14. Circuit Breaker</b>		
i	Type	Vacuum /SF6
ii	Description	Three phase equipped with group control mechanism
iii	Rated normal current, A	As per system requirement
iv	No. of interrupter unit per pole	1
v	Short Circuit breaker current	As per system requirement
vi	Short Circuit Making Current	As per system requirement
vii	Total break Time	As per system requirement
viii	Total Make Time	As per system requirement
ix	Rated operating sequence	As per system requirement
x	Normal voltage for operating mechanism i.e., charging motor (DC)	As per system requirement
xi	Reclosing	As per Manufacturer
xii	Auxiliary Contacts	As per Manufacturer
xiii	Noise Level Maximum of Circuit Breaker	As per Manufacturer
<b>15. Current Transformer</b>		
i	Secondary Current	As per system requirement
ii	Class of Insulation	Class E or better
iii	Current Ratio	As per system Requirement
iv	<b>Accuracy class</b>	
iv.(a)	Protection	Class PS for Differential & REF and core balance CTs (CBCT); 5P20 for other protection CTs
iv(b)	Metering	0.2S
v	Number of CTs.	As per the requirement of CTU / State Transmission Authority.

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vi	Number of Cores	As per the requirement of CTU/ State Transmission Authority.
vii	Partial discharge level	As per system requirement
viii	Rated VA Burden	As per system requirement
ix	Installation	Outdoor(IP 65)
x	Temperature Rise	As per IEC 60044
xi	Minimum primary earth fault current to be detected by CBCT	As per system requirement
xii	Instrument Security Factor for Measurement CTs	As per system requirement
<b>16. Potential Transformer</b>		
i	Rated Voltage Factor	As per system requirement
ii	Class of Insulation	Class E or better
iii	Transformation ratio	As per system requirement
iv	Accuracy Class	
a)	Relaying	3P
	Metering	0.2
v	Rated Total Thermal Burden	As per system requirement
vi	Partial Discharge	As per system requirement
vii	Number of Cores	As per the requirement of CTU/State Transmission Authority.
viii	Number of CTs.	As per the requirement of CTU/State Transmission Authority.

#### 4.0.8.4 Standards & Codes

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable IS/IEC standards. In the event of other standards being applicable they will be compared for specific requirement and specifically approved during detailed engineering for the purpose:

Sl. No.	Standards	Description
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1.	IEC 60529/ IS-13947	Degrees of protection provided by enclosures (IP Code)
2.	IEC 60044-1/ IS-2705	Instrument transformers – Part 1 : Current transformers
3.	IEC 60044-2/ IS-3156	Instrument transformers – Part 2 : Inductive voltage transformers
4.	IEC 60044-6	Instrument transformers – Part 6 : Requirements for protective current transformers for transient performance
5.	IEC 62271-100	High-voltage switchgear and control gear – Part 100: High-voltage alternating-current circuit-breakers
6.	IEC 62271-200	High-voltage switchgear and control gear – Part 200: A.C. metal-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV
7.	IEC 60694	Common specifications for high-voltage switchgear and control gear standards
8.	IS: 8130 –1984	Conductors for Insulated Cables
9.	IEC 60255	Measuring relays and protection equipment
10.	IS 3231	Electrical relays for power systems protection
11.	IS 9431	Indoor post insulators of organic material for systems with nominal voltages greater than 1000 V up to and including 300 kV
12.	IEC 60099-4	Surge arresters - Part 4: Metal-oxide surge arresters without gaps for A.C. systems
13.	IEC 62053	Electricity metering equipment (A.C.) - Particular requirements
14.	IS 9385	High voltage fuses

#### 4.0.8.5 General requirement

1. The Indoor HV Switchgear shall be of the steel enclosed type vermin proof, dust, Moisture protected and shall comply with the requirements of latest edition of IEC/IS. The switchgear boards shall have a single front, single tier, fully compartmentalized, metal enclosed construction complying with IEC 62271-200. Each circuit shall have a separate vertical panel with distinct compartments for circuit breaker truck, cable termination, main bus bars and auxiliary control devices. The adjacent panels shall be completely separated by steel / Aluzinc sheets except in bus bar

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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 bus bar compartment may also be considered.

2. The circuit breakers and bus VTs shall be mounted on with drawable 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 Contractor 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.
3. Switchgear assembly shall be 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.
4. The doors and covers shall be constructed from cold rolled steel sheets of 2.0 mm or higher thickness. The gland plate thickness shall be minimum 3.00 mm for hot/cold rolled sheet steel. 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. Switchboards shall have a degree of protection of IP: 5X for outdoor and IP4X for indoor as per IS/IEC:60947.
5. All the sheet steel work shall be pre-treated in accordance with IS: 6005. The gaskets shall be of good quality EPDM/Neoprene.
6. The indicating lamps be with multiple LEDs shall be installed in the panel.
7. The bus bars shall be of Copper/Aluminium conductors conforming to IEC/IS. The bus bar system shall be insulated with PVC sleeves and shall be complaint with UL 224. The bus bar should be sectionalized in two so that 50% of power transmission takes place in case of occurrence of fault in one section of bus.
8. Circuit breaker shall be according to IEC/IS and shall be complete with the proper interlocking.
9. The current transformer shall be of inductive type. It shall be mounted within the cubicles and shall comply with the requirements of relevant IEC/IS. It shall be used for protection and metering.

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10. The potential transformer shall be of inductive type. It shall be mounted within the cubicles on a withdrawable trolley independent of the trolley for the circuit breaker and shall comply with the requirements of relevant IEC/IS. The potential transformer at bus bar shall have requisite number of cores for protection and metering as per the system requirement.
11. Insulating mats of appropriate size confirming to relevant standards are to be provided in front of all the HV switchgear panels for the safety of personnel.
12. Necessary provision/potential free contacts shall be made available for control, status, alarm and indication of faults/status at Main Control Room.
13. In the Service position, the truck shall be so secured that it is not displaced by short circuit forces. Bus bars, 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.
14. 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.
15. To represent the single line diagram, a mimic diagram shall also be made available on the panel. The circuit breaker cubicle shall be provided with space heater and door operated illumination lamp.
16. Suitable lifting hooks shall be provided for each panel.
17. Restricted Earth fault relay for HV side Power transformer shall be provided. The system shall be compatible with station SCADA, regarding input and output needed for operation, control and monitoring of HV switchgear system.
18. All the auxiliary wiring shall be carried out with calculated design voltage grade, single core cable conductor, colour coded, and PVC insulated wires. Conductor size shall be 1.5 mm<sup>2</sup> (min) for control wiring and 2.5 mm<sup>2</sup> (min) for CT and space heater circuits.
19. Each switchgear panel shall be provided with thermostatically controlled space heaters, separately for breaker, cable and bus bar compartments, to prevent condensation within the compartment.

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20. The Contractor shall submit to the Employer the layout arrangement, equipment Drawings, design calculations for short circuit withstand capability , load calculation for bus bar rating selection etc. and other relevant information as per Engineering Information Schedule during detailed Engineering.
21. Alternatively, Outdoor HT switchgear can be offered for ICOG configuration. The outdoor switchgear shall have minimum IP 55 or better protection with painting and shed requirement as per relevant codes/standards. The bidder shall submit the relevant details of the switchgear including the data sheets, drawings and applicable type test reports during the detailed engineering for Employers approval. Internal Arc requirement for metal enclosed outdoor HT switchgear shall be same as indoor type switchgear. The main pooling/final pooling switchgear shall be indoor only.

#### 4.0.8.6 Routine Testing & Inspection

All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer or its authorized representative reserves the right to inspect the modules at the manufacturer's site prior to dispatch.

The contractor shall perform the routine tests conforming IS/IEC 60044-1:2003 for the Instrument Transformers (CT & PT) including but not limited to following:-

- a. Verification of terminal markings
- b. Power-frequency withstand test on primary winding
- c. Partial discharge measurement
- d. Power-frequency withstand test on secondary windings
- e. Power-frequency withstand tests, between sections
- f. Inter-turn overvoltage test

#### 4.0.8.7 Type Test

HT Switchgear supplied must be of type tested design and certified by any of the accredited certifying agencies in accordance with relevant standards /codes and the type test reports shall be submitted for employer's review. If the type tests are not done previously, then they shall be conducted by the Contractor without any additional cost to the Employer and the type test report shall be submitted before supply of Transformers.

#### 4.0.8.8 The contractor shall perform the routine tests conforming IS/IEC 60044-1:2003 for the Instrument Transformers (CT & PT) including but not limited to following:-

- a. Short-time current tests
- b. Temperature rise test

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- c. Lightning impulse test
- d. Switching impulse test
- e. Wet test for outdoor type transformers
- f. Determination of errors
- g. Radio interference voltage measurement (RIV)

#### 4.0.9 LT SWITCHGEAR

##### 4.0.9.1 LT Switchgear

3-phase, 50 HZ, 415 V switchgear system shall consist of various LT metal enclosed Switchgear boards complete with suitably rated equipment including, Draw out type incoming air circuit breaker, required no. of MCCBs, Current transformers, of Potential transformers, of Multifunction meters, Energy meters, AC bus bars (including N-Bus bar), Local control switches, Indicators (LED Type) as per requirement, all necessary auxiliaries for control and supervisory circuits, and other necessary associated equipment

##### 4.0.9.2 General Requirement

- i. The switchgear system shall be solidly grounded, 3 phases, 4-wire TNS, according to IEC Publication 60364-3. The 415 V Switchgear shall be metal enclosed indoor cubicles free floor standing type and of uniform height not exceeding 2450 mm.
- ii. EPDM/Neoprene gasket shall be provided between the panel sections to avoid ingress of dust into panels.
- iii. All switches, push buttons etc. shall be operated front and shall be flush/semi-flush mounted.
- iv. 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.
- v. Each switchboard shall be provided with undrilled, removable type gland plate having thickness of 3.0 mm for hot / cold-rolled sheet steel and 4.0mm for non-magnetic material.
- vi. Cable entries shall be from bottom. The opening of cable entry shall be covered by 3mm thick gland plates with proper sealing to avoid water and rodent entry.
- vii. Earthing bus bar of suitable cross section shall be provided throughout the length of panel.
- viii. All switchboards shall be of dust-proof and vermin-proof construction and shall be provided with a degree of protection of IP-54 for outdoor LT panels and IP-42 for indoor panels as per IS/IEC60947.
- ix. The minimum clearance in air between phases and between phases and earth for the entire run of horizontal and vertical bus bars and bus-link connections at circuit-breaker shall be 25mm.
- x. All auxiliary wiring shall be carried out with voltage grade as per system

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design single core stranded copper conductor, colour coded, PVC insulated wires. Conductor size shall be 1.5mm<sup>2</sup> (min.) for control circuitwiring and 2.5 mm<sup>2</sup> (min) for CT and space heater circuits.

- xi. Each switchgear panel shall be provided with thermostatically controlled space heaters to prevent condensation within the enclosure. The space heater shall be connected to 240 V, 50 Hz, single phase AC supply through suitable switch and fuse.
- xii. All Switchboards shall be provided with three phase & neutral bus bar. Bus bar conductors shall be made of copper of adequate size with PVC sleeves conforming to UL 224.
- xiii. Copper/Aluminium earth bus shall be provided at the bottom of each panel and shall extend throughout the length of each switchboard with proper earthing arrangements.
- xiv. Control switches and instruments shall be mounted on the circuit breaker compartment doors/front side of the panel.
- xv. The air circuit breakers shall be designed in accordance with the recommendations of IEC Publications 60947-1 and 60947-2.
- xvi. The MCCBs shall be designed in accordance with the IEC Publications 60947.1 and 60947-2.
- xvii. All fuses shall be of HRC cartridge fuse link type of suitable rating.
- xviii. The current transformer shall be single-phase single core inductive type and shall comply with the requirements of relevant IEC 60044-1.
- xix. Required no. of potential transformers with fuses in all the phases shall be provided for metering and interlock.
- xx. The Contractor shall submit to the Employer the layout arrangement, equipment Drawings, design calculations for short circuit withstand capability, load calculation for bus bar rating selection etc. and other relevant information as per Engineering Information Schedule during detailed Engineering

#### 4.0.9.3 Standards & Codes

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable standards. In the event of other standards being applicable they will be compared for specific requirement and specifically approved during detailed engineering for the purpose.

Standards	Description
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IEC 60439	Low-voltage switchgear and control gear assemblies
IEC 60364	Electrical installations of buildings
IEC 60947	Low-voltage switchgear and control gear

#### 4.0.9.4 Routine Testing & Inspection at Works

All the acceptance tests and Routine Tests, inspection at manufacturer's works

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as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer or its authorized representative reserves the right to inspect the modules at the manufacturer's site prior to dispatch.

#### 4.0.10 CABLING SYSTEM

##### 4.0.10.1 Cabling System

Cabling System shall include the following:

- a. LT Power & Control Cable
- b. HT Power cable
- c. Cable Installation Methodology

##### 4.0.10.2 LT Power & Control Cable

LT Power & control cables shall be of minimum 1100 volts grade XLPE / PVC insulated conforming to IS 1554 for utilization voltages less than equal to 415 V. The cables shall be suitable for laying on racks, in ducts, trenches, conduits and underground (buried) installation with chances of flooding by water.

##### 4.0.10.3 General Requirements

1. All cables shall be flame retardant (FR) type designed to withstand all mechanical, electrical and thermal stresses developed under steady state and transient operating conditions. If Cables are to be laid Underground, laying shall be as per relevant IS Code.
2. Copper/Aluminium conductor used in power cables shall have tensile strength as per relevant standards. Conductors shall be stranded.
3. XLPE insulation shall be suitable for a continuous conductor temperature of 90°C and short circuit conductor temperature of 250°C. PVC insulation shall be suitable for continuous conductor temperature of 70°C and short circuit conductor temperature of 160°C.
4. The minimum conductor cross-section for control cable shall be 1.5 sq.mm. KV Grade.
5. Control Cables shall have stranded copper conductor and shall be multicore PVC insulated, PVC inner sheathed, armoured / unarmoured, FR PVC outer sheathed conforming to IS: 1554. (Part-I)
6. All the cables, other than single core unarmoured cables, shall have distinct extruded PVC inner sheath as per IS: 5831.
7. For single core armoured cables, armoring shall be of aluminium wires/formed wires. For multi core armoured cables armoring shall be of galvanized steel of suitable size and type of armour. The aluminium used for armoring shall be of H4 grade as per IS: 8130.
8. The aluminium used for armoring shall be of H4 grade as per IS: 8130 with maximum resistivity of 0.028264 ohm mm<sup>2</sup> per meter at 20 deg C.
9. Outer sheath shall be of PVC as per IS: 5831. In addition to meeting all the requirements of Indian standards referred to, outer sheath of all the cables shall have the following FR properties.
  - a. Oxygen index of min. 29 (as per IS 10810 Part-58).
  - b. Acid gas emission of max. 20% (as per IEC-754-I).

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- c. Smoke density rating shall not be more than 60 % (as per ASTM-D-2843)
- 10. All cables shall meet the fire resistance requirement as per Category-B of IEC 332 Part-3.
- 11. Allowable tolerances on the overall diameter of the cable shall be +/- 2 mm maximum over the declared value in the technical data sheet.
- 12. In plant repairs of the cable shall not be accepted. Pimples, fish eye, blow hole etc. are not acceptable.
- 13. Cable shall be supplied with wooden drums which shall comply with IS: 10418.

**4.0.10.4 HT Power Cable**

All cables shall meet the fire resistance requirement as per IEEE - 383 with cable installations made in accordance with 'Flammability Test' and as per Category-B of IEC 332 Part -3.

**4.0.10.5 Cable Selection and Sizing (Applicable for LT & HT Cables)**

HT & LT Power Cables shall be sized based on the following considerations:

- a. Rated current of the equipment
- b. The Maximum voltage drop
  - i. **LT Power Cable**:- The maximum voltage drop in the cables Inverter to Inverter Transformer shall be limited to 0.5 % of the rated voltage. For other LT cables, Maximum Voltage drop shall be limited to 3% of rated voltage.
  - ii. **HT Power Cable**-The Maximum voltage drop in the cables (Inverter Transformer to HT Panels shall be limited to 3 % of the rated voltage (excluding motor starting conditions)

**4.0.10.6 Derating Factors (Applicable for LT & HT Cables)**

Derating factors for various conditions of installations including the following shall be considered while selecting the cable sizes:

- a. Variation in ambient temperature for cables laid in air
- b. Grouping of cables

Variation in ground temperature and soil resistivity for buried cables

**4.0.10.7 Codes and Standards (Applicable for LT Power & Control & HT Cables)**

All the cables shall conform to the requirements of the following standards and codes:-

Standards	Description
IS :1554 - I	PVC insulated (heavy duty) electric cables for working voltages upto and including 1100V.
IS : 3961	Recommended current ratings for cables
IS : 3975	Low carbon galvanized steel wires, formed wires and tapes for armouring of cables.

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IS : 5831	PVC insulation and sheath of electrical cables.
IS:7098 (Part -I)	Cross linked polyethylene insulated PVC sheathed cables for working voltages up to and including 1100V.
IS:7098 (Part -II)	Cross linked polyethylene insulated PVC sheathed cables for working voltages from 3.3 KV up to and including 33 KV.
IS : 8130	Conductors for insulated electrical cables and flexible cords.
IS : 10418	Specification for drums for electric cables.
IS : 10810	Methods of tests for cables.
ASTM-D -2843	Standard test method for density of smoke from the burning or decomposition of plastics.
IEC-754 (Part-I)	Tests on gases evolved during combustion of electric cables.
IEEE-383	Standards for Type Tests of Class IE Electric Cables
IEC-332	Tests on electric cables under fire conditions. Part-3: Tests on bunched wires or cables (Category-B).
IS- 1255	Code of practice for installation and Maintenance of power cables including and up to 33 KV rating.
IS-3043	Code of practice for earthing
IS:9537	Conduits for electrical installation
IS:13573	Joints and terminations for polymeric cables for working voltages from 6.6 KV upto and including 33 KV performance requirements and type tests
DIN 46329	Cable lugs for compression connections, ring type for Aluminium conductors
VDE 0278	Tests on cable terminations and straight through joints.

#### 4.0.10.8 Cable Ends

- a. Cable end terminations and joint kits shall comply with the latest version of the relevant IS Codes.
- b. The Cable end shall be terminated with adequate size copper lugs, **Aluminum lugs**, sockets, single/double compression cable glands. Cable glands shall have adequate earthing provision. Suitable lock type crimping lug shall be used for cable end terminations.
- c. HT Cable termination kits and straight through joints shall be selected as per the cable specifications. Heat shrinkable type kits only shall be used for HT & LT Cables.

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**4.0.10.9 Inter Plant Cabling:**

Interplant cabling for main routes shall be laid in Cable trenches/cable trays/buried/duct banks.

**4.0.10.10 Trenches:**

PCC flooring of built up trenches shall be sloped for effective drainage with sump pits and sump pumps.

**4.0.10.11 Cable Trays, Fittings & Accessories:**

Cable trays shall be ladder/perforated type as specified complete with matching fittings (like brackets, elbows, bends, reducers, tees, crosses, etc.) accessories (like side coupler plates, etc. and hardware (like bolts, nuts, washers, G.I. strap, hook etc.) as required. Cable trays shall have standard width of 150 mm, 300 mm & 600 mm and standard lengths of 2.5 meter.

**4.0.10.12 Terminations & Straight through Joints:**

Termination and jointing kits for **Inverter Output Voltage/33Kv** and 1.1/1.5kV grade XLPE insulated cables shall be of proven design and make which have already been extensively used and type tested. Termination kits and jointing kits shall be pre-moulded type, taped type or heat shrinkable type. **Inverter Output Voltage** kV, 33 kV and 1.1/1.5kV grade joints and terminations shall be type tested as per IS: 13573. 3.3kV grade joints and terminations shall be type tested as per VDE0278

**4.0.10.13 Cable glands:**

Cable shall be terminated using double compression type cable glands. Cable glands shall conform to BS: 6121. Cable glands shall be made of heavy duty brass machine finished and nickel chrome plated. Thickness of plating shall not be less than 10 micron.

**4.0.10.14 Cable lugs/ferrules:**

Cable lugs/ferrules for power cables shall be tinned copper solderless crimping type suitable for aluminium compacted conductor cables. Cable lugs and ferrules for control cables shall be tinned copper type. The cable lugs for control cables shall be provided with insulating sleeve and shall suit the type of terminals provided on the equipment. Cable lugs and ferrule shall conform to relevant standard.

**4.0.10.15 Installation Cable tray and Support System Installation**

1. Cables shall run in cable trays mounted horizontally or vertically on cable tray support system which in turn shall be supported from floor, ceiling, overhead structures, trestles, pipe racks, trenches or other building structures.
2. The Contractor shall design, erect & install the complete plant cabling system including HT, LT Power & Control cabling, trenches, cable trays, fittings and accessories with proper support system for cable trays, junction boxes, arrangement of proper termination as per system requirements, cable glands, lugs/ferrules, trefoil clamps, cable clamps and straps, receptacles including galvanizing and welding as per the relevant IS/IEC standards, necessary for reliable and satisfactory operation of the plant.
3. The Contractor shall submit a Cable Schedule for complete plant- to the Employer.

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4. Cables shall run in cable trays mounted horizontally or vertically on cable tray support system which in turn shall be supported from floor, ceiling, overhead structures, trestles, pipe racks, trenches or other building structures. The Contractor shall ensure for properly embedding conduit pipe sleeves wherever necessary for cabling work. All openings in the floor/roof/wall cable tunnel/cable trenches made for conduit installation shall be sealed and made water proof by the Contractor.
5. Junction boxes with minimum IP 55 degree of protection shall be mounted at an adequate height above floor level or as specified in the drawings and shall be adequately supported/mounted on masonry wall by means of anchor fasteners/ expandable bolts or shall be mounted on an angle, plate or other structural supports fixed to floor, wall, ceiling or equipment foundations.
6. In each cable run some extra length shall be kept at suitable point to enable one LT/two HT straight through joints to made, should the cable develop fault at a later stage. Control cable termination inside equipment enclosure shall have sufficient lengths so that shifting of termination in terminal blocks can be done without requiring any splicing.
7. The termination and connection of cables shall be done strictly in accordance with cable termination kit manufacturer" instructions, drawings etc.
8. At least 300mm clearance shall be provided between
  - a. HT power & LT power cables,
  - b. LT power & LT control/instrumentation cables

#### 4.0.10.16 Routine Testing & Inspection at Works

All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer or its authorized representative reserves the right to inspect the modules at the manufacturer's site prior to dispatch.

#### 4.0.10.17 Type Test

The cables supplied must be of type tested design and certified by any of the accredited certifying agencies in accordance with relevant standards /codes and the type test reports shall be submitted for employer's review. If the type tests are not done previously, then they shall be conducted by the Contractor without any additional cost to the Employer and the type test report shall be submitted before supply of Cables.

Sl No	Type Test	Remarks
<b>Conductor</b>		
1	Resistance test	
2	Tensile test	For circular non – compacted only
3	Wrapping test	For circular non – compacted only
<b>For Armour wires/Formed wires</b>		
4	Measurement of Parameters	

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5	Tensile test	
6	Elongation test	
7	Torsion test	For round wires only
8	Wrapping test	For aluminium wires/ Formed wires
9	Resistance test	
10(a)	Mass & uniformity of Zinc Coating tests	For GS formed wires/wires only
10(b)	Adhesion test	For GS formed wires/wires only
11	Adhesion test	For GS formed wires/wires only
<b>For PVC /XLPE insulation &amp; PVC sheath</b>		
12	Test for thickness	
13	Tensile strength and elongation test before	
14	Ageing in air oven	
15	Loss of mass test	For PVC insulation and sheath only
16	Hot deformation test	For PVC insulation and sheath only
17	Heat deformation test	For PVC insulation and sheath only
18	Shrinkage test	
19	Thermal stability test	For PVC insulation and sheath only
20	Hot set test	For XLPE insulation only
21	Water Absorption test	For XLPE insulation only
22	Oxygen index test	For outer sheath only
23	Smoke density test	For outer sheath only
24	Acid gas emission test	For outer sheath only

The reports for following type tests shall be furnished for each type (voltage grade) & size of the cable

<b>SI No</b>	<b>Type Test for all cables</b>
1	Insulation Resistance test(Volume Resistivity method)
2	High voltage test
For cables of 11 kV and above Grade only	
3	Sheath Test
4	DC High Voltage Test
5	Dielectric power factor test
	a) As a function of voltage
	b) As a function of temperature
6	Impulse withstand test

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**4.0.11 SWITCHYARD & TRANSMISSION LINE ( Not Applicable )**

**4.0.12 PROTECTION SYSTEM**

4.0.12.1 The Contractor shall provide suitable protection systems for the complete SolarPV Plant and the associated Power Evacuation System covering Inverters, DC System, Inverter Transformers, Auxiliary Transformer, HT Switchgear, LT Switchgear, Switchyard, Associated Power Evacuation System, Battery Bank & Charger and other equipment and systems as per system design as required for safe, efficient and trouble free operation of the Solar PV Plant.

4.0.12.2 The Solar PV Plant and the associated Power Evacuation System shall be protected as per applicable IS/ IEC standards. Over Current Protection, Reverse Power Protection, Differential protection, Earth Fault protection/REF, Under voltage Protection, Over Flux Protection, Bus Bar Protection, Breaker Failure Protection, Buchholz, Winding Temperature, Oil Temperature, PRV and other protection for Transformers and other equipment/ systems installed in the Solar PV Plant shall essentially be provided whichever and wherever applicable as per manufacturer's recommendation, standard practice and system design considering the fault current under most severe fault conditions.

**4.0.12.3 General Requirement**

- a. Protection system shall be complete in all respect. Protection shall be provided through relays, which shall be Numeric type protection relays with RS 485 port or any other compatible port for communication with PC/Laptop for configuration and data download as well as communication with Numeric protection shall be provided with 100% redundancy of relays.
- b. The Solar PV System and the associated Power Evacuation system interconnections should be protected as per IEC 61727 Ed-2 norms.
- c. All relays shall be rated for control supply voltage 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.
- d. All communications of protection system with the control system shall be based on universally accepted protocol as per IEC 60870-5-10.
- e. The numerical relay shall have RS-232/RS-485/RJ-45/USB ports on front side for local communication with PC and on rear side for remote communication to SCADA system.
- f. All circuit breaker feeders shall be provided with communicable numerical relays (IED, i.e. Intelligent Electronic Device, complying with IEC 61850, having protection, control, measurement and monitoring features.
- g. All major numerical relays shall have in built disturbance recorder (DR) and event recorder with adequate number of Digital & Analog channels and storage capacity for enabling smooth fault analysis. All relays,

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disturbance recorders, event recorders etc. shall be time synchronised through universal time synchronisation system as described in “Section - Control and Monitoring (SCADA) System”.

- h. The control/ relay compartments shall have degree of protection not less than IP 5X in accordance with IS/IEC 60947.
- i. One minute power frequency withstand test voltage for all numerical relays shall at least be 2kV (rms) for 1 min or 2.5 kV for 1 sec.
- j. The alarm/status of each individual protection function and trip operation shall be communicated to Switchgear SCADA.
- k. The design of relay shall be immune to any kind of electromagnetic interference.
- l. All CT terminals on the relays shall be fixed type suitable for connection of ring type lugs to avoid any hazard due to loose connection leading to open circuit.
- m. Relay shall have self-diagnostic features with continuous self-check for power failure, program routines, memory and main CPU failures and a separate output contact for indication of failure.
- n. The relays and associated hardware shall be suitable for continuous operation in harsh environmental conditions, high temperature, humidity, dust etc.
- o. The protection scheme shall also be coordinated with the fire protection system for step-up transformers & other areas. The detailed scope of supply given in relevant clause is indicative only. However, all protection as per relevant IEC standards shall be provided.
- p. All the relays shall be of reputed make with proven performance. If the protection system mentioned in the awarded contract become obsolete at the time of supply, the contractor shall offer a latest model without any extra cost.
- q. The contractor shall submit to the employer the protection scheme / diagram, relay setting details/ chart and other relevant information as per Engineering Information Schedule during detailed engineering.

#### 4.0.12.4 Protections

The Incomer, Bus Coupler & Tie feeder protection relay shall be suitable for providing the following protections:

- a. Three Phase Over current and Earth Fault protection (50 & 50N) with instantaneous, definite time, and IDMT features.
- b. The over current element should have the minimum setting adjustable between 250- 2000% of CT secondary rated current. The earth fault element should be suitable for residually connected CT input. The relay shall be suitable for detection of earth fault currents in the range of 5% to 10% of the CT rated current.
- c. The following protections shall be covered:
  - A. **Inverter Transformer Protection as applicable as per standards**  
Contractor shall have to provide the protections for the Transformers as per system design including but not limited to following:
    - i. 87 Differential Protection
    - ii. 49 Winding Temperature Alarm and trip protection
    - iii. 26 Oil Temperature alarm and trip protection

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- iv. 71 Oil Level alarm and trip protection
- v. Bucholz Protection and alarm
- vi. PRV Protection
- vii. 50/51N Instantaneous and time delay over current and earth fault protection On HV as well as LV Side 59 F Over fluxing protection

**B. Auxiliary Transformer Protection**

Contractor shall have to provide the protections for the Transformers as per system design including but not limited to following:

- i. Transformer winding temperature alarm and trip protection
- ii. 50/51N Instantaneous and time delay over current and earth fault protection On HV as well as LV Side
- iii. 64 R Restricted earth fault protection
- iv. 26 Oil Temperature alarm and trip protection
- v. 71 Oil level alarm and trip protection

**C. Bus BAR Protection for complete system**

Contractor shall have to provide the following protections but not limited to following:

- i. 87 Differential Protection of all Buses
- ii. 95 BB CT Wire supervision relay

**D. Other provisions**

- i. Protection of Solar Inverters,
- ii. Protection of 415 V Switchgear
- iii. Protection of all Cables
- iv. Necessary ICTs, Relay panels, marshalling boxes, isolating and shorting links etc.
- v. Protection of all Line bay. Further, the contractor shall also have to co-ordinate in order to integrate of the plant protection systems with State Authority Transmission Authority & Other systems so as to complete the protection of the entire system.
- vi. Provision of necessary contacts and /or ports for integration with plant SCADA System for Alarm, tripping and status signal as per requirements.
- vii. Trip circuit supervision shall be provided for all feeders to monitor the circuit breaker trip circuit.
- viii. 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 stampings using the internal real time clock. Battery backup for real time clock in the event of power supply failure shall also be provided. Sequence of events shall have at least 1 ms resolution at device level.

**4.0.12.5 Routine Testing & Inspection at Works**

All the acceptance tests and Routine Tests, inspection at manufacturer's works as well as at site shall be carried out strictly as per specifications, relevant standards and in accordance with the Final Quality Assurance Plan and reports shall be submitted to Employer. The Employer or its authorized

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representative reserves the right to inspect the modules at the manufacturer’s site prior to dispatch.

#### 4.0.13 ENERGY METERING SYSTEM

##### 4.0.13.1 Metering System

ABT Energy Meter shall be provided as approved by the State Transmission Authority to measure the delivered quantum of energy to the grid for the sale. The responsibility of arranging for the meter, its inspection/calibration/testing charges, maintenance, renewal, and repair of meter etc. rests with the Contractor. Energy metering system is to be approved by State Transmission Authority and comply with Implementing Agency & IMPLEMENTING AGENCY requirements. Necessary MRI, Modem etc. scheme shall be provided by Contractor as per the requirement for all meter as applicable as per SLDC, State Transmission Authority, Implementing Agency and APDCL requirements.

The Contractor shall supply ABT Meters (Main & Check as well as Stand-by meter (s)) at the plant take off point as well as at the substation as per system requirement and as per. & Implementing Agency requirements with all necessary metering rated CTs and PTs at the plant take off point as well as at the substation. These Energy meters of 0.2s accuracy class suitable for ABT requirement conforming to respective APDCLs/RLDC/State power Utilities/CTU requirement, shall be provided at each of the export feeders as per the requirement of the project. These energy meters shall be provided in a separate outdoor metering cubicle with padlock arrangement. For measurement of Auxiliary power consumption, the Contractors shall provide MFM in ACDB incomer.

##### 4.0.13.2 General Requirements

- a) Meters shall be microprocessor-based conforming to IEC 60687/IS- 14697/IEC 62052- 11/IEC 62053
- b) -22/IEC 62056/IS 15959 for category B.
- c) Shall carry out measurement of active energy (both import and export) and reactive energy (both import and export) by 3-phase, 4 wire principlesuitable for balanced/ unbalanced 3 phase load.
- d) Shall have an accuracy of energy measurement of at least Class 0.2S for active energy and at least Class 0.5 for reactive energy according toIEC 60687. The active and reactive energy shall be directly computed in CT & VT primary ratings
- e) The reactive energy shall be recorded for each metering interval in fourdifferent registers as MVARh (lag) when active export, MVARh (Lag) when active import, MVARh (lead) when active export, MVARh (Lead) when active import.
- f) Interface metering shall conform to the Central Electricity Authority (Installation and Operation Meters) Regulation 2006 and amendment thereof.
- g) Shall compute the net MWh and MVARh during each successive 15- minute block metering interval with a plus/minus sign and average frequency during the previous metering interval; peak MW demand since the last demand reset; accumulated total

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- (instantaneous) MWh and MVARh with plus/minus sign, date and time; and instantaneous current and voltage on each phases.
- h) All the registers shall be stored in a non-volatile memory. Meter registers for each metering interval, as well as accumulated totals, shall be downloadable through Optical Port /RS232/RS485 Port. Meters shall have a built in clock and calendar. Date/time shall be displayed on demand. The clock shall be synchronized by GPS time synchronization equipment
  - i) All the hardware required for interconnection, synchronization, commissioning shall be in scope of Contractor. All type tests reports should comply with IEC 62052-11/62053-22 and must be compliant with State Transmission Authority
  - j) The meter shall be suitable to operate with power drawn from the VT supplies. The burden of the meters shall be as per relevant standard. The power supply to the meter shall be healthy even with a single- phase VT supply. Automatic back-up in the event of non-availability of Voltage in all the phases shall be provided by built in long life battery
  - k) Even under the absence of VT input, energy meter display shall be available and it shall be possible to download data from the energy meters
  - l) At least the following data shall be stored before being over-written for the following parameters:

Parameters	Details	Min. No. of days
Net Wh	15 min. block	9 meter
Average Frequency	15 min. block	90 days in meter
Net MVARh for > 103%	15 min. block	90 days in meter
Cumulative net MWh	At every mid-night	30 days in meter /90 days in PC
Cumulative net MVARh for >103%	At every mid-night	30 days in meter /90 days in PC
Date & time blocks for VT failure on any phase		

#### 4.0.13.3 Type Test

Meters supplied shall be of type tested design and certified by any of the accredited certifying agencies in accordance with relevant standards /codes and as per requirement of the STU/Implementing Agency and the type test reports shall be submitted for employer's review. If the type tests are not done previously, then they shall be conducted by the Contractor without any additional cost to the Employer and the type test report shall be submitted before supply of Meters.

#### 4.0.14 EARTHING & LIGHTNING PROTECTION SYSTEM

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#### 4.0.14.1 AC Earthing System

- a. Earthing system shall be in strict accordance with IS: 3043, IEE80-2000, Indian Electricity Rules/Acts, Codes of practice and regulations existing in the location where the system is being installed. The Solar PV Modules, BOS and other components of power plant requires adequate earthing for protecting against any serious fault as guided by IEC 60364. Contractor shall obtain all necessary statutory approvals for the system. The permissible fault level at (Inverter Output Voltage) & (33 kV) shall be kept in consideration while designing the earthing system.
- b. For outdoor switchyard, Earthing system network/earth mat shall be interconnected mesh of mild steel rods buried in ground. For other areas in the solar plant such as transformer yard, switchgear room the earthing system shall consist of minimum two parallel conductors interconnected together. All non-current carrying metal parts, metallic frame of all electrical equipment shall be earthed by two separate and distinct connections to earthing system in compliance to Rule 11 and 61 Indian Electricity Rule 1956 (as amended upto date), IS3043 and IEE80-2000 . All the other structures such as Crane rails, tracks, metal pipes conduits Steel RCC structures, etc shall also be effectively earthed. Separate electronic earthing shall be provided each for PCU, SCB and SCADA system.
- c. Inverter transformer neutral shall be floating, not to be earthed. However, recommendation of inverter manufacturer shall also be taken into account.
- d. Inverter transformer shield shall be earthed separately using minimum two no. of earth electrodes. Earthing conductor between shield bushing and earth electrodes shall be copper flat of suitable size not less than 25 x 6 mm.
- e. Neutral and body of the auxiliary transformer shall be earthed.
- f. The earth conductors shall be free from pitting, laminations, rust, scale and other electrical, mechanical defects.
- g. The material of the earthing conductors shall be as follows
  - Conductors above ground level and in built up trenches -Galvanized steel
  - Conductors buried in earth - Mild steel
  - Earth electrodes - Mild steel rod
- h. Neutral connections and metallic conduits/pipes shall not be used for the equipment earthing. Lightning protection system down conductors shall not be connected to other earthing conductors above the ground level.
- i. Earthing conductors buried in ground shall be laid minimum 600 mm below grade level unless otherwise indicated in the drawing. Back filling material to be placed over buried conductors shall be free from stones and harmful mixtures. Earthing conductor shall be buried at least 2000 mm outside the fence of electrical installations.
- j. Earth pit shall be constructed as per IS:3043. Earth pits shall be treated

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with salt and charcoal if required. However Based on the soil resistivity data of the site, in case, the earthing resistance requirements as per applicable standard is not met, Contractor may have to provide special earthing arrangement like chemical earthing etc. in order to meet the earthing resistance requirements.

- k. On completion of installation, continuity of earth conductors and efficiency of all bonds and joints shall be checked. Earth resistance at earth terminations shall be measured and recorded.

#### 4.0.14.2 Solar Array Earthing

- a. Equipment and structures in Solar Array System shall be earthed in compliance to the IS: 3043 (Code of Practice for Earthing) and Indian Electricity Rules/Acts.
- b. Each Module mounting structures (MMS), SPV Module frames, mounting arrangement for String Monitoring Boxes, Metallic Junction Boxes, Metal frames/Panel, Metallic Pipes of the solar array shall be effectively earthed. The array structures are to be connected to earth pits as per IS standards. Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance. Equipment and structures in the solar PV Plant shall be earthed in compliance to the IS: 3043 (Code of Practice for Earthing) and Indian Electricity Rules/Acts.
- c. **Each PV Module frame shall be earthed in accordance with module manufacturer guidelines.** In case module frame earthing is to be separately provided, it shall be earthed with minimum 2.5 SQMM flexible copper cable with lug at suitable location of module frame.
- d. Earth pit shall be constructed as per IS:3043. Electrodes shall be embedded below permanent moisture level. Earth pits shall be treated with salt and charcoal if required.

#### 4.0.14.3 Lightning Protection General

- a. Lightning protection system shall be in strict accordance with IS:2309 .
- b. Lightning conductor shall be of 25x6mm GS strip when used above ground level and shall be connected through test link with earth electrode/earthing system
- c. Lightning system shall comprise of air terminations, down conductors, test links, earth electrode etc. as per approved drawings
- d. Down conductors shall be as short and straight as practicable and shall follow a direct path to earth electrode.

#### 4.0.14.4 Lightning Protection System For Solar Array

- a. Complete Solar Array with associated structures shall be protected from Direct Lightning Stroke.

Lightning protection system for solar array:

- **Codes & Standards IS/IEC 62305: Protection Against Lightning**
- **NF C 17-102:2011 or latest: Lightning Protection with early Streamer Air Termination Rod.**

- b. Necessary concrete foundation or any other arrangement for holding the

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lightning conductor in position is to be made after giving due consideration to shadow on PV array, maximum wind speed and maintenance requirement at site in future. The Contractor shall submit to the Employer the design calculations for the Earthing System and other relevant information as per Engineering Information Schedule during detailed Engineering.

- c. The Contractor shall submit to the Employer the design calculations for the Earthing System and other relevant information including Earthing Resistance Test Values of each of the Pits on DC side & AC side as per Engineering Information Schedule during detailed Engineering

#### 4.0.15 BATTERY SYSTEM

##### 4.0.15.1 Battery System

- a. Adequate capacity DC battery Bank (s) shall be provided at suitable locations as per system requirements for emergency control supply of inverters, control & protection system, Fire Detection/ Alarm Panel, SCADA System, Operation of Equipment, emergency lighting, CCTV, and other requirements.
- b. Adequate capacity battery charger (Float Cum Boost Charger-FCBC) with relevant IS/IEC standards & protection and automatic change over system shall be provided to charge the battery bank(s) along with relay circuit, fuses, annunciators.
- c. DC power supply Distribution panel/board shall be supplied along with the Charger (FCBC) as per relevant IS standards. Control Room DC Battery Bank & DC supply system design, calculations and detailed explanations along with drawing shall be provided to the Employer for review.

##### 4.0.15.2 General requirements

- a. DC Batteries the batteries shall have the following specifications:-
  - i. Type: VRLA batteries.
  - ii. Rating: As per system Requirement.
  - iii. Standard – IS: 1651-1979; performance as per IS8702
  - iv. Container: Plastic Resin, ABS or PP
  - v. Terminal Posts: Designed suitably to accommodate external bolted connections.
- b. The battery room shall be provided with epoxy paint coated exhaust fan for removal of gasses released from the battery cells.
- c. The battery system shall be designed by the contractor considering sufficient back up time as per system requirement and in accordance with the prevailing practice for reliable and satisfactory operation of the solar PV Plant.
- d. The Contractor shall ensure an adequate battery storage room with all necessary battery equipment and accessories.

##### 4.0.15.2.1 Codes & Standards

The system and equipment shall be designed, built, tested and installed to the latest revisions of the following applicable standards.

Sl. No.	Standard	Description
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1	IEEE Std 485	IEEE recommended practice for sizing VRLA batteries for stationary applications.
2	IEC 60146	Semiconductor converters.
3.	IEC 60439	Low Voltage Switchgear and control assemblies
4.	IEC 62040	Uninterruptible Power Systems (UPS)

#### 4.0.16 PLANT ILLUMINATION SYSTEM

##### 4.0.16.1 Plant Illumination System

- a. A comprehensive illumination system shall be provided in the entire Plant Area. Each building shall be provided with adequate light fittings, 6A/16A socket, fans, etc. Exhaust fans shall also be provided in toilets, battery room and Pantry etc.
- b. This specification covers design of Array yard and sub-station, street light using min. 15 W LED luminaires, tubular poles (from main gate up to the control room/switchyard gate and periphery wall of the plant) distribution pillar boxes, PVC cables, conduit steel trays etc. which shall be supplied by the contractor for installation of luminaires, their control gear and wiring on them.
- c. Normal indoor and outdoor lighting system for Main Control Room, Inverter Rooms, switchyard and Security Room(s) etc. in plant shall be through 415 V AC systems, comprising Lighting cabinets, all energy efficient LED type lighting system for indoor, including the light fittings, lighting facia/panels, warning/direction sign boards, Push-buttons or switches and other accessories.
- d. Outdoor lighting for plant array yard, approach roads, boundary wall / fencing of plant, street lights, S/yard etc. shall be through energy efficient LED type. All lighting fixtures and control gears including lighting panels shall be powder coated, weather proof and of IP 55 deg of protection.

##### 4.0.16.2 Emergency lighting system

Emergency lighting system shall be provided for indoor applications such as Main control room, Inverter Rooms, Security Room(s) etc.

##### 4.0.16.3 General Requirement

- a. Normal AC Lighting System of 415V, 3Phase, 4wire, will be fed from Lighting Distribution Boards (LDBs), which in turn will be fed from the 415V, Main AC Distribution Board.
- b. Control rooms, offices, facilities, utilities, Inverter Rooms shall be equipped with power outlet circuits with necessary breakers/switches, protective and indicating devices shall be provided for each socket/cubicle.
- c. Adequate no. of switchboards (with 3-pin sockets), potable socket cubicles, distribution boards, lighting accessories, lighting poles for street lights etc.,

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shall be provided by the Contractor.

- d. The illumination system shall be properly wired, earthed and connected with suitable grade cables, as applicable.

**4.0.16.4 Lux levels and quality of direct glare limitation**

LED Lamps with at least 15-20 W (at 240 V) shall be provided in control room, Battery Room, Inverter Room, Office space, SACDA Room etc as per requirement.

The nominal illumination level for lighting, measured at the height of a worktable (0.9 m) shall have an average lux value as mentioned below-

Sl. No.	Location	Average Lux Level
1	Main Control Room	300
2	Inverter Room(s)	100
3	Street lighting – roads, Array Yard (Peripheral roads Pole to Pole interspacing of 35 meters, Internal Roads with Pole to pole spacing 50 meters)	5
4	Switchyard, Security room(s)	50
5	Other areas including periphery wall	20

4.0.16.5 The Contractor shall submit to the Employer general arrangement and layout plan for illumination system, Cable and conduit routing diagram, Wiring and termination drawings and other information in accordance to the Engineering information Schedule.

**4.0.17 SCADA AND COMMUNICATION CABLES**

**4.0.17.1 SCADA**

**1. General Requirements**

- a. The Contractor shall provide complete SCADA system with all accessories, auxiliaries and associated equipment and cables for the safe, efficient and reliable operation and monitoring of entire solar plant and its auxiliary systems.
- b. The Contractor shall provide all the components including, but not limited to, Hardware, Software, Panels, Power Supply, HMI, Laser Printer, Gateway, Networking equipment and associated Cables, firewall etc. needed for the completeness.

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- c. SCADA System shall have the provision to perform the following features and/or functions:
- i. Web enabled Operator Dashboards: Showing key information on Generation, Performance and Current Status of various equipment in Single Line Diagram (SLD) format with capability to monitor PV array string level parameters.
  - ii. Real time Data Logging with Integrated Analytics & Reporting: Logging of all parameters - AC, DC, Weather, System Run Hours, Equipment Status and Alarms as well as derived/ calculated/ integrated values. The SCADA User interface shall be customizable and enable Report Generation and Graphical Analysis.
  - iii. Fault and System Diagnostics with time stamped event logging.
  - iv. Support for O&M Activities: SCADA shall provide a Data Analysis and Decision Support for smooth and efficient Plant Operations.
  - v. Generate, store and retrieve user configurable Sequence of Event (SOE) Reports
  - vi. Interface with different field equipment in the plant and work seamlessly with field equipment supplied by different companies
  - vii. Transfer of plant data reliably, to Cloud on any kind of remote network including low bandwidth and wireless links such as 2G/3G/VSAT.
- (Note: Telecom Lease line connection, if required for transferring data from Plant over internet shall be taken by Contractor in the name of Employer for O&M period)
- viii. The Control system shall be designed to operate in non-air-conditioned area. However, the Contractor shall provide a Package/ Split AC of suitable capacity decided by heat load requirement in SCADA room at Main Control Room.

## 2. Architecture

- a. The SCADA System shall be built over Industrial IoT architecture with integrated Analytics, secure web access, enterprise software and Database.
- b. Data acquisition shall be distributed across MCR and LCRs while plant level data aggregation shall be done in the server.
- c. Analog and Digital IO modules shall have integrated processor for distributed IO processing and control.
- d. Data communication system shall be built over fibre optic cables/ wireless network with high bandwidth TCP/IP communication (Fast Ethernet or 802.11a/b/g/n) across all Inverter and Control Rooms with Internet/Intranet access at Main Control Room. Firewall shall be provided for network security.
- e. Plant SCADA Server shall have Industrial Grade Server Hardware

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running SCADA & Monitoring Software with data storage (complete plant data) space for 2 years.

- f. Plant data for monitoring and control operations should be accessible without dependence on external network.
- g. A virtual/cloud server running SCADA & Monitoring Software shall be configured in parallel with Plant Server to enable easy access to plant data from outside the plant without having to login to plant server. Effectively, the plant data shall be replicated to provide data redundancy for critical plant data.
- h. Operator Workstation/PC shall be of Industrial Grade for browser-based access to plant data from Plant. Plant control & SLDC/Utility related operations shall only be initiated through browser-based interface requiring no client software or database to be installed on the Workstation. All critical software shall be installed/stored on local server and Plant Data shall be installed/stored on local as well as cloud servers with user access control for protecting the software and data assets from accidental deletion or corruption.
- i. Internet/Intranet at Plant: Public or private network access shall be provided at the plant through any broadband/VSAT connectivity of 2Mbps or higher bandwidth. In case no broadband/VSAT connectivity can be provided at the plant, a 3G/4G data card from any Internet Service Provider (ISP) may be provided. SCADA system shall be capable of sending all plant data in real time to the Cloud Server.
- j. GPS based Time Synchronization System: The SCADA system shall have a Master/Slave Clock system along with antenna, receiver, cabinet and internal interconnection cables. All SCADA controllers, servers, OWS and communicating equipment shall be synchronized to the GPS clock.

### 3. Industrial IoT Controllers & Data Acquisition

The Plant SCADA and Monitoring System may use one or more IoT Controllers at each LCR and MCR for the purpose of data acquisition and data forwarding to the Local and Cloud Servers. SCADA Servers. The IoT Controllers shall meet the following minimum requirements:

- a. The IIoT Controllers shall be distributed in nature and work independently of other IIoT Controllers or any central controller in the system.
- b. Shall be capable of supporting wide range of field protocols to communicate with different field equipment (Modbus over RS485/Ethernet, etc.)
- c. Shall have local storage for a minimum of 2 weeks (in case of network failure).
- d. Provide web-based interface to configure the controller for various equipment in the field.

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- e. IO Functionality: Shall support status monitoring of VCBs & Trip relays on RMU/HT & Transformer panels through distributed DI/AI modules.
- f. Controls: Shall be capable of Controlling Breakers (ON/OFF). Both ON/OFF and Parameter control of inverters shall be supported.
- g. Data Communication with Servers: Shall send the data collected, from all the equipment at Inverter Control Room and/or Main Control Room, to the Monitoring & Control Server.
- h. Controllers shall be capable of sending data over Internet connections, USB data cards
- i. Shall not require a static public IP address, at the plant for the purpose of remote access.

#### 4. Functionalities

- a. The SCADA system shall monitor instantaneous and cumulative electrical parameters from all DC & AC Equipment including inverters, string combiner boxes, weather station, MFM, Transformer and Switchgear (LT & HT Panels) at regular intervals not greater than one minute.
- b. The SCADA system shall monitor Instantaneous and cumulative environment parameters from weather sensors or data loggers at same interval as electrical parameters and provide PR, CUF on the fly.
- c. The SCADA system shall provide Alarms and Alerts on equipment faults and failure in less than 5 seconds. Alarms on status change of hardwired DI shall also be provided.
- d. The SCADA system shall provide configurable alerts on any parameter crossing settable thresholds.
- e. The SCADA system shall have user-friendly browser-based User Interface for secure access from anywhere, for minimum ten concurrent connections from the Operator PC or other securely connected laptop/mobile, for plant monitoring, O&M, daily reporting and analysis. A dashboard providing summary details of total plant generation, day's export, irradiance, Inverter Control Room level generation and performance indicators like PR and CUF.
- f. Reporting: The SCADA system shall provide downloadable reports in Excel/PDF, configurable for equipment parameters across the plant.
- g. The system shall have Configurable Analysis page for self-configured as well as on demand Analytics charts.
- h. The SCADA system shall be extensible to include maintenance of O&M schedules and related activities for plant equipment as per the O&M Manual.
- i. Mobile User Interface: summary of plant performance and issues should be accessible in a mobile Native UI or browser UI.
- j. Data Communication to SLDC: SCADA system shall provide required

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interface to integrate with TRANSCO-SLDC, in compliance with grid code, to send any parameters specified by SLDC.

**Note:** The methodology and specification of SLDC interface will be provided separately by SLDC/TRANSCO and it shall be the responsibility of the Contractor to determine the same.

- k. Power Plant Control: SCADA system shall provide required interface to the local SCADA operator to set various power control modes (active/reactive power/frequency/PF) through the inverters over industry standard communication protocols like Modbus over TCP/IP.
- l. Forecasting and Scheduling: SCADA shall provide day ahead and week ahead forecasting and scheduling for power generation at the plant as per SLDC/Utility stipulations.
- m. All programming functionalities shall be password protected to avoid unauthorized modification.
- n. The Contractor shall provide software locks and passwords to Employer for all operating & application software. Also, the Contractor shall provide sufficient documentation and program listing so that it is possible for the Employer to carry out modification at a later date.

## 5. Cable Specifications

RS485 & IO Cables shall meet the following minimum specifications:

- a. For RS485: 0.5sq.mm ATC multi-strand (class-5), insulated core, twisted pair, overall screened with ATC drainwire, GI wire Armored, PVC sheathed, DIN47100 colour standard, FRLS, 1.1 kV grade
- b. For IO cabling (between HT/RMU panels and SCADA panel) – 1.0 sq.mm multi- strand, 4/8/12 core screened, armored, FRLS cable, 1.1KV grade.
- c. For Optical Cabling: 6F, Armored, Single/Multi mode laid through HDPE conduits to minimize cable breaks.

## 6. Earthing

- a. Two isolated electronic earth pits near to SCADA panel at every Inverter and Control Room with < 1 Ohm resistance shall be provided. One earth pit shall be used for protective/body earth and the other to be used for Signal Earth
- b. Apart from providing separate earth pits, manufacturer specified earthing
- c. Recommendations shall be followed for all communicating equipment connected to SCADA. This includes but is not limited to SMBs, Inverters, WMS and Switchgear panels

## 7. Communication Cable Laying

- a. All RS485, IO and CAT6 cables shall be laid in separate conduits with

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- a minimum separation of 1.5ft from AC/DC power cables all along.
- b. Power cables shall be laid deep in the trenches first. Data cables shall be laid in separate conduits after partially filling the trenches to ensure minimum 1.5 ft separation between power and communication cables all along the trench.
- c. IO Cables between switch gear panels and SCADA panel shall be laid on separate cable trays, with a minimum of 1.5ft separation from trays carrying AC Power cables
- d. RS485 & CAT6 cables between switch gear panels or Inverters and SCADA panel shall be laid on separate cable trays, with a minimum of 1.5ft separation from trays carrying AC Power cables

**8. Control Cabinets / Panels / Desks at Main Control Room**

- a. The cabinets shall be IP-22 protection class. The Contractor shall ensure that the temperature rise is well within the safe limits for system components even under the worst condition and specification requirements for remote I/O cabinets.
- b. The cabinets shall be totally enclosed, free standing type and shall be constructed with minimum 2 mm thick steel plate frame and 1.6 mm thick CRCA steel sheet or as per supplier's standard practice for similar applications.

**9. Software Licenses**

The Contractor shall provide software license for all software being used in Contractor's System. The software licenses shall be provided for the project and shall not be hardware/ machine-specific.

**10. Hardware at Main Control Room**

- a. The Hardware as specified shall be based on latest state of the art Workstations and Servers and technology suitable for industrial application & power plant environment.
- b. **1 No.** Local Monitoring & Control Server and **2 No.** Operating Work station, to be deployed in the Plant Control Room, shall have the following server hardware and operating system along with accessories:

<b>Plant Server</b>	
<b>Server Hardware</b>	Hex/Octal Core Xeon, 32GB RAM (expandable to 64 GB RAM), 4 X 2TB SATA hard discs in RAID 5 configuration, 2TB external USB hard disc (for backup), dual power supplies, 2 LAN ports, LCD console, keyboard & mouse. The Server hardware shall be housed in a rugged fan-cooled, and rodent-proof Server Rack.

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<b>Operating System</b>	Operating System and Database shall be of enterprise scale (RedHat Linux or equivalent Linux OS, Oracle/MySQL or equivalent DB), with required AMC for 5 years.
<b>Accessories</b>	<ol style="list-style-type: none"> <li>1. Monitor: Min 22" LED Flat Monitor with non-interfaced refresh rate min. 75 Hz.</li> <li>2. Keyboard: ASCII type 3</li> <li>3. Pointing Device: Mouse</li> <li>4. Intelligent UPS (on line): Minimum 2 hour battery backup.</li> </ol>
<b>Operator Workstation</b>	
<b>Hardware</b>	i7 CPU running at 3.0 GHz or faster with 8GB RAM, 500GB hard disk, 24" LED monitor, keyboard and mouse, 4 USB ports, LAN port
<b>Operating System</b>	Windows operating system with necessary tools, anti-virus software.
<b>Accessories</b>	<ol style="list-style-type: none"> <li>1. Screen Display Unit: Min 50" LED Flat Monitor with wall mounted arrangement for the display of SCADA screen</li> <li>2. A4 size monochrome laser printer.</li> <li>3. UPS of required capacity with 2 hour battery backup.</li> </ol>

- c. All network components of LAN and Workstations shall be compatible to the LAN, without degrading its performance.

#### 4.0.17.2 COMMUNICATION CABLES

##### 1. Optical Fiber Cables

- a. Optic Fiber cable shall be 4/8/12 core, galvanized corrugated steel taped armoured, fully water blocked with dielectric central member for outdoor/ indoor application so as to prevent any physical damage.
- b. The cable shall have multiple single-mode or multimode fibers on as required basis so as to avoid the usage of any repeaters.
- c. The outer sheath shall have Flame Retardant, UV resistant properties and are to be identified with the manufacturer's name, year of manufacturing, progressive automatic sequential on-line marking of length in meters at every meter on outer sheath.
- d. The cable core shall have suitable characteristics and strengthening for prevention of damage during pulling.
- e. All testing of the optic fibre cable being supplied shall be as per the relevant IEC, EIA and other international standards.

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- f. The Contractor shall ensure that minimum 100% cores are kept as spare in all types of optical fiber cables.
- g. Cables shall be suitable for laying in conduits, ducts, trenches, racks and underground buried installation.
- h. Spliced/ Repaired cables are not acceptable. Penetration of water resistance and impact resistance shall be as per IEC standard.

**2. Communication Cable (Modbus)**

- a. Data (Modbus) Cable to be used shall be shielded type with stranded copper conductor. Cable shall have minimum 2 pair each with conductor size of 0.5 Sq.mm. Cable shall be flame retardant according to IEC 60332-1-2.
- b. Cable shall be tested for Peak working voltage of not less than 300 V and shall be suitable for serial interfaces (RS 422 and RS 485).
- c. Communication cable shall be laid through underground with suitable HDPE ducts.

**4.0.18 GENERAL SYSTEMS**

**4.0.18.1 WEATHER MONITORING STATION**

**4.0.18.1.1 Weather Monitoring System**

- 1) As a part of weather monitoring station, the contractor shall provide following measuring instruments with all necessary software & hardware required to integrate with SCADA so as to enable availability of data in SCADA.
- 2) All the weather sensors shall be supplied with all required certification and shall be proven for Solar Plant Application.
- 3) Location of Sensors and Data Acquisition to SCADA shall be decided during detailed Engineering Stage

**4.0.18.2 Pyranometer**

The Contractor shall provide secondary minimum two (02) number of standard pyranometers (ISO 9060 classification) for measuring incident global solar radiation. One of them shall be placed on horizontal surface and the other on adjustable inclined plane. The specification for pyranometers shall be as follows:

Sl.No	Details	Values
1.	Spectral Response.	0.31 to 2.8 micron
2.	Accuracy Class	According to ISO 9060: Secondary Standard.
3.	Sensitivity	Min 7 micro-volt/w/m <sup>2</sup>

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3.	Time response (95%):	Max 15 s
4.	Non linearity:	±0.5%
5.	Temperature Response:	±2%
6.	Tilt error:	< ±0.5%.
7.	Zero offset thermal radiation:	±7 w/m <sup>2</sup>
8.	Zero offset temperature change	±2 w/m <sup>2</sup>
9.	Operating temperature range:	0°C to +80°C
10.	Uncertainty (95% confidence Level):	Hourly- Max-3%, Daily- Max-2%
11.	Non stability:	Max ±0.8%
12.	Resolution:	Min + / - 1 W/m <sup>2</sup>

#### 4.0.18.3 Temperature Sensor

Contractor shall provide minimum six (6) thermometers (one for ambient temperature measurement with shielding case and five (5) for module temperature measurement). The thermometers shall be RTD / semiconductor

type measuring instrument. Instrument shall have a range of 0<sup>o</sup>C to 80<sup>o</sup>C. The instrument shall have valid calibration certificate

#### 4.0.18.4 Anemometer

Contractor shall provide minimum one no. anemometer with wind vane of rotating cup type

Sl. No	Details	Values
1.	Velocity range with accuracy limit	± 0.11 m/s upto 10.1 m/s ± 1.1 % of true when more than 10.1 m/s
2.	Wind direction range with accuracy limit	0 to 360 deg with accuracy ± 4 deg
3.	Mounting Bracket	Anodized Aluminium bracket to reduce corrosion, all mounting bolts of SS
4.	Protection Class	IP 66

All the above instruments shall have valid calibration certificate. The contractor shall submit all test certificates /Calibration Certificates to RECPDCL as per Engineering Information Schedule. The Contractor shall provide instrument manual in hard and soft form.

**Note:** Contractor will be required to submit this data to IMPLEMENTING AGENCY/MNRE on line and/or through a report on regular basis every month for the entire duration of O&M period. The Contractor shall provide access to IMPLEMENTING AGENCY & RECPDCL or their authorized representatives for installing any additional monitoring equipment to facilitate on-line transfer of

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data.

The plant shall be equipped with measuring and recording following parameters, these will be required to be submitted to MNRE on line and/or through a report on regular basis every month for the entire duration of PPA:-

- **Global Horizontal Irradiation**
- **Irradiation on Collector Plane**
- **Module Temperature**
- **Wind Speed**
- **Ambient Temperature**
- **DC Input power to all the Inverters**
- **AC output power of all the Inverters**
- **Electrical parameters at outgoing feeders**
- **The SPD shall maintain the list of Module IDs along with performance characteristic data for each module. The data shall be submitted to Implementing Agency/MNRE.**

#### 4.0.18.5 Data logger and Data Acquisition System

Data logger for the weather monitoring station should have the following features:

Provision for analog, digital and counter type inputs for interfacing with various type of sensors

##### 1. Analog Input

- a. Adequate nos. for all analog sensors with redundancy
- b. Provision for operation in different current and voltage ranges as per connected sensors
- c. Accuracy of +/-0.1% of FS

##### 2. Digital Inputs

- a. Adequate no. of Digital inputs and outputs for the application
- b. Provision for RS232 and RS485 serial outputs
- c. Built-in battery backup
- d. Connectivity and Data transmission:
  - i. Built-in GSM/ GPRS modem for wireless data transmission to SCADA/ cloud server (procurement of GPRS enabled SIM Card and connection subscription to be the responsibility of Contractor). It should be possible to remotely communicate with the device for configuration settings.
  - ii. RS485 MODBUS interface for data collection and storage on SCADA
  - iii. Web interface with provision for user login to enable viewing and downloading of weather data in XLS/ CSV format.
  - iv. Communication protocol should support fast data transmission rates, enable operation in different Frequency bands and have an encryption-based data security layer for secure data transmission.
- e. Display Settings: Graphic LCD screen which should be easily accessible and should display relevant details like all sensor values,

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- battery strength, network strength etc.
- f. Provision of Time synchronization from telecom time or server time
- g. Data Storage: Provision for at least 2 MB internal Flash Memory and at least 8 GB Micro SD card (expandable)
- h. Protection level: IP65

#### 4.0.18.6 FIRE FIGHTING SYSTEM

The SPV plant shall be equipped with suitable fire protection & firefighting systems (including Portable fire extinguishers, Sand buckets, fire alarm panel and other equipment as required) for protection of entire equipment, switchyard & control room as per CEIG and other statutory requirements. The installations shall meet all applicable statutory requirements, safety regulations in terms of fire protection.

##### 4.0.18.6.1 Fire protection system

- a) Liquefied CO2 fire extinguisher shall be upright type of capacity 9 kg having IS: 2171. 7 IS: 10658 marked. The fire extinguisher shall be suitable for fighting fire of Oils, Solvents, Gases, Paints, Varnishes, Electrical Wiring, Live Machinery Fires, and All Flammable Liquid & Gas.
- b) Fire protection for different equipment as per NFPA standard and NBC Norms.
- c) Fire-fighting system for main control room having SCADA room, battery room, Panel room, store room etc.
- d) Firefighting system for switchyard equipment's, Power/Inverter Transformers & Auxiliary Transformer.
- e) Contractor shall provide adequate fire protection system for transformer as per statutory requirements/relevant standard for power/inverter transformer.
- f) Firefighting system for inverter rooms having Power Conditioning Units & Inverter Transformers.
- g) Nitrogen based fire protection system shall be provided for power/inverter transformers if required.
- h) Fire detection and alarm system for Main control Room, Switchyard & transformer area, Inverter Rooms etc.
- i) Notification devices such as fire horns/ alarms/ hooters/ bells, light or text display. Manual Call point, Fault Isolation Modules, Control Modules, Digital output or through RS 485/ any other compatible network from the fire detection system shall be integrated with SCADA.
- j) Any other Items not mentioned specifically but necessary for the satisfactory completion of the system.

##### 4.0.18.6.2 General Requirements

The complete fire detecting & fire-fighting system shall be coordinated and established in accordance with latest standards. It shall be sole responsibility of the contractor to ensure proper installation and operation of the system in compliance with the applicable statutory /regulatory requirements.

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#### 4.0.18.6.3 Fire Alarm Control Panel Indication

Alarm conditions shall be immediately displayed on the control panel. Alarm LED shall flash on the control panel until the alarm has been acknowledged. Once acknowledged the LED shall remain lit. During an alarm condition, an alarm tone shall sound within the control panel until the alarm is acknowledged.

#### 4.0.18.6.4 Ratings of complete fire-fighting including auxiliary system shall be taken in accordance with prevailing standards & practices. They shall work satisfactorily for the specified conditions.

The firefighting should have followings-

1. Main Control room - Fire alarm system
2. Control room :
  - a. DCP Type ABC - 2 No's
  - b. Co<sub>2</sub> 9 KG capacity - 2 No's
  - c. Foam type 9 KG - 1 Number
  - d. Hand portable Co<sub>2</sub> 9KG Capacity - 1 Number
  - e. Sand bucket -1 Number
3. Inverter station :
  - a. DCP Type ABC - 1 No's
  - b. Co<sub>2</sub> 9 KG capacity - 1 No's
4. Transformer Yard :
  - a. DCP Type ABC - 1 No's
  - b. Co<sub>2</sub> 9 KG capacity - 1 No's
  - c. Foam type 9 KG - 1 Number
  - d. Sand bucket -1 Number
5. Switch yard (As applicable)
  - a. DCP Type ABC - 2 No's
  - b. Co<sub>2</sub> 9 KG capacity - 2 No's
  - c. Sand bucket -1 Number
6. Pantry room
  - a. Hand portable Co<sub>2</sub> 9KG Capacity - 2 Number

#### 4.0.18.7 MODULE CLEANING SYSTEM (MCS)

##### 4.0.18.7.1 Module Cleaning System

- a) The Contractor shall provide Module cleaning system in the Solar PV Plant after taking into consideration the site conditions. The Module cleaning system shall be complete in all respect and shall conform to the relevant IS Codes standards. This shall include pumps and motors, requisite storage arrangement and laying of HDPE Pipes with sufficient number of isolating valves conforming to IS 4984 and other relevant code and other equipment as required for completion of the system. The contractor shall also install a flow meter for measurement of water consumption. The contractor shall take all necessary approvals required from respective authorities for digging deep bore wells in plant area.
- b) The contractor shall arrange water supply for module cleaning and

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- ensure that the storage arrangement/ Water tank shall have sufficient storage capacity for cleaning of modules and other requirements as per the frequency of water supply.
- c) Design of the Module cleaning system shall be such that complete solar plant shall be cleaned once in 15 days cycle. The water used for cleaning should be of appropriate quality fit for cleaning purpose as per the recommendations of the module manufacturer. The contractor shall also install the water purification/filtration/DM Plant (if necessary) so as to achieve the required quality of water for cleaning of modules as per manufacturer's recommendations. The Contractor shall ensure that each of these tube wells shall provide sufficient yield to meet the water requirement as stipulated above. The Contractor shall also submit the design details of the same to the Employer.
  - d) The HDPE Pipe shall be suitably protected against any impact load and shall be protected with higher diameter GI Pipes or other protection system at road crossings and other locations where higher loads are expected.
  - e) Contractor shall furnish calculations based on the head and discharge requirements of the pump rating and the water-line details. Contractor shall provide the single line diagram of water washing arrangement with location of pump to Employer for approval during detailed engineering
  - f) The contractor may propose any advanced cleaning solution like waterless cleaning system, if required, depending upon the site conditions for satisfactory and reliable operation & maintenance of the plant. The Contractor shall provide the Process and Instrumentation Diagrams (P & ID) of Module Cleaning arrangement and other relevant information for review of the Employer during detailed Engineering as per Engineering Information Schedule.

#### 4.0.18.8 CLOSED CIRCUIT TELEVISION SYSTEM (CCTV)

##### 4.0.18.8.1 Closed Circuit Television System

The contractor shall provide CCTV Cameras along with monitoring stations (sufficient numbers) and all other accessories including but not limited to all the power supply (UPS), cables, cable trays, power packs, erection hardware (viz. junction boxes, brackets glands, nut-bolts, conduits etc.) and mounting required for its proper operation. CCTV Cameras must be installed to have complete coverage of following areas

1. Main Entry: Covering all the entry/exist 24 Hrs
2. Plant Solar Array area (PTZ cameras shall be high speed integrated dome type, **1 no. PTZ type camera at each inverter room**)

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**locations)**

3. **Control Rooms:** Covering Entry/Exit and activities within Control Rooms
4. Monitoring Station of all the CCTV Network shall be installed in the Main Control Room (2nos CCTV Workstation each with 22" monitor at each Unit).
5. The equipment furnished under this section shall meet the requirements of all the applicable International codes and standards or their latest amendment Codes and Standard.
6. Contractor has to propose the locations and number of cameras required for the Plant during bidding, however Employer's decision on number of cameras and location shall be final. The exact locations and number of Cameras shall be decided during detailed engineering.
7. The Contractor shall ensure that CCTV Cameras and related equipment must have appropriate rating to work in prevailing site conditions as per the current opportunity. The CCTV Cameras along with all its system components i.e. network switches, storage devices, servers, LAN switches, media converters etc. shall be powered from UPS system.
8. The CCTV system shall be designed as a standalone IP based network architecture. System shall use video signals from different cameras at different locations, process the video signals for viewing on monitors at different locations and simultaneously record all the video streams.
9. CCTV System shall be provided with all relevant safety standards and network standards.
10. Camera server shall be provided with sufficient storage space to store recordings of all cameras at 25/30 FPS at 1920X1080 (For HD cameras) for a period of 02 Months or more using necessary compression techniques.
11. Contractor has to ensure that the data of all the CCTV Cameras shall be compatible for remotely monitoring (5 numbers concurrent view at each Unit) at the Employers Corporate office/any other office as desired.
12. It shall be possible to view, record, search and replay simultaneously without affecting performance of the system.

**4.0.18.8.2** All the cameras shall capture video stream in colour and be suitable for day and night surveillance (under complete darkness conditions). There will be two types of cameras viz. PTZ & Fixed. PTZ cameras shall be highspeed integrated dome type.

**4.0.19 QUALITY ASSURANCE REQUIREMENTS**

- a. For all major and critical items, the contractor shall submit Manufacturing and Site/Field Quality Assurance Plans, considering the latest practices being followed in Solar Power Industry/Standard requirements/technical

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specifications requirements, in the format widely accepted in the Solar Power Industry. The final Quality Assurance Plans shall be mutually agreed upon with the successful bidder during the detailed engineering stage progressively. This Quality Plan will detail out various tests / inspection to be carried out as per the requirements of the Technical Specifications and standards mentioned therein and Quality Practices and procedures to be followed by Supplier/Contractor's Quality Assurance Department., the relevant reference documents and standards and acceptance norms etc. during all stages of material procurement, manufacture, assembly and final testing/performance testing.

- b. For submission of Quality Plans, an Inspection Categorization Plan shall be approved by RECPDCL and the equipment shall be categorized under three categories: -
  - i. Critical Items – Quality Plan to be submitted to RECPDCL for approval and shall have Customer Hold Point (CHP) for RECPDCL along with Contractor.
  - ii. Major Items – Quality Plan to be submitted to RECPDCL for approval and tests shall be Witness by the Contractor
  - iii. Minor Items – No Quality Plan approval required and Test certificates/ Certificate of Compliance to be submitted to RECPDCL for request of issuance of MDCC.
  
- c. During inspection, the Supplier/Contractor shall provide reference documents/plant standards/acceptance norms/test and inspection procedure etc. as referred in Quality Plan. The approved Quality plan shall form a part of the contract. For each Lot of all critical items offered for inspection, RECPDCL's authorized representative will identify 10% (minimum 01 no per lot) quantity except for the Solar PV Modules (to be finalized by the Employer before the finalization of QAP) for testing/inspection in his presence as per approved Quality Plan. These 10% quantity of the major/critical items whose testing/ inspection has been carried out jointly, shall have to be used in the project identified for RECPDCL and should be readily traceable/identifiable. For the remaining 90% of the major/critical items, testing/inspection will be carried out in house by the Quality Assurance Department of the contractor/supplier as per the approved Quality Plan. The documents of such testing/inspection carried out in house, will be submitted to RECPDCL for review and subsequent issuance of Material Dispatch Clearance Certificate (MDCC). The material/item/assembly for which MDCC has been issued by RECPDCL, shall have to be used in the project identified for RECPDCL and should be readily traceable/identifiable. No material shall be dispatched from the manufacturer's works before the same is accepted, subsequent to pre-dispatch final inspection including verification of records of all previous tests/inspections by Employer's Project Manager/Authorized

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representative and duly authorized for dispatch by issuance of Material Dispatch Clearance Certificate (MDCC).

- d. The site/field quality assurance plans shall detail out the various quality practices, tests and procedures etc. to be followed by the Supplier/Contractor's Site Quality Assurance Dept. during various stages of site activities from receipt of material/ equipment at site till final commissioning/ acceptance/handover. However, 90 days Performance Guarantee test shall be conducted at site as described in Clause 4.0.20 respectively.
- e. The inspection calls shall be placed at least one month in advance for overseas inspections and 10 days for inspections within India.
- f. Only calibrated testing and measuring instruments would be used during manufacturing, testing and commissioning by the Supplier/contractor. Copy of the valid calibration certificates would be provided during inspection to RECPDCL by the Supplier/contractor.
- g. For all spares and replacement items, the quality requirements as agreed for the main equipment supply shall be applicable.
- h. The contractor will provide a compliance certificate regarding confirmation that repair/rectification has been carried out as per the standard procedure to make the job acceptable.
- i. Approval of the results of the tests and inspection will not, however, prejudice the right of RECPDCL to reject the equipment if it does not comply with the specification in service and the above shall in no way limit the liabilities and responsibilities of the contractor in ensuring complete conformance of the materials/equipment supplied to relevant specification, standard, data sheets, drawings etc.
- j. For item/material/assembly covered in QAP, the Supplier/contractor shall be required to submit copies of the following Quality Assurance documents in original along with the request letter for issuance of MDCC (Material Dispatch Clearance Certificate).
  - i. Factory test result for testing required as per applicable codes and standards referred in the Specifications and approved Quality Assurance Plan.
  - ii. Inspection reports duly signed by authorized representative of RECPDCL and Supplier for the 10% quantity for which inspection has been jointly carried out. For remaining 90% quantity, duly accepted test reports by the authorized representative of the Quality Assurance Dept of the Supplier/Contractor in accordance with the approved Quality Assurance Plan.
  - iii. The accepted deviation, if any, shall be included with complete technical details

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- k. For BBU (Billing break up) items/material/assembly not covered in QAP, the Supplier/contractor shall be required to submit copies of the following Quality Assurance documents in original along with the request letter for issuance of MDCC:
- Internal inspection reports/compliance certificate duly signed by authorized representative of Supplier/contractor's Quality Assurance Department.
  - Undertaking from the Supplier/contractor that the components requested for MDCC meets the requirements of applicable standards and other relevant requirements of the contract.
- l. (a) Non-conformities observed during manufacturing, handling, packaging, transportation, storage, preservation, erection, testing and commissioning including the corrective action taken by the Supplier/contractor to ensure that the supplied components/items meet the various requirements of the contract will be intimated by the Supplier/contractor for information of RECPDCL promptly.  
 (b) In case, Supplier/contractor agrees to replace such items/components having non-conformities with new items/components and redo the services having non-conformity, without any additional cost to RECPDCL, the Clause No 4.4.5(a) will not be applicable.
- m. Any test which is the part of the contract document but not mentioned in the Quality Plan will also be carried out by the Supplier/contractor without any additional cost to RECPDCL.
- n. The Contractor shall have to submit the Quality Assurance Plans for the following (but not limited to) Equipment/systems.
- i. FQAP for Civil Works
  - ii. MQAP for PV Module
  - iii. MQAP for Power Conditioning Unit (PCU)/Inverter
  - iv. MQAP for Inverter Transformer
  - v. MQAP for HT Switchgear Panel
  - vi. MQAP for HT Power Cables
  - vii. MQAP for SCADA System
  - viii. MQAP for Control & Relay Panels
  - ix. MQAP for AB Tariff Meters
  - x. MQAP for Auxiliary Transformers
  - xi. MQAP for LT Power Cables
  - xii. MQAP for MMS (Module Mounting Structure)
  - xiii. MQAP for LT Panels
  - xiv. MQAP for Solar DC Cables
  - xv. MQAP for String Monitoring Unit
  - xvi. MQAP for DC Cable Connector
  - xvii. MQAP for Weather Monitoring System

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- xviii. FQAP for Electro-Mechanical Items
- xix. MQAP of Switchyard Items (As applicable)

**Note:** Any other items mentioned in Technical Specification and not specified above shall also be made part of the Quality Assurance Plan (QAP) and the above list shall be updated accordingly.

#### 4.0.20 PERFORMANCE GUARANTEE

A Performance Guarantee test shall be carried out after the commissioning of Plant Facilities to demonstrate that the plant has achieved the **Guaranteed Performance Ratio** in line with requirements of the bidding document. This will be one of the pre-conditions for the Plant Operational Acceptance. Performance Guarantee (PG) test period would be continuous measurement of 30 consecutive days. The test shall be conducted in accordance with the IEC-61724 as per the methodology described in Technical Specifications Part of the bidding document. General requirements & Procedure of PG test are described further in this section. The report shall contain all the measured energy and Met data values, calculations, results and conclusions.

##### 4.0.20.1 Pre-PG Test

4.0.20.1.1 The EPC Contractor shall perform start-up tests after completion of commissioning and Test Procedure as per Annexure – C: Plant Documentation, Commissioning and Test Procedure and recording of punch points.

4.0.20.1.2 Performance Guarantee Test shall commence immediately after all issues arising from the functional/ start-up test have been rectified.

Note:

- (a) All measurement(s) shall be carried out taking proper safety precaution.
- (b) Also it shall be ensured that to avoid any loose connection at the terminal points for which measurement procedure is conducted.
- (c) Ensure proper functioning (e.g. Multimeters shall be calibrated) of all measuring instruments before conducting above measurement procedure.
- (d) The above test procedure shall be conducted in presence of site in-charge.

##### 4.0.20.2 Performance Ratio

The Performance Ratio (PR) of the PV Plant **in a reporting period** shall be

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calculated as follows (according to IEC 61724).

$$PR' = \left( \sum_k P_{out,k} \times \tau_k \right) / \left( \sum_k \frac{(C_k \times P_o) \times G_{i,k} \times \tau_k}{G_{i,ref}} \right)$$

$$C_k = 1 + \gamma \times (T_{mod,k} - T_{ref}) \quad \text{Temp. correction to power}$$

Where,

$P_{out}$  Cumulative Plant Generation measured at Plant End ABT meter over the **duration of reporting period** (kWh), (1/4) hour

$P_o$  Installed nominal peak power of PV modules, i.e. Nameplate rating at STC (kWp)

$\tau_k$  Duration of the  $k^{th}$  recording interval, i.e. (1/60) hour

$\sum_k$  Summation over all recording intervals in the reporting period, (1/4) hour

$G_{i,}$  Average irradiance measured at the Plane of Array (POA) at the commencement of time interval  $\tau_k$  (kW/m<sup>2</sup>) (**average of all Pyranometers installed in various sites**)

$G_{i,}$  Irradiance value at which  $P_o$  is determined, i.e. 1 kW/m<sup>2</sup>

$C_k$  Power rating temperature adjustment factor and can be calculated as below  $C_k = 1 + \gamma \times (T_{avg\_mod,k} - T_{ref})$

$\gamma$  Temperature coefficient of power with negative sign (°C<sup>-1</sup>)

$T_{avg\_mod,k}$  Avg. PV Module temperature measured at the commencement of time interval ' $\tau_k$ ' (°C) (**average of all Module Temperature sensors installed**)

$T_{ref}$  PV Module temperature at which  $P_o$  is determined, i.e. 25°C

#### 4.0.20.3 General Requirements

- The PG test shall commence within 60 days of the commissioning of Plant Facilities.
- The PG test shall be carried out for a period of 30 days at site by the Contractor in presence of the Employer/ Employer's Representative/ Owner's Engineer.
- The date of commencement of the PG Test shall be communicated in advance and agreed upon by both parties i.e. RECPDCL and EPC Contractor. Any consecutive 30 days period (excluding interruptions that last entire day on account of grid outage or as per hindrance record maintained at site or weather conditions) for the purpose of conducting PG test shall be mutually discussed and agreed between RECPDCL and EPC Contractor.
- These tests shall be binding on both the parties to the contract to determine compliance of the equipment with the guaranteed performance parameters.

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- The test shall consist of guaranteeing the correct operation of the Plant Facilities, by way of the performance ratio based on the reading of the energy produced and delivered to the grid (ABT meter) and the Plane of Array incident solar radiation.

#### 4.0.20.4 PR Test Procedure

##### 4.0.20.4.1 Pre-Test Requirements

- (1) Before the commencement of PG test, the plant shall have completed Pre-PG tests as per Clause 2.1.1 above and SCADA system and WMS shall be fully commissioned and functional.
- (2) Pyranometer Tilt Angle & Cleanness: The pyranometers & Tilt Angle shall be verified before the test commences and **then visually inspected at regular intervals for cleanliness during the tests.**
- (3) The Pyranometers and Temperature sensors used for the purpose of the PG Test shall have valid calibration certificates.
- (4) Trial Run: The PG Test for Plant Facilities shall commence with a trial run for 7 consecutive days. RECPDCL shall estimate the PR for the Trial Run period and revert within 3 working days. Post the trial run period, the 30 days PG test will commence after communication from RECPDCL.

##### 4.0.20.4.2 General Procedure for the PR Test

- (1) **Data Collection:** The EPC Contractor shall provide the raw data as per **Annexure-1 (Format for Raw Data Submission)** to RECPDCL. PV Power Plant test related parameters are collected in one-minute and 15 intervals for the 30 (Thirty) days reference period. The data shall consist of the following at a minimum:
  - Irradiance at Collector's (i.e. PV Module) POA; (Source: SCADA, Temporal Resolution: 1 minute) Average values from all the sites will be considered
  - Other Met Data received from installed WMS; (Source: SCADA, Temporal Resolution: 1 minute)
  - Energy generated at Plant (kWh) (Source: Plant TVM Meter from SCADA, Temporal Resolution: 1 minute)
  - Energy injected into grid (kWh) (Source: Plant End ABT Meter, Temporal Resolution: 15 minute)
  - PV Module Temperature recorded from the temperature Sensors (°C)

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(Source: SCADA, Temporal Resolution: 1 minute)

(2) **Data Cleaning/Filtering:** The data shall be filtered so that the data set is free of nuisance data points and bad data that exhibit a high degree of error (such as errors caused by faulty instrumentation). The following criteria shall be excluded from the dataset used for this test:

- **Missing data:** Time blocks with missing 1-minute records shall be interpolated using average interpolation method.
- **Nuisance or bad data** – Nuisance data points or bad data that clearly exhibit a high degree of error (eg. due to rainy/cloudy weather or meteorological measurement equipment that is identified as being out of calibration or requiring adjustment). A 15- minute time-block shall be *explicitly* flagged through a flag parameter on account of this factor after recording reasons thereof (**Note:** no filtration shall be done on site data). The same shall be corroborated/verified by RECPDCL. Suitable statistical methods may be applied to identify such erroneous data.
- **Grid Interruptions** – Time periods (15-minute time blocks) of the grid interruptions at the utility substation, recorded manually jointly by EPC Contractor and RECPDCL representatives shall be eliminated. Grid outage period, if any, shall be verified from SCADA.
- Any Force majeure conditions
- **Radiation Criteria** – Radiation on Plane of Array (POA) less than 200 W/m<sup>2</sup>
- Shutdown explicitly demanded by the Owner/DISCOM/STU/CTU.
- **Note:** Minimum 24 Nos of 15-minute time blocks shall be considered to account the day for PR estimation. Otherwise the PR test shall be extended to another day.

**(3) Estimation of Daily PR**

- **For each reporting period (15-min time-block)** of cumulative plant generation measured at plant end ABT meter, PR shall be calculated as per the formula given in Clause no. 2.1.2
- The same shall be recorded on daily basis for each reporting period from 6:00 am to 6:00 pm as per the format provided at **Annexure-2: Sample for Daily PR Report**
- Considering minimum 24 Nos of 15-minute time blocks to account the day for PR estimation, **Daily PR shall be estimated as the average of PR**

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**calculated for 15-min time blocks falling within 99% confidence interval.**

- This exercise shall be carried out & recorded for a period as specified in Point (4) below.
- The filled-in format (Daily PR Report) shall be signed by both the parties (EPC Contractor and RECPDCL) and each party will keep one copy for record.

**(4) Final PR Calculation**

Final PR of the plant facility shall be calculated as the **average of daily PRs for 30 consecutive days.**

**4.0.20.5 PR Test Pass/Fail Criterion:**

The Functional Guarantee condition for the purpose of Provisional Acceptance of the Plant Facilities shall be considered to have been met if **the average of daily PRs (for 30 days\*) is greater than or equal to the guaranteed Performance Ratio (PR).**

\* 30 days excluding any interruption due to rainy/cloudy day or allowable Interruptions as per this document. Interruptions due to communication breakdown only may be exempted based on specific approval to the effect that generation is not affected and equipment failure is not attributable. In such case, the test shall be extended for affected no. of days (up to 5 days)

- During the PG test, equipment failure/interruption of any kind, except for SCADA communication failures, will not be accountable. In case of a breakdown, the test may be resumed once the complete system is rectified and working properly.
- If the If the EPC Contractor is not able to demonstrate guaranteed PR during this period, **two more chances shall be given** to demonstrate the same after incorporation of suitable corrective measures. In case the contractor fails to achieve guaranteed PR even after the two more chances, further action shall be taken as per the provisions of contract.

**Note:** The test shall be repeated for 30 days in case of any outage of following equipment (as applicable) for more than 7 days.

- Power Transformer/Inverter Duty Transformer
- Power Conditioning Unit
- HT Switchgear Panel
- SCADA and data logger combined

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- Tilted pyranometer
- Other WMS sensors

#### 4.0.21 ERECTION CONDITIONS OF CONTRACT (ECC)

##### 4.0.21.1 General Conditions

The following provisions shall supplement the conditions already contained in the other parts of these specifications and documents and shall govern that portion of the work of this contract which is to be performed at site. The erection requirements and procedures not specified in these documents shall be in accordance with the recommendations of the equipment manufacturer, or as mutually agreed to between the Employer and the Contractor prior to commencement of erection work.

##### 4.0.21.2 Electrical Safety Regulations

The contractor shall ensure that entire electrical installation work is executed by adopting applicable statutory safety regulations and best practices in the industry. The Contractor shall employ the necessary number of qualified, full time electricians to maintain his temporary electrical installation.

##### 4.0.21.3 Inspection And Testing Inspection Certificates

The provisions of the clause entitled Inspection and Testing in the Technical Specification, shall also be applicable to the erection portion of the Works. The Employer shall have the right to re-inspect any equipment though previously inspected and approved by him at the Contractor's works, before and after the same are erected at Site. If by the above inspection, the Employer rejects any equipment, the Contractor shall make good for such rejections either by replacement or modification/ repairs as may be necessary to the satisfaction of the Employer. Such replacements will also include the replacements or re-execution of such of those works of other Contractors and/or agencies, which might have got damaged or affected by the replacements or re-work done to the Contractor's work.

##### 4.0.21.4 Contractor's Field Operation

The Contractor shall keep the Employer informed in advance regarding his field activity plans and schedules for carrying out each part of the works. Any review of such plan or schedule or method of work by the Employer shall not relieve the Contractor of any of his responsibilities towards the field activities. Such reviews shall also not be considered as an assumption of any risk or liability by the Employer or any of his representatives and no claim of the Contractor will be entertained because of the failure or inefficiency of any such plan or schedule or method of work reviewed. The Contractor shall be solely responsible for the safety, adequacy and efficiency of plant and equipment and his erection methods.

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The Contractor shall have the complete responsibility for the conditions of the Work-Site including the safety of all persons employed by him or his Sub-Contractor and all the properties under his custody during the performance of the work. This requirement shall apply continuously till the completion of

the Contract and shall not be limited to normal working hours. The construction review by the Employer is not intended to include review of Contractor's safety measures in, on or near the Work-Site, and their adequacy or otherwise.

**4.0.21.5 Protection Of Work**

The Contractor shall have total responsibility for protecting his works till it is finally taken over by the Employer. No claim will be entertained by the Employer or the representative of the Employer for any damage or loss to the Contractor's works and the Contractor shall be responsible for complete restoration of the damaged works to original conditions to comply with the specification and drawings. Should any such damage to the Contractor's Works occur because of any other agency/individual not being under his supervision or control, the Contractor shall make his claim directly with the party concerned. The Contractor shall not cause any delay in the repair of such damaged Works because of any delay in the resolution of such disputes. The Contractor shall proceed to repair the Work immediately and no cause thereof will be assigned pending resolution of such disputes.

**4.0.21.6 Facilities To Be Provided By The Contractor**

1. **Contractor's site office Establishment:** The Contractor shall establish a site office at the site and keep posted an authorized representative for the purpose of the contract.
2. **Tools, tackles and scaffoldings:** The Contractor shall provide all the construction equipments, tools, tackles and scaffoldings required for pre-assembly, installation, testing, commissioning and conducting Guarantee tests of the equipments covered under the Contract. The Contractor shall arrange machinery & equipment such as Dozer, Hydra, Cranes, Trailer, etc. wherever required for the purpose of fabrication, erection and commissioning.
3. **Testing Equipment and Facilities:** The contractor shall provide the necessary testing, equipment and facilities
4. **Testing of construction material at the site:** Contractor shall make arrangements for the testing of construction material at the site wherever required, under the scope of services of the contract.
5. **First-aid:** The Contractor shall provide necessary first-aid facilities for all his employees, representatives and workmen working at the Site. Enough number of Contractor's personnel shall be trained in administering first-aid.
6. **Water:** Contractor shall make all arrangements himself for the supply of construction water as well as potable water for labour and other personnel at the worksite.

**4.0.21.7 Security**

The Contractor shall have total responsibility for all equipment and materials in his custody stores, loose, semi-assembled and/or erected by him at Site.

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The Contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and losses.

**4.0.21.8 Fire Protection**

- a. The work procedures that are to be used during the erection shall be those, which minimize fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the Site regularly. Fuels, oils and volatile or flammable materials shall be stored away from the construction and equipment and materials storage areas in safe containers. Untreated canvas, paper, plastic or other flammable flexible materials shall not at all be used at Site for any other purpose unless otherwise specified. If any such materials are received with the equipment at the Site, the same shall be removed and replaced with acceptable material before moving into the construction or storage area.
- b. All materials used for storage or for handling of materials shall be of water proof and flame resistant type. All the other materials such as working drawings, plans etc., which are combustible but are essential for the works to be executed shall be protected against combustion resulting from welding sparks, cutting flames and other similar fire sources.
- c. All the Contractor's supervisory personnel and sufficient number of workers shall be trained for fire-fighting and shall be assigned specific fire protection duties. Enough of such trained personnel must be available at the Site during the entire period of the Contract.
- d. The Contractor shall provide suitable quantity & type fire protection equipment for the warehouses, office, temporary structures etc.

**4.0.21.9 Materials Handling and Storage:** All the equipment furnished under the Contract and arriving at Site shall be promptly received, unloaded and transported and stored in the storage spaces by the Contractor. Modules, Inverters, Transformers and Other Balance of items etc. must be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage. All the materials stored in the open or dusty location must be covered with suitable weather proof and flameproof covering material wherever applicable. The Contractor shall be responsible for any loss or damage during transportation, handling & storage due to improper packing.

**4.0.21.10 Construction Management**

Contractor shall be responsible for performance of his works in accordance with the specified construction schedule. If at any time, the Contractor is falling behind the schedule, he shall take necessary action to make good for such delays by increasing his work force or by working overtime or otherwise accelerate the progress of the work to comply with the schedule and shall communicate such actions in writing to the Employer, satisfying that his action will compensate for the delay. The Contractor shall not be allowed any extra

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compensation for such action.

**4.0.21.11 Unfavorable Working Conditions**

The Contractor shall confine all his field operations to those works which can be performed without subjecting the equipment and materials to adverse effects during inclement weather conditions, like monsoon, storms, etc. and during other unfavorable construction conditions. No field activities shall be performed by the Contractor under conditions which might adversely affect the quality and efficiency thereof, unless special precautions or measures are taken by the Contractor in a proper and satisfactory manner in the performance of such Works and with the concurrence of the Employer. Such unfavorable construction conditions will in no way relieve the Contractor of his responsibility to perform the Works as per the schedule.

**4.0.21.12 Employment of Labour**

In addition to all local laws and regulations pertaining to the employment of labour to be complied with by the Contractor as mentioned elsewhere in the document, the Contractor will be expected to employ on the work only his regular skilled employees with experience of the particular work. No female labour shall be employed after darkness. No person below the age of eighteen years shall be employed.

The Contractor shall also comply with the Minimum Wages Act and the Payment of Wages Act (both of the Government of India) and the rules made there under in respect of its labour and the labour of its sub-contractors currently employed on or connected with the contract.

The contractor shall be solely responsible for discharge of all obligations relating to retirement /superannuation benefits to employees or any other benefit accruing to them in the nature of compensation, profit in lieu /in addition to salary etc. for the period of service with the contractor, irrespective continuance of employees with the project as employees of contractor after conclusion of O& M period.

All travelling expenses including provisions of all necessary transport to and from Site, lodging allowances and other payments to the Contractor’s employees shall be the sole responsibility of the Contractor.

**4.0.22 OPERATIONS AND MAINTENANCE (O&M)**

**4.0.22.1 Scope of Operation & Maintenance (O&M)**

**4.0.22.1.1 General**

Comprehensive O&M of the solar PV plant (s) for a period of **Five (05) years** from the COD is in the scope of the Contractor. The contractor shall be responsible for all the required activities for the successful Operation and Maintenance of the entire Solar PV plant during the O&M period. The contractor shall be responsible for arranging at his own cost all spare parts

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required for routine repair/replacement for keeping the Solar power plant operational, repairs /replacement of any defective equipment(s) at his own cost as required from time to time, scheduled and preventive maintenance, maintaining log sheets/records of operational details, deployment of competent staff for continuous operation and qualified engineers for supervision of O&M work so as to ensure trouble free operation & healthy condition of the entire system at the designed efficiency/ performance level for the entire period of O&M Contract. Unless otherwise specified in the contract(s),the Employer shall not pay any other amount except the agreed O&M charges.

**4.0.22.1.2 The scope of works shall include (but not limited to) the following: -**

- i. Ensuring successful operation of SPV Plant for achieving Declared Net Annual Guaranteed Generation (NAGGs) at Metering Point (STU end) on the annual basis.
- ii. Ensuring Breakdown maintenance, Periodic maintenance, Preventive maintenance, predictive maintenance, overhauls, arranging visit of O&M experts (when required) to maximize the availability of the solar plant.
- iii. Daily work of the operators involves logging the voltage, current, power factor, power and energy output of the SPV plant, temperature, logging down individual array output data once a day.
- iv. The operator shall record periodic energy output of each array and transformer /Inverter and reports shall be prepared on performance of SPV plant.
- v. Operation procedures such as preparation to start, routine operations with safety precautions, monitoring of Solar Power Plant etc. shall be carried out as per the manufacturer’s instructions to have trouble free operation ofthe complete system.
- vi. Contractor shall adhere to the terms & conditions as specified by the RECPDCL/HPSEBL/HIMURJA and subsequent clarifications or amendments issued from time to time.
- vii. Submission of periodical reports to the Employer on the energy generation& operating conditions of the SPV plant containing the plant performance data as finalised by the employer.
- viii. Ensuring Safety and protection of the plant by deputing sufficient security personals.
- ix. Monitoring, controlling, troubleshooting, maintaining of records, registers.
- x. Supply of all type of spares, consumables and fixing / application of the same as required. List and quantity to be submitted for which stock will be maintained during O & M period.
- xi. Cleaning of the plant including array yard on regular basis and as and when required.
- xii. General up keeping of all equipment, buildings, roads, other common facilities in the plant area.
- xiii. Cleaning of drains, cable trenches, box culverts etc.
- xiv. Module washing/Cleaning as per as per approved schedule (Preferably, modules cleaning cycle shall be 15 days) Record of washing/Cleaning

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- activities to be submitted periodically as per instruction of the employer.
- xv. Herbicide spray and grass cutting on a periodic basis.
- xvi. Module tilt angle changing/adjustment as per the schedule approved during detailed engineering/as per requirements.
- xvii. The contractor shall at his own expense provide all amenities to his workmen as per applicable laws and rules.
- xviii. The Contractor shall ensure that all safety measures are taken at the site to avoid accidents to his employees or his Contractor's employees.
- xix. The Contractor shall immediately report the accidents, if any, to the Engineer In charge & to all the concerned authorities as per prevailing laws of the state.
- xx. The Contractor shall comply with the provision of all relevant Acts of Central or State Governments including payment of Wages Act 1936, Minimum Wages Act 1948, Employer's Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maturity Benefit Act 1961, Employees State Insurance Act 1948, Contract Labour (Regulations & Abolishment) Act 1970 or any modification thereof or any other law relating thereto and rules made there under from time to time.
- xxi. In order to ensure longevity, safety of the core equipment and optimum performance of the system the contractor should use only genuine spares of high-quality standards.
- xxii. Deployment of Plant in Charge, adequate number of technical support staff and other supporting personnel during the O&M period.
- xxiii. **Energy estimation and scheduling:** The work regarding the Estimation, Scheduling & Forecasting on daily basis in form of day ahead schedule or applicable guidelines shall be in the scope of contractor without any additional cost to Employer during period of O & M Contract. Any financial losses on account of scheduling and forecasting shall be on the account of the contractor. Coordination with concerned Agencies (SLDC/RLDC etc.) for the above shall also be in the scope of the contractor.
- xxiv. Co-ordination with STU/CTU/SLDC/RLDC/ other statutory organizations as per the requirements on behalf on the Employer for JMR recording, furnishing Generation Schedules as per requirement, revising schedules as necessary and complying with grid requirement.
- xxv. To maintain compliance to the applicable Grid Code requirements and directions, if any, as specified by concerned SLDC/RLDC from time to time.
- xxvi. Contractor shall be responsible to carry out all test and work as required by statutory regulation in effect during O&M period.
- xxvii. aa. Contractor is required to maintain adequate O&M spare during the O&M contract period of the Solar PV plant with the view to maximize availability of the plant.
- xxviii. bb. At the time handing over of the plant by the contractor to the Employer, the contractor shall handover equipment in healthy condition.

#### 4.0.22.1.3 Operation and Performance Monitoring

Operation part consists of all activities including deputing necessary manpower required to operate the plant at the optimum capacity, including **Monitoring performance of each PCUs & Modules**

##### 1. Monitoring performance of each Distribution Transformer, Substation

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equipments & Metering Panels.

2. The plant would be operated at unity Power Factor.
3. Contractor shall have a proper compatible Bar code reader along with thermal image sensor at the site during the entire O&M period of the plant.

**4.0.22.1.4 The following points would be taken care of to ensure healthy operation of the plant:**

1. Regular cleaning of the module surfaces at every 15-day cycle.
- ii. Continuous monitoring through SCADA of plant performance and external grid conditions
- iii. Frequent checking and calibration of instruments;
- iv. Monitoring and maintaining performance, operations & maintenance records
- v. Coordinate with various agencies, departments for continuous operations, maximum generation and revenue realization
- vi. Comply with applicable rules, regulations, grid codes, and the specific guidelines for MW solar PV plants set under the MNRE and other schemes
- vii. The system shall include logging the voltage, current, power factor, Active and Reactive Power output of the plant, individual panels/ arrays output data once a day, etc. The system shall also record failures, interruption in supply and tripping of different relays, reason for such tripping, duration of interruption etc. and inform Employer of such interruptions with details on periodic basis. Necessary auto data recording instruments will be provided.
- viii. The system shall record daily and monthly energy output of each array. Monthly Performance reports indicating array wise energy production, down time, capacity utilization factor, etc. shall be prepared for the plant and furnished in soft mode to Employer in the first week of the following month along with the details of saleable energy as calculated/ arrived at by power utility and /or by contractor.

**4.0.22.1.5 Maintenance**

- i. The contractor shall ensure:
  - i. Establish robust preventive maintenance system to maximize up time and to ensure peak generation in peak periods
  - ii. Careful logging of operation data/historical information from the Data Monitoring Systems, and periodically processing it to determine abnormal or slowly deteriorating conditions.
  - iii. Walk down checks of the plant.
  - iv. Careful control and supervision of operating conditions
  - v. Regulate routine maintenance work such as keeping equipment clean, preventive maintenance and checks of delicate ingredients of transformers, circuit breakers, junction boxes, module mismatches, Cleanliness of isolators also to be ensured.
  - vi. Repairs and replacements to ensure maximum uptime for the plant.

**4.0.22.2 Handing over of the Plant**

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- a. At the end of the contract period, the contractor shall hand over the plant and equipment back to the Employer in completely safe and healthy condition and without any pending defect.
- b. The items supplied by the Employer on returnable basis, such as spares parts, consumables, tools and plants, documents etc. shall be returned back to the Employer, else, suitable recoveries shall be made from the Contractor's bills.
- c. The contractor shall hand over all technical documents, literature, instruction manuals, lists of spare part & tools & tackles. Contractor shall also hand over all the relevant record/documents, spares and consumable required for **two year's Operation & Maintenance**.
- d. After O&M period, Employer may at its discretion decide to extend the existing O&M contract on mutually acceptable terms & conditions or undertake the O&M of the SPV Plant on its own.

#### 4.0.23 List of Mandatory Spares

S. No.	Equipment/Material	Quantity (for each type and rating)
1.	PV Modules	0.1% of Total supply
2.	MC4 connectors (including Y-connector if used)	1% of total supply
3.	String Monitoring Unit (SMU)	1% of total supply
4.	Power Conditioning Unit (PCU)	
	(i) Central Inverter	As per OEM recommendation
5.	Inverter Transformer	
	(i) HV bushing with metal parts and gaskets	2 set
	(ii) LV bushing with metal parts and gaskets	2 set
	(iii) WTI with contacts	2 set
	(iv) OTI with contacts	2 set
	(v) Buchholz relay	2 set
	(vi) Magnetic Oil Gauge	2 set
	(vii) Complete set of gaskets 2 set	2 set
6.	HT Switchgear	
	(i) Vacuum pole	2 Nos.
	(ii) Closing coil	2 Nos.
	(iii) Tripping coil	2 Nos.
	(iv) Spring charging motor	2 Nos.

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	(v) Relay	2 Nos.
	(vi) Meter	2 Nos.
	(vii) Current Transformer	2 Nos.
	(viii) MCCB	2 Nos.
	(ix) MCB	2 Nos.
	(x) Fuse	10% of total supply
	(xi) Indicating lamp	10% of total supply
	(xii) Rotary switch	10% of total supply
7.	LT Switchgear	
	(i) MCCB	2 Nos.
	(ii) MCB	2 Nos.
	(iii) Fuse	10% of total supply
	(iv) Relay	2 Nos.F
	(v) Meter	2 Nos.
	(vi) Current Transformer	2 Nos.
	(vii) Voltage Transformer	2 Nos.
	(viii) Indicating lamp	10% of total supply
	(ix) Rotary switch	10% of total supply
8.	Solar Cable	1% of total supply
9.	DC Cable	1% of total supply
10.	AC Cable	1% of total supply
11.	Communication Cable	1% of total supply
12.	Fuse	10% of total supply
13.	Set of Valves for Power transformer	1 Set
14.	WTI with contacts of Power transformer	1 Nos.
15.	OTI with contacts of Power transformer	1 Nos.
16.	Buchholz relay complete of Power transformer	1 Nos.
17.	Pressure Relief Device of Power Transformer	1 Nos.
18.	Magnetic Oil Gauge (MOG) of Power Transformer	1 Nos.
19.	HV and LV Bushing with metal parts and gaskets of Power Transformer (each type)	1 Nos.
20.	33 kV outdoor Current Transformer	1 no. Of each rating
21.	33 kV Outdoor Potential Transformer	1 no. Of each type

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22.	33 kV Outdoor Surge Arrestor	1 nos.
23.	33 kV Isolator (one pole)	1 nos.
24.	Switchyard Spares	
25.	Current Transformer (Protection)	1 no of each rating
26.	Current Transformer (Metering)	1 nos.
27.	CVT (For Protection)	1 nos.
28.	Voltage Transformer (Metering)	1 nos.
29.	Outdoor Surge Arrestor	1 nos.
30	Isolator (one pole)	1 no of each rating
31	Circuit Breaker (one pole)	1 no of each rating
32	Swyd Control& Protection-Numerical protection Relay	1 no of each type
33	Swyd Control& Protection-Auxilliary Relay	1 no of each type
34	Swyd Control& Protection-Bay Control Unit (BCU)	1 no of each type
35	Wave trap	1 nos.
36	Transformer Oil	10% of oil used in all Transformers

**Remarks:**

- a. Components mentioned in mandatory spares list, which are not applicable as per plant design consideration shall not be applicable.
- b. All the mandatory spares may be kept at site with record for use by the Contractor during O&M. Spares, if used, during O&M period shall be replenished by Contractor. All the mandatory spares shall be handed over to Employer in working condition at the end of O&M Period.
- c. Contractor shall furnish the recommended spare list as part of design/drawing approval stage.

**4.0.24 Engineering Information Schedule**

4.0.24.1 The Contractor shall submit to the Employer necessary documents, drawings, data, Design and Engineering Information in 3 (three) Hard & Soft copies from time to time as per the Engineering Information Schedule.

4.0.24.2 The list of documents to be submitted by the contractor before the signing of Contract Agreement shall include (but not limited to) the following:-

Sr. No.	Documents to be submitted
1)	Detailed Schedule for various activities including Supply, Erection and Civil Works in the form of PERT Chart for the entire project indicating Start Date and End Date for each activity

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<b>2)</b>	Solar Resource Assessment Report containing Solar Insolation data, Generation data etc. using latest software (METEONORM, Solar GIS, PVSYST etc.)
<b>3)</b>	List of Sub Vendors for all Bill of Material items supplied under this Contract
<b>4)</b>	Contract Performance Guarantee (CPG)

4.0.24.3 List of the Drawings, GA Drawings and other technical documents to be submitted by the Contractor.

The Contractor shall submit all drawings, GA Drawings, technical documents & other documents. (Indicative List i. of MDL & QAP's is attached for reference. However, the same shall be finalized based on the technical and functional requirement as per the TS within 30 days from date of LOA) for the satisfactory completion of the project to RECPDCL.

**1) Documents to be submitted at the end of every year (O&M Period)**

- i. Inventory of spares at project site
- ii. As-Built Drawings – Where ever corrections involved
- iii. Operation log book
- iv. List and description of major maintenance works done on equipment

On completion of complete Operation and Maintenance period, the contractor has to submit Completion Report highlighting all major miles stone events, Spares list with part number, do's and don'ts, special instructions, lessons learnt, etc.

The above list is indicative only and will be finalized in consultation with RECPDCL. It shall be the responsibility of the contractor to furnish all requisite engineering information in respect of all equipment/systems/spares as required for the successful execution of the contract. The contractor shall be obligated to furnish to the Employer, any other specific information as requested by the Employer

**All the documents/drawings shall be submitted in PDF as well as editable format like AutoCAD, Excel, Word etc. as per the requirement of RECPDCL.**

**2) Documents to be submitted before the COD**

As per the requirements of RFS document, Contractor has to submit the following documents (duly signed and stamped by authorized signatory) well in advance prior to the scheduled commissioning date to RECPDCL. These documents then will be uploaded to IMPLEMENTING AGENCY-CRM Portal. It is the responsibility of the Contractor to upload these documents on the IMPLEMENTING AGENCY's-CRM portal.

\*\*\*\*\*END OF SECTION\*\*\*\*\*

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## Master Document List (MDL)

Sr. No.	Description of documents
1.	Soil Test Report including ERT, CBR report
2.	Topographical Survey report
3.	Pile load test report
4.	Roads and pathways - layout and cross-section
5.	Plant drainage system - layout and design
6.	Boundary Fence drawing with foundation
7.	Main Gate GA and layout
8.	Fencing & Gate GA and layout for Inverter station
9.	Security room GA, layout and foundation
10.	MCR architecture layout
11.	MCR Plinth Beam, Lintel/Tie Beam and Roof General Arrangement and Reinforcement Details
12.	MCR - Plumbing Network and Sanitary Details
13.	MCR cable trench details
14.	MCR Design with STAAD
15.	MCR foundation
16.	SCB foundation drawing
17.	Inverter station Platform Drawing
18.	Inverter station foundation
19.	Inverter transformer foundation-design and drawing
20.	Design Basis -Civil & Structural Works
21.	CCTV foundation drawing and design
22.	WMS foundation drawing and design
23.	LA foundation drawing and design
24.	NIFPS foundation drawing and design
25.	MMS Foundation design and drawing
26.	MMS Design calculation with STAAD
27.	MMS General Arrangement
28.	MMS Fabrication drawing
29.	Module Cleaning system- GA and Data sheet, Design
30.	SLD- Single line diagram DC
31.	SLD- Single line diagram AC
32.	SLD -Auxiliary Power supply system
33.	MCR Equipment layout
34.	ICR Equipment layout

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35.	Plot Plan (Array Layout)
36.	PV array Grouping Layout
37.	AC cable routing and section details
38.	DC cable routing and section details
39.	OFC cable routing and section details
40.	Earthing calculation
41.	DC and AC earthing layout
42.	Lightning protection -layout, GA
43.	Plant Lighting layout and illumination - calculations
44.	CCTV Layout and GA
45.	MCR and Inverter station Light layout
46.	MCR FDA layout
47.	Detailed array layout with coordinates
48.	PV Syst report
49.	PG Test Procedure
50.	DC cable schedule
51.	AC Cable Schedule
52.	Control /Comm/ Aux Cable Schedule
53.	Auxiliary transformer, UPS, Battery and Battery Charger-Sizing calculation
54.	DC, HT and LT Cable Sizing
55.	PV Module Data Sheet and Type Test Reports
56.	Inverter data sheet and Inverter Type Test Report
57.	Inverter transformer GA, data sheet and type test report
58.	AUX Transformer GA, data sheet, Type test report and foundation
59.	HT switchgear GA and data sheet & Scheme (ICOG)
60.	HT switchgear GA and data sheet & Scheme (Pooling panel MCR)
61.	LT switchgear GA and data sheet and Type test reports
62.	SCB GA, Data sheet and type test report
63.	String Cable data sheet and Type test
64.	DC Cable data sheet and Type test
65.	AC Cable data sheet and Type test (Inverter to IDT)
66.	HT Cable data sheet and type test report
67.	LT /Aux Cable data sheet and type test report
68.	Control cables data sheet
69.	33 kV cable jointing & termination kit- GA & Data sheet
70.	UPS, -GA & Data sheet & Type Test Report
71.	Battery and Battery Charger-GA & Data sheet & Type Test

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72.	Weather Monitoring Station- GA & Datasheet
73.	Fire Detection and protection system- GA & Datasheet
74.	Lightning protection data sheet, GA and type test
75.	Earthing data sheet, GA
76.	CCTV data sheet, GA
77.	SCADA Architecture including BoM
78.	SCADA FAT report
79.	SCADA input & output list
80.	SCADA- Mimics and HMI screen
81.	Communication cable data sheet - OFC
82.	Communication cable data sheet - RS 485
83.	Communication cable data sheet - CAT 6
<b>Switchyard Systems (As applicable)</b>	
84.	Power Transformer - OGA ,GTP , Rating Plate, BOQ, Foundation Plan, Bushing, Cable BoX and Accessories
85.	Power Transformer-NITROGEN FIRE PROTECTION SYSTEM DRAWINGS
86.	kV Circuit Breaker - Drawings & Data sheet
87.	kV Instrument Transformers - Drawings & Data sheet
88.	kV ISOLATOR - Drawings & Data sheet
89.	kV LA - Drawings & Data sheet
90.	GA , Bom & Schematics Of Control and Relay Panel - kV Line & Transformer
91.	Switchyard Bus Gantry and Tower Design and Drawings
92.	Steel Structure drawings and calculations for all equipment's
93.	kV Switchyard Layout Plan & Section
94.	kV Switchyard - Short Circuit Force & Cantilever Strength Calculation - Equipment Bus.
95.	kV Earthing Design Calculation & Layout for Switchyard.
96.	kV DSLP Calculation & Layout - Overall
97.	EKD - Plan, Section & BOM
98.	POST INSULATOR - Drawings & Data sheet
99.	Control & Power Cable Schedule
100.	Earth mat Layout - Switchyard
101.	Relay Setting Calculation - Overall Plant
102.	kV Circuit Breaker Type Test Repots
103.	kV Instrument Transformers - Type Test Repots
104.	kV ISOLATOR - Type Test Repots
105.	LA -Type Test Repots
106.	ACSR conductors Drawing & Data Sheet & Type Test Reports

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107.	GI Shield wire - Drawing & Data Sheet & Type Test Report
108.	Control & Protection Panel - Relays - Type Test Reports
<b>MQP and FQP for PV yard and Sub-station</b>	
109.	FQAP for Civil Works
110.	MQAP for PV Module
111.	MQAP for Power Conditioning Unit (PCU)
112.	MQAP for Inverter Transformer
113.	MQAP for Power Transformer
114.	MQAP for HT Switchgear Panel
115.	MQAP for HT Power Cables
116.	MQAP for SCADA System
117.	MQAP for Control & Relay Panels
118.	MQAP for AB Tariff Meters
119.	MQAP for Auxiliary Transformers
120.	MQAP for LT Power Cables
121.	MQAP for MMS (Module Mounting Structure)
122.	MQAP for LT Panels
123.	MQAP for Solar DC Cables
124.	MQAP for Switchyard System ( Not applicable)
125.	MQAP for String Combiner Box
126.	MQAP for DC Cable Connector
127.	MQAP for Weather Monitoring System
128.	FQAP for Electro-Mechanical Items

**Note:** 1. The above Master Document List (MDL) is indicative only and it will be finalized mutually with successful bidder after award of works.

2. Any other items mentioned in Technical Specification and not specified above shall also be made part of the Master Document List and the above list shall be updated accordingly.

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# SECTION- VIII

## Schedule of Rates (SOR)

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1. Bidders are required to quote for the Total Contract Price on Lumpsum basis in cognizance with the Tender Terms & Conditions.
2. Bidder's quoted prices shall be strictly as per various Formats included under this Section [i.e. Section-VIII, Schedule of Rates (SOR)]. Bidder shall quote Lumpsum (LS) Price for the entire scope of work including Design, Engineering, Manufacture, Supply, Storage, Civil Work, Erection, Testing & Commissioning as per the Technical Specifications (TS) as defined under Section-VII. (Bidder is free to analyse and increase DC Capacity for optimum Power generation)
3. All the Columns of quoted items in the Schedule of Rates including currency must be filled with required information, as applicable.
4. Bidder must quote the price in enclosed SOR formats only. The formats shall not be changed and/ or retyped.
5. Bidder to note that breakup of Lumpsum price is to be provided for assessment of Evaluated Bid Value (EBV), however total price payable under the Contract shall be restricted to the Lumpsum Price/ Contract Price only.
6. The Lumpsum Price shall be considered as Total Contract Price Which Owner agrees to pay and the Contractor agrees to accept as full compensation for the Contractor's full performance of the Work in accordance with the provisions of the Contract Documents. Contract Price shall not be subjected to any adjustment except in case of Change Order or Statutory Variations in accordance with the provisions of the Contract.
7. The price quoted shall be Lumpsum price on Turnkey basis. Unless the basic parameter changes or additional/ extra requirements are made, total payments to be made to the contractor shall be limited to Lumpsum price indicated, irrespective of the progressive payments made during execution based on the split up of price.
8. Obligation of the Contractor is not limited to the quantities that the Contractor may either indicate in the Schedule of Breakup of Lumpsum Prices along with his bid or in further detailed break of Lumpsum prices furnished along with the bid or after award of work. Contractor shall carry entire scope of work/ supplies as detailed in various sections/ volumes of the Tender Document within the quoted Lumpsum Price (Contract Price).
9. Lumpsum Prices quoted by the Bidder shall include cost of any other supplies/ work(s) not specifically mentioned in the Bidding Document but necessary for the efficient, trouble free commissioning & operation of the Plant and to make this package job complete. Quoted price is FIRM and fixed till complete execution of the entire order. Also, variation on account of Foreign Exchange rate is not to be payable extra.
10. Spares for start-up/ commissioning and mandatory spares required are in Contractor's Scope and deemed included in the quoted Lumpsum Prices.
11. Bidder shall furnish following Forms (enclosed separately) of Schedule of Rates: -

Schedule No. 1: Ex Works basis Supply of Plant and Mandatory Spare Parts .

Schedule No. 2: Freight, Design, Civil & Installation and Other Services

Schedule No. 3: Net Present Value (NPV) of O&M Price for the total O&M period for the plant facilities to be calculated at a given discounting rate

Schedule No. 4: Net Present Value (NPV) of Land charges on Lease rental

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Schedule No. 5: Grand Summary of Schedule Nos.1 to 4

12. INR = Indian Rupees

13. Bidder confirms that he has noted the contents of the Preamble to the Schedule of Rates, Schedule of Rate, Bid Document and quoted his Prices accordingly without any deviation.

14. O & M Charges on YoY basis must be equal or in ascending order only.

=====X=====

Composite EPC for setting up of Grid Connected 1MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity	<u>Tender No.</u> RECPDCL/RE/Solar/1MW/01 dated 09-Dec-2024	SOR Page 3 of 3	<u>Signature of Bidder</u>
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Name of Bidder							
<b>Schedule No. 1. Plant and Mandatory Spare Parts</b>							
<b>Composite EPC for setting up of Grid Connected 1 MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity</b>							
Item	Description	Qty (Ls)	Unit EX Works (EXW) Price	Total EX Works (EXW) Price	Goods & Service Tax (GST) in absolute figures	% (Percentage) of Goods & Service Tax (GST) considered	Total Ex Works (EXW) Price with GST
1	2	3	4	5=3*4	6	7	8=5+6
<b>A - SUPPLY</b>							
1	Supply of Solar Panels as specified in Tender Documents	1					0.00
2	Supply of Inverters as specified in the Tender Documents	1					0.00
3	Supply of Inverter Transformer as specified in the Tender Documents	1					0.00
4	Supply of Panels & Switchgears as specified in the Tender Documents	1					0.00
5	Supply of Module Mounting Structure as specified in the Tender Documents	1					0.00
6	Mandatory Spares	1					0.00
7	Cables (All DC, LT & HT)	1					0.00
8	Weather Monitoring Station	1					0.00
9	Manufacture & Supply of Balance of System including all Equipments, Materials, Spares, Accessories, Safety & Fire Fighting System etc. excluding in above Solar Part supply and any other Supplies specified in the Tender Documents	1					0.00
<b>Sub Total - A</b>							<b>0.00</b>
<b>Grand Total A</b>							<b>0.00</b>
<b>General instructions to fill the Price Schedules</b>							
1	The payment of GST by the Employer shall only be at the CEILING of GST as mentioned by the Bidder in the Schedule No 1 at the time of bidding. Bidders are required to quote the applicable GST with due diligence & appropriate financial prudence, as afterwards bidders will not be able to change or claim the GST charges already quoted during the bid.						
2	Bidders are required to fill the relevant portion/Parts/Line items/scope of the respective Price Schedules only. In case, any line item is left blank by the bidder, it will be deemed assumed by the Employer that such portion/Parts/line item/Scope has been considered by the bidder suitably somewhere else in the Price schedules.						
3	In case the bidder don't want to mention any quantity/price in any particular line item, then he has to put zero (0) against that particular line item.						

Name of Bidder							
Schedule No. 2. Freight, Design, Civil & Installation and Other Services							
Composite EPC for setting up of Grid Connected 1 MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity							
Sl. No.	Description of Item	Quantity (Ls)	Price		Goods & Service Tax (GST) in absolute figures	% (Percentage) of Goods & Service Tax (GST) considered	Total Price including GST
			Unit Charges (INR)	Total Charges (INR)			
1	2	3	4	5=3*4	6	7	8 = 5+6
<b>A - INSTALLATION &amp; OTHER SERVICES</b>							
1	Freight & Insurance including Loading, Unloading, Storage, Handling at Site	1		0			0.00
2	Design, Engineering, Installation, Erection, Testing and Commissioning including Performance Testing in respect of all the Equipments Supplied and any other Services Specified in the Tender Documents	1		0			0.00
3	Civil and allied works including construction of Trenches, Module Mounting Structure, foundations, ( Solar park items like road, water infrastructure, buildings fencing, street light foundation, other civil works) ,etc., of all the Equipments Supplied.	1		0			0.00
<b>Sub Total - A</b>							0.00
<b>Grand Total A (Freight, Design, Civil &amp; Installation and Other Services)</b>							0.00

General instructions to fill the Price Schedules	
1	The payment of GST/Taxation by the Employer shall only be at the CEILING of GST/Taxation as mentioned by the Bidder in the Schedule No 2 at the time of bidding. Bidders are required to quote the applicable GST/Taxation with due diligence & appropriate financial prudence, as afterwards bidders will not be able to change or claim the GST charges already quoted during the bid.
2	Bidders are required to fill the relevant portion/Parts/Line items/scope of the respective Price Schedules only. In case, any line item is left blank by the bidder, it will be deemed assumed by the Employer that such portion/Parts/line item/Scope has been considered by the bidder suitably somewhere else in the Price schedules..
3	In case the bidder don't want to mention any quantity/price in any particular line item, then he has to mandatorily put zero (0) against that particular line item.

Name of Bidder							
Schedule No. 3. Operation & Maintenance							
Composite EPC for setting up of Grid Connected 1 MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity							
Sl. No.	Description of Item	Year	PRICES (INR)				
			Yearly O&M Price (Excluding GST)	Total value of Applicable GST (in figures)	Yearly O&M Price including GST	Present Value Factor (PVF)	NPV of O&M Price
1	2	3	4	5	6=4+5	10%	7 = 6* PVF
OPERATION & MAINTENANCE - 200 MW (AC) Solar Power plant at Jhansi							
1	Operation and Maintenance of the Solar PV Project including solar park for <b>FIRST YEAR</b>	1			INR 0.00	0.909	INR 0.00
2	Operation and Maintenance of the Solar PV Project including solar park for <b>SECOND YEAR</b>	2			INR 0.00	0.826	INR 0.00
3	Operation and Maintenance of the Solar PV Project including solar park for <b>THIRD YEAR</b>	3			INR 0.00	0.751	INR 0.00
4	Operation and Maintenance of the Solar PV Project including solar park for <b>FOURTH YEAR</b>	4			INR 0.00	0.683	INR 0.00
5	Operation and Maintenance of the Solar PV Project including solar park for <b>FIFTH YEAR</b>	5			INR 0.00	0.621	INR 0.00
	<b>NPV OF O&amp;M FOR 5 YEARS (1+2+3+4+5) - For 200 MW (AC) tender at Jhansi, Uttar Pradesh</b>			INR 0.00	INR 0.00		INR 0.00

General instructions to fill the Price Schedules	
1	The payment of GST/Taxation by the Employer shall only be at the CEILING of GST/Taxation as mentioned by the Bidder in the Schedule No 3 at the time of bidding. Bidders are required to quote the applicable GST/Taxation with due diligence & appropriate financial prudence, as afterwards bidders will not be able to change or claim the GST charges already quoted during the bid.
2	Bidders are required to fill the relevant portion/Parts/Line items/scope of the respective Price Schedules only. In case, any line item is left blank by the bidder, it will be deemed assumed by the Employer that such portion/Parts/line item/Scope has been considered by the bidder suitably somewhere else in the Price schedules..
3	In case the bidder don't want to mention any quantity/price in any particular line item, then he has to mandatorily put zero (0) against that particular line item.
4	Bidders are required to mention the GST amount ( Column I) on the actual O&M cost of the yearly basis & not on the NPV of O&M cost.
5	O & M Charges on YoY basis must be in equal or in ascending order only.

Schedule No. 4. Lease rates of Land							
Composite EPC for setting up of Grid Connected 1 MW Ground Mounted Solar PV plant with arrangement of Land and ISTS Connectivity							
Sl. No.	Description of Item	Year	PRICES (INR)				
			Yearly Lease Price (Excluding GST)	Total value of Applicable GST (in figures)	Yearly Lease Price including GST	Present Value Factor (PVF)	NPV of Lease Price
1	2	3	4	5	6=4+5	10%	7 = 6* PVF
1	Lease of approx. 5 Acres Land for FIRST YEAR	1			INR 0.00	0.909	INR 0.00
2		2			INR 0.00	0.826	INR 0.00
3		3			INR 0.00	0.751	INR 0.00
4		4			INR 0.00	0.683	INR 0.00
5		5			INR 0.00	0.621	INR 0.00
6		6			INR 0.00	0.564	INR 0.00
7		7			INR 0.00	0.513	INR 0.00
8		8			INR 0.00	0.467	INR 0.00
9		9			INR 0.00	0.424	INR 0.00
10		10			INR 0.00	0.386	INR 0.00
11		11			INR 0.00	0.350	INR 0.00
12		12			INR 0.00	0.319	INR 0.00
13		13			INR 0.00	0.290	INR 0.00
14		14			INR 0.00	0.263	INR 0.00
15		15			INR 0.00	0.239	INR 0.00
16		16			INR 0.00	0.218	INR 0.00
17		17			INR 0.00	0.198	INR 0.00
18		18			INR 0.00	0.180	INR 0.00
19		19			INR 0.00	0.164	INR 0.00
20		20			INR 0.00	0.149	INR 0.00
21		21			INR 0.00	0.135	INR 0.00
22		22			INR 0.00	0.123	INR 0.00
23		23			INR 0.00	0.112	INR 0.00
24		24			INR 0.00	0.102	INR 0.00
25		25			INR 0.00	0.092	INR 0.00
26		26			INR 0.00	0.084	INR 0.00
27		27			INR 0.00	0.076	INR 0.00
28		28			INR 0.00	0.069	INR 0.00
29		29			INR 0.00	0.063	INR 0.00
30	Lease of approx. 5 Acres Land for 29th year 11 months	30			INR 0.00	0.057	INR 0.00
	<b>NPV of Lease charges</b>		<b>INR 0.00</b>		<b>INR 0.00</b>		<b>INR 0.00</b>

General instructions to fill the Price Schedules	
1	The payment of GST/Taxation by the Employer shall only be at the CEILING of GST/Taxation as mentioned by the Bidder in the Schedule No 3 at the time of bidding. Bidders are required to quote the applicable GST/Taxation with due diligence & appropriate financial prudence, as afterwards bidders will not be able to change or claim the GST charges already quoted during the bid.
2	Bidders are required to fill the relevant portion/Parts/Line items/scope of the respective Price Schedules only. In case, any line item is left blank by the bidder, it will be deemed assumed by the Employer that such portion/Parts/line item/Scope has been considered by the bidder suitably somewhere else in the Price schedules..
3	In case the bidder don't want to mention any quantity/price in any particular line item, then he has to mandatorily put zero (0) against that particular line item.
4	Bidders are required to mention the GST amount ( Column I) on the actual Lease cost of the yearly basis & not on the NPV of Lease cost.
5	Lease rates Charges on YoY basis must be in equal or in ascending order only.

Name of Bidder :		
<b>Composite EPC for setting up of Grid Connected 1 MWAC Ground Mounted Solar PV plant with arrangement of Land and STU Connectivity</b>		
<b>SCHEDULE NO 5 /SCHEDULE OF RATES [SOR-5] - GRAND TOTAL SUMMARY</b>		
1	Total Price of Schedule No 1/SOR 1 (Rs. )	0.00
2	Total Price of Schedule No 2/SOR 2(Rs. )	0.00
3	Total Price of Schedule No 3/SOR 3(Rs. )	0.00
4	Total Price of Schedule No 4/SOR 4(Rs. )	0.00
5	Total Cumulative DC capacity of PV Modules considered by Bidder (kWp)	
6	Guaranteed First year Generation in kWhr.	
7	Evaluated Bid Value (SOR 1+SOR 2+SOR 3+SOR4)/Guaranteed Generation in kWhr.	#REF!