KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

(Corporate Identity Number (CIN): U75112KA1996SGC020020)

Tender Inviting Authority	:	KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED (KREDL)
Procurement Entity	:	KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED (KREDL)
Address	:	Assistant General Manager, Solar Grid Section KREDL, Head Office Bangalore #6/13/1, 10th Block, 2nd Stage Nagarabhavi, Bangalore-560072
Telephone No's	:	9986111464 and 9901808861 [between 10:00 hrs to 17:30 hrs on working days]
Email ID	:	agm.sgkredl@gmail.com

TENDER FOR SELECTION OF EPC CONTRACTOR FOR "DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR PROPOSED 300 KW HYDROGEN PLANT".

Tender Reference /Bid Enquiry No.	:	**KREDL/SG/F-1992/2025 dated 18/08/2025**
Availability of Tender Documents In e-procurement Portal	:	18/08/2025
Estimated value of the work (Amount Put to Tender-AMPT)	:	Rs.5.53 Cr (Excluding GST)
EMD/Bid security	:	Rs. 8.30 Lakhs (in the form of e-payment mode)
Validity of Tender	:	180 Days from the Date of original bid due date
Completion Period	:	**Twelve (12) Months** from the date of NTP
Pre –Tender Meeting Venue: Last date and Time for seeking clarifications Last Date and Time for submission of Tenders	: : : :	20/08/2025- 15:00 hrs KREDL, Head Office Bangalore #6/13/1, 10th Block, 2nd Stage Nagarabhavi, Bangalore-560072. 20/08/2025 - 17:30 hrs 28/08/2025 - 17:00 hrs
Time and Date of opening of Techno Commercial Bids	:	29/08/2025 – 17:05 hrs
Online Opening of Techno Commercial Bids in Karnataka Public Procurement Portal.	:	KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED KREDL, Head Office Bangalore #6/13/1, 10th Block, 2nd Stage Nagarabhavi, Bangalore-560072.
Online Opening of Price (Financial) Bids in Karnataka Public Procurement Portal	:	After Completion of Techno Commercial Evaluation
Address For Communication	:	Assistant General Manager, Solar Grid section KREDL, Head Office Bangalore #6/13/1, 10th Block, 2nd Stage Nagarabhavi, Bangalore-560072. Mob: 9986111464 and 9901808861 [between 10:00 hrs to 17:30 hrs on working days] Email: agm.sgkredl@gmail.com

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

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SECTION 1

INVITATION FOR TENDERS (IFT)

SECTION 1

INVITATION FOR TENDERS (IFT)

1. The **KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED (KREDL), Head Office Bangalore #6/13/1, 10th Block, 2nd Stage Nagarabhavi, Bangalore-560072, the Tender Inviting Authority** invites tenders from eligible tenderers, for the **"DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT"** detailed in the Table below. The tenderers shall submit tenders for the works given in the Table. ***Two cover Electronic Tender Document System*** as per Rule 28 of the KTPP Act shall be followed.

   The Tenderers are required to submit the Tender in Two Parts (1) Techno -Commercial containing the Earnest money deposit and the details of their capability to undertake the tender (as detailed in ITT Clause 2 and 3), which will be opened first and (2) Financial Bid containing the price tender which will be opened only if the Tenderer is found to be qualified to execute the tendered works both on Electronic Mode. **Manual bids will not be accepted.**

   The Tenderers are advised to note the minimum qualification criteria specified in Clause No.2 &3 of the Instructions to Tenderers to qualify for award of the contract.

2. The Bids are invited and to be submitted through e-Procurement Platform only. The Bid Notification, Bidding Documents along with Drawings are available on website https://kppp.karnataka.gov.in. Tender Documents along with drawings and bidding formats are available 'Free of Cost' to bidders. Bidders need to pay Tender Processing Fee and Earnest Money Deposit through any of the 4 modes of e-Payment as mentioned in Clause No.13 of ITT. Bids not accompanied with requisite Tender Processing Fee and Bid security are liable for rejection.

3. Tenders must be accompanied by Earnest Money Deposit specified for the work in the Table below. Earnest Money Deposit will have to be in any one of the forms as specified in the Tender document and shall have to be valid for **45 days** beyond the validity of the tender.

4. Tenders must be electronically submitted Online in e-procurement portal on or before the date and time as mentioned in the e-Procurement platform & Techno - Commercial Bids will be opened on the date and time mentioned in the tender document/e-procurement portal in the presence of the Tenderers who wish to attend. If the office happens to be closed on the date of receipt of the tenders as specified, the tenders will be received and opened on the next working day at the same time and venue.

5. A Pre-tender meeting will be held on date and time mentioned in the tender document/e-procurement portal at the office of the KREDL, Head Office Bangalore #6/13/1, 10th Block, 2nd Stage Nagarabhavi, Bangalore-560072 to clarify the issues if any, and to answer questions on any matter that may be raised at that stage as stated in Clause No. 8.2 of 'Instructions to Tenderers' of the tender document.

6. Other details can be seen in the tender documents:

Package No.	Name of work	Amount Put To Tender	Earnest Money Deposit	Tender Processing Fee	Period of completion
1	2	3	4	5	6
Bid Enquiry No. KREDL/SG/F-1992/2025 dated 18.08.2025	Selection of solar power EPC contractor through competitive bidding process for: SELECTION OF "EPC CONTRACTOR FOR "DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT".	Rs.5.53 Crores (Excluding GST)	Rs.8.3 Lakhs. (Rs.8.3 Lakhs though e-payment in KPP portal)	As specified in Karnataka Public Procurement Portal.	12 Months from the date notice to proceed

7. The interested eligible Bidders may obtain further information from the Office of the KREDL, Head Office Bangalore #6/13/1, 10th Block, 2nd Stage Nagarabhavi, Bangalore-560072

   Tel: 9448955911 [between 10:00 hrs to 17:30 hrs on working days]

   e-mail: agm.sgkredl@gmail.com

Assistant General Manager

Solar Grid section

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 2: INSTRUCTIONS TO TENDERERS (ITT)

TABLE OF CLAUSES

A. General

1.0 Scope of Tender:

1.1.1 Background

Karnataka Renewable Energy Development Limited ("KREDL") incorporated under the Companies Act, 1956 is a nodal agency of the Government of Karnataka("GoK") to facilitate the development of renewable energy in Karnataka. KREDL processes all applications received for setting up of renewable energy generating plants and based on their recommendation, GoK approvals and grants rights to such independent power producers to set up their generation plants in Karnataka. Subsequently, KREDL also monitors progress of various renewable energy projects in Karnataka.

GoK intends to undertake the work of "**1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT FOR THE PROPOSED 300 KW HYDROGEN PLANT"** through KREDL, has decided to carry out the bidding process for selection of the EPC Bidders to whom the Project may be awarded. **300 KW Hydrogen plant tender will be published separately in KPPP Portal.**

Bidders are allowed to Bid for the Project based on the Eligibility Criteria stipulated in this RFP.

The EPC contractor (hereinafter referred to as "Contractor") shall be responsible for Development of ""DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT"

1.1.2. Capacity of the Project

A Bidder must submit Bids for ""EPC CONTRACTOR FOR "DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT", subjected to approval from the concerned appropriate authority for setting up the Project.

The Bidder who quotes the lowest price ("L1") will be selected, subject to technical criteria and financial capacity.

1.1.3. Connectivity with the Grid

The contractor shall be responsible for power evacuation from the solar power plant to the identified KPCL Thermal station existing 11 KV Feeder within 1 km from the identified land parcel where ICOG panel will be placed for interconnection.

It is pertinent to mention that the metering shall be done at the KPCL Interconnection point for performance and guaranteed generation calculation.

The Contractor shall carry out maintenance of the facilities till the KPCL Delivery Point during the O&M

Period. However, any applicable charges shall be paid by the Contractor till end of the project.

1.1.4. The Scope of Work will broadly include development of "DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT"

1.1.4. The Bidding Documents include this RFP.

1.1.5. The RFP sets forth the detailed terms and conditions including the scope of the Contractor's services and obligations

1.1.6. The statements and explanations contained in this RFP are intended to provide a proper understanding to the Bidders about the subject matter of this RFP and should not be construed or interpreted as limiting in any way or manner the scope of services and obligations of the Contractor set forth in KREDL's right to amend, alter, change, supplement or clarify the scope of work, the Right to be awarded pursuant to this RFP or the terms thereof or herein contained. Consequently, any omissions, conflicts or contradictions in the Bidding Documents including this Request for Proposal ("RFP") shall be noted, interpreted and applied appropriately to give effect to this intent, and no claims on that account shall be entertained by KREDL.

1.1.7. KREDL shall receive Bids in accordance with the terms set forth in this RFP and other documents to be provided by KREDL pursuant to this RFP (collectively the "Bidding Documents"), as modified, altered, amended and clarified from time to time by KREDL, and all Bids shall be prepared and submitted in accordance with such terms.

1.1.8. The Project would be awarded to the Bidder subjected to the Eligibility Criteria of this RFP. For the purpose of identifying the Bidder to implement the Project, the Bids submitted by each Bidder would be evaluated on the basis of the evaluation criteria set out in Section Tender Opening and Evaluation of this RFP.

The salient features of the Scope of work covered under this package shall include, but not limited to, the following:

i. Scope of Supply & Work includes all Survey, design, fabrication, supply of equipment and materials, testing at manufacturers works, multi – level inspections, packing and forwarding, loading, 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 a **"DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT**". 300 KW Hydrogen plant tender will be published separately in KPPP Portal.
ii. Design, engineering, procurement, supply, insurance, packing, forwarding, loading, transportation, unloading, storage, construction, installation, erection, testing, commissioning and operational acceptance of the Facilities having all Plant and Equipment and their Installation Services along with

its associated auxiliaries including all solar photovoltaic modules, inverters, module mounting structures, string combiner boxes, inverter transformers, HT panels, metering infrastructure, auxiliary transformer, lightening arrestor etc., AC components, DC components, tools/ tackles and all the other assets, structures, machinery, facilities and related assets thereof.

iii. Supply of components with respect to termination of 11 KV ICOG to KPCL HT panel through HT cable (Tentative SLD & scheme drawing provided).
iv. Site-grading, cutting, filling, levelling, compacting, clearing of vegetation etc.
v. Design and construction of foundation and module mounting structures for placing solar photovoltaic modules.
vi. Providing power supply and water supply during construction period (EPC bidder has to arrange the power & water at his own cost. KPCL may provide power and water on chargeable basis based on availability. In that case necessary infrastructure to be made by bidder for receiving power from KPCL on chargeable basis till COD. EPC bidder has to make own arrangement of water for solar plant cleaning and other purposes. If available can be procured from KPCL on chargeable basis. KPCL decision will be final in this regard. In all cases infra development will be in the scope EPC)
vii. Construction of outdoor inverter with power conditioning units / LT ACDB with canopy (as applicable) associated with LT and HT switchgear for inverters and transformers, as required.
viii. Construction of control room/container as per project O&M requirement, fencing of solar PV plant, security cabin etc. in line with the provisions of KERC/KPCL from time to time. Minimum 1 No fully furnished, Air conditioned type control cum office room needs to be provided as per industrial utility practices. The other facilities shall be provided as per EPC plant operation requirements
ix. All associated electrical and civil works required for interfacing with grid including but not limited to establishing inverter transformers, breakers, isolators, panels, protection system, cables, earthing of transformer etc. and evacuation of power to the assigned 11 KV feeder.
x. Water supply for cleaning of solar PV modules including supply and installation of water based cleaning system during the construction period and thereafter during O&M Period.
xi. Construction of internal roads (WBM road with drains), pathways, fencing, peripheral boundary compound wall, storm water drains, drainage system, watch towers, weather monitoring stations, firefighting system, module cleaning system, necessary IT security system, surveillance system with camera and lighting system. Minimum 1 No of porta cabin to be provided for security. Additional requirements shall be decided by EPC contractor for O&M requirements at his cost and risk.
xii. SCADA system for remote monitoring and control of inverters with all associated hardware and software.
xiii. Operation & Maintenance (O&M) of Facilities along with electrical equipment,
xiv. The Contractor, at its own cost, shall bear all Statutory charges for obtaining all statutory approvals except the statutory charges to be paid by KREDL.
xv. Obtaining all required approvals from KPCL/SLDC like GNA and connectivity approvals for interconnecting this Solar Project with KPCL 11 KV line shall vest with contractor. The solar PV plant system should comply with regulations/instructions issued by CERC, KERC, CEA, SRPC/SLDC, Grid India from time to time.
xvi. The detailed scope of work is as defined in the relevant clauses of this RFP.

Detailed Technical Specification, Scope of Work and Terms & Conditions are given in this RFP, which are

available in e-procurement, GoK portal, as amended from time to time.

i. Prospective Bidders are compulsorily required to provide GST, TIN, PAN and PF details at the time of submission of Bids.
ii. All Bids must be accompanied by Bid Security and Power of Attorney for an amount as stipulated in the RFP.
iii. All statutory clearances, wherever required shall be arranged by the bidder. The Bidder should clear any kind of wayleave problems, but the owner shall extend all required support in this regard.

2.0 Eligible Tenderers:

2.1 Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Karnataka

2.2 Tenders from Joint ventures are not acceptable

3.0 Qualification of the Tenderer:

3.1 All Tenderers/Bidders shall provide the requested information accurately and in sufficient detail in Section-3: Qualification Information

3.2 To qualify for award of this contract, each Tenderer in its name should have in the last five years i.e. **2019-2020 to 2023-2024** the following

Sl No	Requirement Description	Documents to be Uploaded
(a)	Achieved in at least two financial years a minimum financial turnover (in all classes of engineering construction works only) of **Rs.11.06 Crores** (Note: Updated to the FY in which the tenders are invited. Financial turn over of previous years shall be given a weight of 10% per year to bring them to the price level of the FY in which the tenders are invited)	Certified copies of audited financial statements providing the turnover details for the last Five preceding financial year viz. FY 2019-2020 to 2023-2024 Networth Certificate to be submitted as per the format specified
(b)	Satisfactorily completed (at least 80% of the contract value), as prime contractor, at least one similar work such as Design, supply, Construction, erection testing and commissioning ground mounted Solar PV plant of value not less than **Rs 4.4 Crores** (Updated to the FY in which the tenders are invited. The value of the completed works shall be given a weight of 10% per year to bring them to the price level of the FY in which the tenders are invited)	Satisfactory **Work Completion** certificate along with P.O, LOI/LOA, DWA issued by the end users not below the rank of Executive Engineer or equivalent in case of Govt. Projects and owner / Project-in-charge/Authorized signatory for private sector projects.

(c)	Executed in **any one year**, the following minimum quantities of work 1. Satisfactorily completed design, engineering, Construction, erection, testing and commissioning of **1.3 MWp** Ground mounted grid connected solar PV plant in the last Five (5) years preceding the Date of Bid submission in private or govt sector in India	Satisfactory **Work Completion** certificate along with P.O, LOI/LOA, DWA issued by the end users not below the rank of Executive Engineer or equivalent in case of Govt. Projects and owner / Project-in-charge/Authorized signatory for private sector projects.
(d)	The Tenderer or his identified sub-contractor should possess class 1 electrical license issued by GoK and should have executed similar electrical works totaling **Rs. 6 lakhs** in any one year	Valid electrical license along with **Work Completion** certificate along with P.O, LOI/LOA, DWA issued to the bidder/sub-contractor by the end users not below the rank of Executive Engineer or equivalent in case of Govt. Projects and owner / Project-in-charge/Authorized signatory for private sector projects.

(e) Deleted

3.3 Each Tenderer should further demonstrate:

(a) Availability by owning the following key and critical equipment for this work – Not applicable

(b) liquid assets and /or availability of credit facilities of no less than **Rs. 1.7 Crores** (Credit lines/ letter of credit/ certificates from banks for meeting the fund requirement etc. The Banker's certificate format is as per GO no: FD-CAM/16/2022 (P-2) Date:22.08.2022 is enclosed in Section-3

3.4 Deleted

3.5 Sub-contractors' experience and resources shall not be taken into account in determining the Tenderer's compliance with the qualifying criteria except to the extent stated in 3.2 (d) and (e) above

3.6 Tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than the total tender value. The available tender capacity will be calculated as under:

Assessed available tender capacity = (A*N*1.50 - B)

Where

A = Maximum value of engineering construction works executed in any one year during the last five years (updated to 2025-26 price level) taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which tenders are invited

B = Value, at 2025-26 price level, of existing commitments and on-going works to be completed during the next 1 year.

Note: The statements showing the value of existing commitments and on-going works as well as the stipulated completion period, remaining period for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

3.7 Even though the Tenderers meet the above criteria, they are subject to be disqualified if they have

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.

4. One Tender per Tenderer:

4.1 Each tenderer shall submit only one tender. A tenderer who submits or participates in more than one Tender (other than as a sub-contractor or in cases of alternatives that have been permitted or requested), will cause all the proposals with the Tenderer's participation to be disqualified.

5. Cost of Tendering:

5.1 The tenderer shall bear all costs and expenses associated with the preparation and submission of his tender including pre/post bid discussions, technical and other presentations etc., and the Employer will under no circumstances, be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

6. Site Visit and Local conditions:

6.1 The Tenderer at his own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for construction of the Works. The cost of visiting the Site shall be at the Tenderer's own expense.

6.2 It will be imperative on each Bidder to fully inform himself of all Local conditions and factors which may have any effect on the execution of the Contract covered under these Documents and Specifications. The Owner shall not entertain any request for clarifications from the Bidders, regarding such Local conditions.

6.3 It must be understood and agreed that such factors have properly been investigated and considered while submitting the Proposals. No Claim for financial adjustment to the Contract Awarded under these Specifications and Documents on account of Local conditions will be entertained by the Owner. Neither any change in the Time Schedule of the Contract nor any financial adjustments arising thereof shall be permitted by the Owner, which are based on the lack of such clear information or its effect on the Cost of the Works to the Bidder.

6.4 Verification of information

It shall be deemed that by submitting a Bid, the Bidder has:

1. made a complete and careful examination of the Bidding Documents;
2. received all relevant information requested from KREDL;
3. acknowledged and accepted the risk of inadequacy, error or mistake in the information provided in the Bidding Documents;

4. satisfied itself about all matters, things and information necessary and required for submitting an informed Bid, execution of the Project in accordance with the Bidding Documents and performance of all of its obligations thereunder;
5. acknowledged and agreed that inadequacy, lack of completeness or incorrectness of information provided in the Bidding Documents shall not be a basis for any claim for compensation, damages, extension of time for performance of its obligations, loss of profits etc. from KREDL, or a ground for termination; and
6. agreed to be bound by the undertakings provided by it under and in terms hereof.

KREDL shall not be liable for any omission, mistake or error on the part of the Bidder in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to RFP, the Bidding Documents or the Bidding Process, including any error or mistake therein or in any information or data given by KREDL.

B. Tender Documents

7. Content of Tender documents/RFP:

7.1 The Goods and Service required, Tendering Procedures and Contract Terms are prescribed in the Tender Document. The Tender Document is a compilation of the following Sections:

Section 1	:	Invitation for Tenders (IFT)
Section 2	:	Instructions to Tenderers (ITT)
Section 3	:	Qualification Information
Section 4	:	Format of Annexures
Section 5	:	Conditions of Contract (CC)
Section 6	:	Contract Data (CD)
Section 7	:	Technical Specifications
Section 8	:	Drawings
Section 9	:	Bill Of Quantities
Section 10	:	Format Of Bank Guarantee/Insurance Surety Bond For EMD & Security Deposit

7.2 Understanding of Bid Documents:

A Prospective Bidder is expected to examine all Instructions, Forms, Terms and Specifications in the Bid Documents and fully inform himself as to all the Conditions and matters, which may in any way, affect the Scope of Work or the Cost there of. Failure to furnish all information required by the Bid Document or submission of a Bid not substantially responsive to the Bid Document in every respect will be at the Bidder's risk and may result in the rejection of its Bid.

8. Clarification on Tender Documents:

8.1 If the Prospective Bidder finds discrepancies or omissions in the Specifications and Document or is in doubt as to the true meaning of any Part, he shall at once make a request, in writing to the Assistant General Manager, Solar Grid section, KREDL on or before the date and time as mentioned in the e-Procurement platform for an interpretation/clarification. Interested Bidders may also submit online queries through the e-Procurement platform and need to mention their firm credentials along with online queries. Online queries not supported by firm credentials are liable for **rejection.**

The Owner, then, will issue interpretations and clarifications as he may think fit in writing. After receipt of such interpretations and clarifications the Bidder may submit his Bid but within the time and date as specified in the Invitation for Bid. All such interpretations and clarifications shall form a

Part of the Bidding Document and shall accompany the Bidder's Proposal. A prospective Bidder requiring any clarification on Bid Document may notify the Owner in writing. The Owner will respond in writing to any request for such clarifications on the Bidding Document, which, it receives not later than the date indicated in the https://kppp.karnataka.gov.in (E-procurement portal) Clarifications/Amendments/ Corrigendum will be issued through the portal if found necessary.

Verbal clarifications and information given by the Owner or his Employee(s) or his Representative(s) shall not in any way be binding on the Owner.

8.2 Pre-Tender Meeting:

8.2.1 The tenderer or his authorized representative is invited to attend a Pre-Tender Meeting which will take place at KREDL, Head Office Bangalore #6/13/1, 10th Block, 2nd Stage Nagarabhavi, Bangalore-560072 (address of venue) on time and date mentioned in the tender document/e-procurement portal.

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

8.2.3 The tenderer is requested to submit any questions in writing or e-mail to reach the Employer.

8.2.4 Minutes of the meeting, including the text of the questions raised (without identifying the source of enquiry) and the responses given will be uploaded in e-procurement platform and the Tenderers are advised to keep updated of the same. Verbal response/discussion shall not be considered. Any modification of the tender documents listed in Sub-Clause 7.1 which may become necessary as a result of the pre-tender meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 9 and not through the minutes of the pre-tender meeting.

8.2.5 Non-attendance at the pre-tender meeting will not be a cause for disqualification of a tenderer.

9 Amendment of Tender documents:

9.1 At any time prior to the deadline for submission of Bids, the Employer/ Owner may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Document / conditions by Amendment(s).

9.2 The Amendment/Addendum will be notified in the e-Procurement portal and the same shall be made available against the published tender in the e-Procurement system. Owner will bear no responsibility or liability arising out of non-receipt of the same in time or otherwise.

9.3 To give prospective Tenderers reasonable time in which to take an addendum/Amendment into account in preparing their tenders, the Employer may at its discretion extend the deadline for submission of tenders, in accordance with Sub-Clause 16.2 below.

9.4 Such Amendments, Addendum, Clarifications etc. shall be binding on Bidders and will be given due consideration by the Bidders while they submit their Bids and invariably upload such Documents as a part of the Bid.

C. Preparation of Tenders

10 Documents comprising the Tender:

10.1 The tender submitted by the Tenderer on https://kppp.karnataka.gov.in (E-procurement Portal) shall be in electronic document system and shall contain the documents as follows:

10.2 First Electronic Document (Techno-Commercial Offer):

The Bidder shall complete the scan copy of following

a) Form of tender
b) Appendix I-Letter of Bid
c) Annex I - Details of Bidder
d) Annex II (A) – Declaration of adopting Solar PV Modules & Cells
e) Annex II (B) – Format for Declaration by the Bidder for the proposed technology
f) ANNEXII(C) - Format for Technical Capacity (Section 3)
g) Annex III - Financial Capacity of the Bidder
h) Annex IIIA - Format for certificate from Chartered Accountant/Independent Auditor for Financial Capacity of the bidder
i) Annex IV- Not applicable
j) Annex V -Statement of Legal Capacity
k) Annex VI – Anti Collusion Certificate
l) Annex VII – Anti Blacklisting Affidavit
m) Annex VIII – Declaration of Shareholding Pattern of the Bidder
n) Annex IX – Information furnished by the Bidder checklist
o) Annex X - Format for “NO DEVIATION CERTIFICATE”
p) ANNEX - XI Certification for not availing/ to avail subsidy/ grant/ central financial assistance from MNRE and/or any other State Government and/or any other Central Government
q) ANNEXURE – XII Eligibility Clauses in Respect of Restrictions On Procurement from A Bidder of a Country Which Shares a Land Border with India
r) ANNEXURE - XIII Restrictions on Sourcing of Equipments/Materials by The Bidder From a Vendor of a Country Which Shares a Land Border With India
s) Appendix II - Power of Attorney for signing of Bid
t) Appendix III – Not applicable
u) Appendix IV – Not applicable

v) Appendix V – Not applicable
w) Appendix VI – Site details
x) All other relevant documents specified in the tender documents.

All forms and formats must be submitted along with supporting documents specified in the forms. Any shortfall in supporting documents, the bid will be considered as a Non-responsive

10.3 Second Electronic Document (Item wise Financial Bid): Shall be filled in e-procurement portal.

A. Deleted

B. The Bidder shall quote for the entire scope of the proposal covering all aspects of the contract specified under the accompanying Technical Specifications.

C. Bids not covering the Total Scope of Works may be treated as incomplete and hence rejected summarily.

D. No deviation whatsoever, either in full or in part, the conditions of the bidding documents as specified in the special conditions of contract are permitted by the Owner. Therefore, the Bidders are advised that while making bid proposals and quoting price, these conditions may appropriately be taken into consideration. Bidders are required to upload a certificate in this regard as per the format provided in special conditions of contract in sealed envelope along with other documents.

E. The Bidder shall complete all the Schedules & Annexure in the Bid Proposal Sheets, Technical Data Sheets, Financial Bid offer and specified elsewhere. The Qualifying Data shall be filled in the required Schedule of Techno-Commercial sheets. While furnishing Qualifying Data, only the list of executed Works, similar in nature to the tendered Scope of Work, shall be furnished.

F. Language of Bid& Measurement:
The Bid prepared by the Bidder and all correspondence and Documents relating to the Bid, exchanged by the Bidder and the Owner, shall be written in the English Language only, provided that any Printed Literature furnished by the Bidder may be written in another language so long as accompanied by an authenticated English translation of its pertinent passages. Failure to comply with this may disqualify a Bid. For purposes of interpretation of the Bid, the English translation shall govern. The Metric System of measurement shall be used exclusively in the Contract.

11 Tender Prices/ Bid Price:

11.1 The contract shall be for the whole works as described in Scope of work, based on the Item-wise Financial Bid submitted in e-procurement portal by the Tenderer.

11.2 The Tenderer shall fill in rates in Item-wise Financial Bid in e-Procurement Portal, Items for which no rate or price is entered by the Tenderer will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Item-wise Financial Bid.

11.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Tenderer.

11.4 The rates and prices quoted by the Tenderer shall be subject to firm without any variation during the performance of the Contract in accordance with the provisions of Clause of the Conditions of Contract as per clause 40.

11.5 The Bidder shall indicate, in the appropriate Financial bid offer sheets, the ex-works prices of the goods (in the scope of the Contractor), all applicable Taxes such as CGST, SGST, IGST, UTGST, Custom Duties on Imports, cess if any, the price for erection, testing and commissioning including applicable CGST, SGST thereon, price for associated civil, structural works and other services under the contract including all applicable CGST, SGST thereon, along with the total bid price. The rates of all applicable CGST, SGST, IGST, UTGST, Custom Duties on Imports, cess if any shall be clearly indicated for each item.

11.6 Taxes and Duties:

11.6.1 (i) Bought Out Items from Vendors, Sub-Suppliers, etc.:

Applicable CGST, SGST, IGST, UTGST, Custom Duties on Imports, levies, cess if any payable on material / equipment, component sub-assemblies, raw materials and any other items used for the contractor's consumption or dispatched directly to the site stores of the contractors, associated civil works and erection works shall be included in the bid price and any such taxes, duties levies etc, additionally payable due to statutory variation or due to introduction of new tax or taxes, duties and levies not considered by the Bidder but payable as applicable on the date of bidding etc., shall be to the Bidder's account and no separate claim on this behalf shall be entertained by the owners either during the contractual period or during the extended period if any.

(ii) Erection and Civil works:

The bidder shall quote the prices excluding GST in KPP portal. The applicable CGST, SGST, cess if any etc., shall be indicated separately in the price break up provided in the KPP portal.

Any such taxes, duties, levies etc., not considered by the Bidder but payable as applicable on the date of bidding shall be to Bidder's account and no separate claim on this behalf shall be entertained by the Owner.

(iii) In case of any statutory variation in CGST, SGST, IGST, UTGST, levies, cess if any or if any tax/

duty/levy is newly introduced by the government applicable for this contract with effect from the next day of the date of submission of the bid these variations/additional taxes/ duties/ levies will be to the account of the Owner. In case the Bidders indicate lesser rates of taxes & duties with reference to the prevailing rates of taxes & duties at the time of bidding, any variations in the taxes and duties would be paid/recovered keeping the rates of taxes & duties applicable as on the last date of Techno-Commercial Bid Submission as notified (either original or extended) as the base and not the quoted rates of taxes & duties for payment/recovery of difference in the taxes and duties. If the contractor is required to pay additional tax or duty, then the owner shall reimburse the contractor the additional tax or duty so paid by the contractor against submission of documentary evidence to the satisfaction of the owner by the contractor. This provision will be applicable to Supply, erection and civil works.

Note: Additional tax liability on account of change in the sources of the equipments/materials, if any, will be to bidders account only.

The claims against statutory variation, in principle, would be settled as reimbursement provided the contractor furnishes documentary evidence to establish that the extra amount claimed due to statutory variation was in fact paid by him solely on account of such statutory variation. This may vary from case to case depending upon the nature of statutory variation.

11.6.2 The civil, structural and architectural portion of the contract shall be treated as civil works contract. The Bidder shall specify CGST, SGST, cess if any on civil works. Any Tax payable on the Cost of the items of supply under the civil Works Contract shall also be included by the Bidder in his Bid Price and the Owner shall have no liability whatsoever in respect of such Taxes.

11.6.3 The Owner will deduct Tax at Source as per applicable law from the proceeds payable to the Contractor.

11.6.4 GST registered firm having GSTIN: Applicable CGST, SGST on civil and erection works has to be borne by the bidder.

11.6.5 As regards the Income Tax, Surcharge on Income Tax and any other Corporate Tax, the Owner shall not bear any Tax liability whatsoever. The Bidder shall be liable and responsible for Payment of such Taxes as mandated under the provisions of the Law.

11.6.6 Notwithstanding anything stated in the Sub-Clause 11.11.1 to 11.11.6 above, the Owner shall have the right to make deduction at Source from the amounts payable to the Contractor against this Contract in respect of any Tax liability as may be Mandatory in terms of the Law. The Owner shall not bear any liability in this regard but shall issue necessary TDS Certificate in respect of such deductions made.

11.6.7 Whenever concessional rate of Taxes is indicated by the Bidder, it shall be confirmed whether, any increase in the rates that becomes applicable during the Performance of the

Contract would be absorbed by the Bidder. Bidder shall note that in the absence of such confirmation, the Bids will be evaluated taking into account the maximum rate of Taxes applicable.

11.6.8 The Owner's liability for all taxes and duties under the contract shall be limited to only those indicated by the Bidder in the bid proposal sheets subject to the statutory variations and variations as per RFP

If the cost of the Contract during the performance of the contract shall be increased or reduced by reasons of the making, passing or promulgation of any law after the date of submission of bid or by any order, regulation or by-law having the force of law, the amount of such increase or reduction shall be added to or deducted from the 'Contract Price' as the case may be. It is the Bidder's responsibility to furnish details of taxes, duties, levies, etc. applicable as on the date of submission of the bid. Note: This clause is applicable for change in GST only.

11.6.9 No claim for any increase towards the statutory variation regarding enhancement of existing CGST, SGST, IGST, UTGST, Custom Duties on Imports, levies, cess if any or introduction of a new tax or duty applicable shall be entertained by the Owner during the extended period of contract, if the extension of the contract is required due to the causes attributable to the contractor.

11.6.10 Statutory Variation regarding increase/decrease of existing Taxes & Duties or introduction of a new tax or duty during the Contractual completion period would be to the account of Owner.

11.6.11 Before quoting, the Bidder shall ascertain from the concerned Tax Authorities of Government of Karnataka/ Govt. of India, the applicability of CGST, SGST, IGST, UTGST, Custom Duties on Imports, levies, cess if any etc., as on the last date of Techno-Commercial Bid Submission as notified (either original or extended) in respect of this Package and include the same in the quoted Price. No separate Claim in this regard will be entertained by the Owner, as it is the responsibility of the Bidder to pay all these Taxes.

Note:

(i) The successful bidder shall be entirely responsible for payment of all taxes, levies, duties, license fees, etc., incurred until delivery of the contracted goods to the purchaser. In respect of supply portion, the successful bidder shall pay all types of fees, levies, taxes, duties etc. required to be paid by any National or State statute, ordinance or other law or any regulation or bye-law of any local or other duly constituted authority in relation to the execution of works and by the Rules and Regulations of all Public bodies and companies whose property or rights are affected or may be affected in any way of the works. The successful bidder shall in compliance with the above keep the Purchaser indemnified against all such penalties and liability of every kind for breach of any statute, ordinance or law, Regulation or bye-law. Nothing in the contract shall relieve the successful bidder from his responsibility to pay any tax that may be levied by the Government on the turnover / profits etc., made by him in respect of the contract.

(ii) In case any Refund of GST from Commercial Tax Department is availed in respect of subject work, the same shall be returned to Employer/Owner ie., KREDL.

11.6.12 Building and other construction workers welfare Cess:

The Building and other construction workers welfare cess act 1996, came into operation with effect from 3rd day of November 1995, the government has decided to collect cess now with immediate effect. Accordingly the government has issued order No. LD/300 LET/2006 dated 18.01.2007.

As per the order, cess at the rate of 1% of the cost of construction (in respect of building or other construction works) incurred by the employer (contractor) shall be collected which shall exclude the cost of land and any compensation paid or payable to a worker or his kin under Workman Compensation Act 1923.

Therefore, building & other construction workers welfare cess at the rate of 1% of the amount of the Supply, Erection and Civil portion of the contract as per the clarification issued by Labour department, G.O.K, vide their letter No. LD338LET/2011 dated: 27.04.2012 & LD87/LET-2016 dated: 17.01.2018 will be deducted from the bill at the time of making payment and such amount so deducted from the bill will be remitted to Karnataka State Building and other construction workers welfare board.

It is mandatory to furnish a return in Form-I to the concerned assessing officer in terms of section-4 of the building & other construction workers welfare cess act, 1996 and its rules there under 1998. The concerned employer (contractor) shall furnish the aforesaid return to the concerned assessing officer.

12 Tender validity:

12.1 The Bids shall be valid for a period of not less than **180 (One Hundred and Eighty) days** from the Original Bid Due Date (the "Bid Validity Period"). The Bid Validity Period may be extended by mutual consent of the respective Bidders and KREDL.

13 Bid Security (Earnest Money Deposit):

The Earnest Money Deposit (EMD) at 1.5% (or 2 lakhs min) of the amount put to tender excluding GST i.e., 8.3 Lakhs shall be paid by the bidder in the following manner;

a. ₹8,30,000 (Rupees Eight Lakh Thirty Thousand only) in the form of e-payment mode in KPP portal.

13.1 Deleted

13.2. Any Bid not accompanied by the Bid Security shall be rejected by KREDL as non-responsive.

13.3. Save and except as provided in RFP, the Bid Security of unsuccessful Bidders will be returned by KREDL, without any interest, as promptly as possible on acceptance of the Bid of the Selected Bidder and successful completion of the Bidding Process or when the Bidding process is cancelled by KREDL. With respect to Bid Security paid through e-payment, the refund shall be made through electronic transfer.

The Bidders shall furnish the information regarding RTGS, Account number etc. details as may be required by KREDL.

13.4. The Selected Bidder's Bid Security will be returned, without any interest, upon the Bidder signing the contract agreement and furnishing the Performance Security in accordance with the provisions thereof.

13.5. KREDL shall be entitled to forfeit and appropriate the Bid Security as genuine compensation / damages to KREDL in any of the events specified in Clause 13.6 herein below. The Bidder, by submitting its Bid pursuant to this RFP, shall be deemed to have acknowledged and confirmed that KREDL will suffer loss and damage on account of withdrawal of its Bid or for any other default by the Bidder during the Bid Validity Period. No relaxation of any kind on Bid Security shall be given to any Bidder.

13.6. The Bid Security shall be forfeited and appropriated by KREDL as genuine compensation and damages payable to KREDL for, inter alia, time, cost and effort of KREDL without prejudice to any other right or remedy that may be available to KREDL hereunder or otherwise, under the following conditions:

I. If a Bidder engages in a corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice as specified in Section 4 of this RFP;

II. If a Bidder withdraws its Bid after opening of the Financial Bid during the period of Bid validity as specified in this RFP and as extended by the Bidder from time to time;

III. In case the Bidder fails to acknowledge the Letter of Award and/or Allotment Letter, and fails to fulfil conditions of the Letter of Award and/or Allotment Letter.

IV. In the case of Selected Bidder, if it fails within the specified time limit -

i) to sign the contract agreement and/or

ii) to furnish the Performance Security

14 Format and Signing of Tender:

14.1. The Bidder shall provide all the information sought under this RFP in electronic mode. KREDL will evaluate only those Bids that are received in the required formats and complete in all respects. Incomplete and /or conditional Bids shall be liable to rejection.

14.2. All the documents of the Bid sought under this RFP shall be typed or written in indelible ink and signed by the authorised signatory of the Bidder who shall also initial each page in blue ink. In case of printed and published documents, only the cover shall be initialled. All the alterations, omissions, additions or any other amendments made to the Bid shall be initialled by the person(s) signing the Bid. The Bid shall contain page numbers.

14.3. All documents of the Bids submitted in electronic mode under this RFP shall be uploaded on E-Procurement Website: https://kppp.karnataka.gov.in/ using digital signature

D. Submission of Tenders

15 Sealing and Marking of Tenders:

15.1. The Bidder shall submit the Bid(s) in the form specified in Clause 15.2.

15.2. The Bidder shall submit following documents in the electronic mode using their digital signatures in the correct slots in E-Procurement Website. The documents accompanying the Bid(s) submission shall include.

"Key Submissions"

a. Receipt of E-Procurement portal fees & EMD paid

b. Scanned copy of the Letter of Bid, Qualification information section 3, Form of tender, Appendix - I to VI along with Annexures and supporting documents should be uploaded in E-Procurement portal

15.3 The Financial Bid of the Bidder shall be submitted only through E- Procurement Website. This shall be uploaded at the slot provided for Financial Bid only. If the price is disclosed anywhere else, the bid will be rejected.

15.4 Deleted

15.5 Deleted

16 Deadline for submission of the Tenders:

16.1. Bids through electronic mode in E-Procurement Website should be submitted up to the Bid Due Date in the manner and form as detailed in this RFP.

16.2. KREDL may, in its sole discretion, extend the Bid Due Date and/or Due Date by issuing an Addendum in accordance with Clause 9 uniformly for all Bidders.

16.3. KREDL reserves the right to seek original documents for verification of any of the documents or any other additional documents upon opening of the Bidding Documents.

17 Late Tenders:

17.1 Bids received by KREDL after the specified time on the Bid Due Date and/or Due Date for submission of online payment towards Original Bank Guarantee/Insurance Surety Bond towards Bid Security shall not be eligible for consideration and shall be summarily rejected.

18 Modification and Withdrawal of Tenders:

18.1 The Bidder may withdraw its Bid after submission of the Bids electronically prior to Bid Due Date. No Bid can be withdrawn by the Bidder after the Bid Due Date.

18.2 Any alteration/ modification in the Bid or additional information supplied subsequent to the Bid Due Date or Due Date, as the case may be, unless the same has been expressly sought for by Authority, shall be

disregarded.

18.3 No Bid may be withdrawn during the period after Bid Due Date or Due Date, as the case may be and during Bid Validity Period. Withdrawal of a Bid during this period may result in the forfeiture of its Bid security, pursuant to Clause 13.5 and Clause 13.6.

E. Tender Opening and Evaluation

19 Opening of Techno-Commercial Bid of all Tenders and evaluation to determine qualified Tenderers:

19.1 KREDL shall open the Bids as per the Schedule of Bidding process specified in RFP, at the place specified in Clause 15 and in the presence of the Bidders who choose to attend.

19.2 KREDL will examine and evaluate the Bids in the manner set out in RFP and in accordance with the provisions set out in Section 2 of this RFP.

19.3 To facilitate evaluation of Bids, KREDL may, at its sole discretion, seek clarifications in writing from any Bidder regarding its Bid.

19.4 Any information contained in the Bid shall not in any way be construed as binding on KREDL, its agents, successors or assigns, but shall be binding against the Bidder if the Project is subsequently awarded to it under the Bidding Process on the basis of such information.

19.5 KREDL reserves the right not to proceed with the Bidding Process at any time without notice or liability and to reject any Bid without assigning any reasons

19.6 Deleted.

19.7 Deleted

20 Opening of Financial Bid of qualified Tenderers and Evaluation:

20.1 The Price Bids of those Bidders whose Techno-Commercial Bids are found Responsive will be opened after completion of Techno Commercial Evaluation.

NOTE: Price Bids of Techno commercially Non - Responsive Bidders will not be opened.

20.2 to 20.4 Deleted.

21 Process to be confidential:

21.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

21.2 Bids shall be deemed to be under consideration immediately after opening of Techno-Commercial Bid and until such time official intimation of Award / rejection is made by the Owner to the Bidders. While the Bids are under consideration, Bidders and/or their Representatives or other interested Parties are advised to refrain from contacting by any means, the Owner and/or his Employees/ Representatives on the matters related to the Bids under consideration.

21.3 No Bidder shall contact the owner on any matter relating to its Bid, from the time of the Bid opening to the time the contract is awarded.

21.4 Any effort by a Bidder to influence the Owner in the Owner's Bid evaluation, Bid comparison or Contract award decisions, may result in disqualification.

22 Clarification of Tenders:

22.1 To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at his discretion, ask any Tenderer for clarification on already uploaded documents of their Tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by e-mail, but no change in the price or substance of the Tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause 24.

22.2 Subject to sub-clause 22.1, no Tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded. If the Tenderer wishes to bring additional information to the notice of the Employer, it should do so in writing.

22.3 Any effort by the Tenderer to influence the Employer in the Employer's Tender evaluation, Tender comparison or contract award decisions may result in the rejection of the Tenderers' Tender.

23 Examination of Tenders and determination of responsiveness:

23.1 Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender;

a) it is received as per the format at Form of tender, Appendix-I to Appendix-VI along with Annex-I to Annex-X under Appendix-I. Also all supporting documents specified in the forms;
b) it is received by the Bid Due Date and/or the Due Date including any extension there of pursuant to Clause 16;
c) it is submitted electronically on the E-Procurement Website in the manner stipulated in Clause 15;
d) it is signed and submitted as stipulated in Clause 14;
e) copy of Certificate of Incorporation and a Copy of Memorandum and Articles of Association of the Bidder;
f) Copies of Bidder's duly audited annual reports and financial statements (balance sheets and profit and loss account) for the financial year 2019-20 to 2023- 24;
g) it contains all the information (complete in all respects) as requested in this RFP and/or Bidding Documents (in formats same as those specified);

h) it provides information in reasonable detail. ("Reasonable Detail" means that, but for minor deviations, non-material non-conformities, the information can be reviewed and evaluated by KREDL without communication with the Bidder). KREDL reserves the right to determine whether the information has been provided in reasonable detail;

i) No change whatsoever to the financial and commercial conditions will be made after accepting the Bid;

j) it does not contain any condition or qualification; and

k) it is not non-responsive in terms hereof

KREDL reserves the right to reject any Bid which is non-responsive and no request for alteration, modification, substitution or withdrawal shall be entertained by KREDL in respect of such Bid.

23.2 A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the Employer's rights or the Tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders. The Owner's determination of a Bid's responsiveness shall be based on the contents of the Bid itself without recourse to extrinsic evidence.

23.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

23.4 The Owner may waive any minor infirmity or Non-conformity or irregularity in a Bid which does not constitute a Material Deviation, provided such waiver does not prejudice or affect the relative Ranking of any of the Bidder.

24. Correction of errors:

24.1 to 24.3 Deleted

25. Evaluation and comparison of Tenders:

25.1 The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 23. The Technical and Commercial evaluations will be carried out offline.

25.2 In evaluating the Tenders, the Employer will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:
making any correction for errors pursuant to Clause 24; and
Deleted.

25.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer.

Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Tender evaluation.

25.4 The estimated effect of the price adjustment conditions under Clause 41 of the Conditions of Contract, during the implementation of the Contract, will not be taken into account in tender Evaluation.

25.5 If the tender of the successful tenderer is seriously unbalanced in relation to the Employer's estimate of the cost of the work to be performed under the contract, the Employer `may require the Tenderer to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After Evaluation of the price Analysis, the Employer may require that the amount of the performance Security setforth in clause 29 be increased at the expense of the Successful Tenderer to a level sufficient to protect the Employer against financial loss in the event of default of the Successful Tenderer under the Contract.

25.6 The Owner will evaluate and compare the Bids previously determined to be substantially responsive, pursuant to Clause 23 of ITT.

25.7 All evaluated Bid Prices of all the Bidders shall be compared among themselves to determine the Lowest Evaluated Bid and the Lowest Bid, as a result of this comparison, will be selected for the Award of the Contract.

F. Award of Contract

26. Award criteria:

26.1 Subject to Clause 27 of ITT, the Employer will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such Tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2 and Clause 3 of ITT, and (b) qualified to perform the contract satisfactorily in accordance with the provisions of Clause 3 of ITT. The Owner shall be the sole judge in this regard.

26.2 Deleted

26.3 Deleted

27. Employer's right to accept any Tender and to reject any or all Tenders:

27.1 Notwithstanding Clause No. 26, the Employer reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract,

without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the Employer's action.

28. Notification of award and signing of Agreement:

28.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by cable, telex, e-mail or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

28.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of Security deposit in accordance with the provisions of Clause 29.

28.3 The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will be kept ready for signature of the successful Tenderer in the office of Employer within 30 days following the notification of award along with the Letter of Acceptance. Within 20 days of receipt, the successful Tenderer will sign the Agreement and deliver it to the Employer.

28.4 Upon the furnishing by the successful Tenderer of the Performance Security, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

28.5 After acknowledgement of the LOA and Allotment Letter, the Selected Bidder shall execute the contract agreement within 30 (thirty) days of such acknowledgement and within the aforementioned period. The Selected Bidder shall not be entitled to seek any deviation in the contract terms.

28.6 Failure of the Selected Bidder to comply with the requirements of Clause 28.6 shall constitute sufficient grounds for the annulment of the LOA and/or the Allotment Letter, as the case may be, and forfeiture of the Bid Security. In such an event, KREDL reserves the right to take any such measure as may be deemed fit in the sole discretion of KREDL.

28.7 The Bid Security submitted by the remaining Bidders shall be returned on successful completion of the Bidding Process or when the Bidding Process is cancelled by KREDL.

28.8 Contacts during Bid Evaluation

Bids shall be deemed to be under consideration from the time immediately after they are opened until such time KREDL makes official intimation of award/ rejection to the Bidders. While the Bids are under consideration, Bidders and/ or their representatives or other interested parties are advised to refrain from contacting by any means, KREDL and/or their employees/ representatives on matters related to the Bids under consideration.

29 Security deposit /Contract Performance Guarantee:

29.1 Within 20 days of receipt of the Letter of Intent to Award the Contract, the successful Tenderer shall deliver to the Employer a Security Deposit / Contract Performance Guarantee in the form of Bank Guarantee/Insurance Surety Bond from a Public Sector Indian Bank/ Scheduled Commercial Bank (in the second schedule of the RBI Act-1934) and the Bank should be covered under jurisdiction of Indian laws in the form attached as Section 10 in favour of the Owner for an amount equivalent to 10% of the Contract price,

Note:

1. The successful bidder to whom the work is awarded shall furnish additional Contract Performance Guarantees in accordance with the Qualifying Requirements of the projects depending upon the scope of the work in addition to the above Contract Performance Guarantees stipulated at clause no: 29.1 above.
2. The Bidder will be blacklisted, if the security deposit/contract performance Bank Guarantee/Insurance Surety Bond turns out to be fake during confirmation from the bank regarding genuineness of BG submitted by the bidder.
3. **The Bank Guarantee/Insurance Surety Bond shall be submitted only through SFMS and is effective only when the BG Message is transmitted by the issuing Bank through SFMS to IDBI Bank Ltd, Bengaluru having IFSC CODE - IBKL0000377 (Bank of Beneficiary) & written confirmation to that effect is issued by Bank of Beneficiary.**

29.1 If the Security deposit is provided by the Successful Tenderer in the form of a Bank Guarantee/Insurance Surety Bond , it shall be issued either by a Nationalised /Scheduled Bank.

29.2 Deleted

29.3 Failure of the successful Tenderer to comply with the requirements of Sub-Clause No. 29.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Earnest Money Deposit, besides Blacklisting the firm for a period at the discretion of the Employer.

29.4 The Performance Guarantee shall cover additionally the following Guarantees to the Owner:

a) The Successful Bidder Guarantees the Successful and Satisfactory Operation of the Equipment in the Scope of the Contract, as per the Specifications and Documents;

b) The Successful Bidder further Guarantees that the Equipment provided by him/his sub- Vendors shall be free from all defects in Design, Material and Workmanship and shall upon written Notice from the Owner, fully remedy free of expenses to the Owner, such defects as developed under the normal use of the said Equipment within the period of Guarantee specified in the relevant Clause of the tender documents.

29.5 The Contract Performance Guarantee amount shall be unconditional and irrevocable and the amount therein shall be payable to the Owner on demand without any condition whatsoever.

29.6 The cost of complying with the requirements of this Clause shall be borne by the Contractor. The security shall be furnished valid initially till three months after the expiry of the guaranty Period and shall be extended appropriately as guaranty period is extended in accordance with Clause No.10 of SCC.

29.7 The form of the Performance Security shall be as provided in Section- Annexures, of the Bidding Documents. In the event of any change in the Contract Price, the Performance Security shall be adjusted provided that such adjustment shall be subject to the approval of the Owner. The Performance Security shall be paid to the Owner on first demand without conditions or proof.

29.8 The Performance Guarantee will be discharged without any interest at the end of Guarantee Period.

30 Advance Payment and Security: Deleted

31 Corrupt or Fraudulent practices:

31.1 The GOK/KREDL requires that the Tenderers/Suppliers/Contractors, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, GOK / KREDL

i. Will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

ii. Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a GOK/ KREDL contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a GOK / KREDL contract.

31.2 Deleted

32 Debarment of Tenderers

1. The Owner may debar tenderers, for a period not exceeding three years, from participation in its tenders, following such procedure as may be prescribed on the ground that tenderer is engaged in corrupt or fraudulent practices in competing or executing the contract including misleading the procuring entity at any stage of Procurement Activity with a fraudulent intention: Provided that, no tenderer shall be debarred without giving opportunity of being heard.
2. The State Government /KREDL may debar tenderers for a period not exceeding three years, from participating in any procurement activity within the State, following such procedure as may be prescribed, on grounds of, but not restricted to, criminal offence, corruption, integrity, honesty and work ethics: Provided that no tenderer shall be debarred without giving opportunity of being

heard.

3. The State Government / KREDL shall publish the list of so debarred tenderers under sub-section (2) above from participating in any procurement activity on the Karnataka Public Procurement portal / KREDL website.
4. The tenderer so debarred under sub section (2) above shall not be entitled to apply to participate in tenders called by any procurement entity under this Act during the period so debarred.

32 (A) Debarment of Tenderers by Procurement Entity

1. The Procurement Entity may proceed with debarring such tenderer or contractor or supplier or any of the successor of the tenderer or contractor or supplier who has engaged directly or through an agent in a corrupt or fraudulent practices in participating or competing or executing the contract including misleading the Procurement Entity at any stage of procurement and executing activity.
2. The Procurement Entity may, by order, appoint a Committee consisting of such officers not below the rank of Tender Inviting Authority to be the Debarment Committee to consider the proposals for debarring bidder or contractor or supplier and to take a decision thereof.
3. On the receipt of information, Debarment Committee shall provide a reasonable opportunity, including an oral hearing, to the concerned for making representations before taking a decision.
4. For consideration of debarment, Tender Inviting Authority or any other officer authorized by Tender Accepting Authority shall furnish the details of such bidders or contractors or suppliers who have engaged in corrupt practice and fraudulent practices to the Debarment Committee constituted under sub rule (2) above.
5. The Debarment Committee may make recommendations with reasoning in writing, within thirty days from date of receipt of information. Provided that, the said period may be extended by another fifteen days by Procurement Entity for the reasons to be recorded in writing.
6. On the recommendations of the Debarment Committee, the Procurement Entity shall by notification debar any of tenderer or contractor or supplier and publish the same on its website and Karnataka Public Procurement Portal and also maintain the list of such tenderer or contractor or the supplier or any of its successors.
7. The order of debarment shall be deemed to have been automatically revoked on the expiry of the period specified in the debarment order.

32(B) Debarment by the Government/ KREDL

1. The Government/KREDL may debar a tenderer or contractor or supplier, in the public interest and on the grounds specified in the Act.

2. There shall be a State Level/ KREDL Debarment Committee consisting of such Officers as may be notified by the State Government to consider the proposals for debarring bidder or contractor or supplier and to take a decision thereof.

3. On the receipt of the information, the State Level/ KREDL Debarment Committee shall provide a reasonable opportunity, including an oral hearing, to the concerned for making representations before taking a decision on the debarment.

4. For consideration of debarment of the bidders or contractors or suppliers, the officer authorized by the Procurement Entity shall furnish the details of such bidders or contractors or suppliers to the State Level Debarment Committee constituted under sub rule (2) above;

5. The State Level/ KREDL Debarment Committee may make recommendation to the State Government to such an effect, within thirty days, from the date of receipt of the information: Provided that, the said period may be extended by another fifteen days for the reasons to be recorded in writing by the Debarment Committee.

6. On the recommendation of the State Level/ KREDL Debarment Committee, the Government shall debar by notification such tenderer or contractor or supplier and publish the same on the Department website as well as Karnataka Public Procurement Portal and shall maintain the list of such bidder or contractor or the supplier or any of its successor.

7. The debarred tenderer or contractor or supplier shall be removed from the list of registered contractors or vendors.

8. The order of debarment shall be deemed to have been automatically revoked on the expiry of the specified period in the debarment order.

32(C) Measures to be taken after Debarment

The Procurement Entity may take appropriate measures in respect of debarred tenderer or contractor or supplier including one or more of the following, namely

1. reject the bid and forfeit or encash EMD or Bid Security;
2. terminate the contract; forfeit or encash the performance guarantee; recover the compensation of loss incurred by Procurement Entity;
3. forfeit or encash any other security or guarantee or bond provided by such tenderer or contractor or supplier in relation to the such procurement; and
4. recover payments including advance payments, if any, made by the Procurement Entity along with the interest thereon at the prevailing rate of Nationalized Bank.

33 Appeal

An appeal under shall lie:

i. (a) to the Head of the Department concerned if the order is passed by the Tender accepting authority subordinate to the Head of the Department:
(b)To the Government if the order is passed by a tender accepting authority which is Head of the Department, or a local authority or a State Government Undertaking or a Board, Body Corporation or any other authority owned or controlled by the Government.

ii. The aggrieved tenderer shall submit online appeal within specified period to the Appellate Authority specified in tender schedule through the Karnataka Public Procurement Portal.

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 3

QUALIFICATION INFORMATION

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SECTION 3: QUALIFICATION INFORMATION

The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in Clause 3 of the Instructions to Tenderers. This information will not be incorporated in the Contract.

1.1 Constitution or legal status of Tenderer : [Attach copy]

Place of Registration : [Attach copy]

Principal place of business :

1.2 Total value of Engineering construction works executed and payments received in the last five years (in Rs. Lakhs)

2019-20:--------

2020-21:--------

2021-22:---------

2022-23:--------

2023- 24:-------

Note: Attach relevant Certificate/s from Chartered Accountant.

1.3 Work performed of similar nature in the last 5 years as per Clause No: 3 of ITT:

Project Name	Name of Employer	Description of work	Voltage class	Contract Number	Value of contract Rs. Lakhs	Date of issue of work award	Specified period of completion	Actual date of commissioning	Remarks explaining reasons for delay in commissioning of work
1	2	3a	3b	4	5	6	7	8	9

Note: The documentary proof of fulfilling the qualifying requirements shall be uploaded along with the bid. The bidder shall upload the P.O, LOI/LOA, DWA, Work done Certificates issued by the end users not below the rank of Executive Engineer or equivalent in case of Govt. Projects and owner / Project-in-charge/Authorized signatory for private sector projects along with the bid.

1.4 Quantities of work executed as prime contractor (in the same name) during the last five years specified in 1.2 above as per Clause No: 3 of ITT:

Year	Name of Work	Name of Employer	Quantity of work performed (cum)	Remarks (Indicate contract reference)
2019-20				
2020-21				
2021-22				
2022-23				
2023-24				

1.5 Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender:

(A)Existing commitments and on-going works:

Description of work	Place & State	Contract No & Date	Name and Address of Employer	Value of contract Rs. Lakhs	Stipulated period of Completion	Value of works remaining to be completed (Rs.Lakhs) (Attach Certificates from Engineers – in- Charge)	Anticipated date of commissioning
1	2	3	4	5	6	7	8

(B) Works for which Tenders already submitted:

Description of work	Place & State	Name and Address of Employer	Estimated value of works (Rs. Lakhs)	Stipulated period of Completion	Date when decision is expected	Remarks if any
1	2	3	4	5	6	7

Tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than the total tender value. The available tender capacity will be calculated as under:

Assessed available tender capacity = (A*N*1.50 - B)

Where

A = Maximum value of engineering construction works executed in any one year during the last five years (updated to 2025-26 price level) taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which tenders are invited

B = Value, at 2025-26 price level, of existing commitments and on-going works to be completed during the next 1 year. Same be submitted along with bid.

1.6 Deleted

1.7 Reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the last five years;

1.8 Qualification and experience of the key technical and management personnel in permanent employment with the tenderer and those that are proposed to be deployed on this contract, if awarded.

1.9 Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may provide references if contacted by the Employer.

1.10 Evidence of access to financial resources to meet the qualification requirement specified in ITT Clause3.3 (b): Letter of Credit etc. List them below and attach certificate from the Banker in the suggested format as under: **The Banker's certificate format is as per GO no**: FD-CAM/16/2022 (P-2) Date:22.08.2022

FORMAT OF BANKER'S CERTIFICATE/LINE OF CREDIT LETTER
[TO BE ISSUED IN THE LETTER HEAD OF THE BANK BRANCH]

Reference Number (SL. No) Place:
Date:

To:
[Name & Address of the beneficiary]

This is to certify that Mr./M/s._____[name of the customer] having his/ their registered/ administrative office at _____ _____ is a customer of our Bank and is/ are engaged in _____[nature of activity]. If the said customer is allotted / awarded with _____[brief details of works], we may extend credit facilities up to Rs _____lakh, to meet his/ their working capital requirement towards the execution of the said work order as per the Loan Policy of the Bank.

This certificate is valid up to three months from date of issue, that is Up to dd / mm / yyyy.

Yours faithfully,

BRANCH MANAGER.

1.11 Proposals for sub-contracting components of works as detailed in ITT Clause 3.2 (d) and (e)

Item of work	**Value of Sub-Contract**	**Identified Sub-Contractor (Name & address)**	**Experience of similar work** (Attach certificates from the respective Employers)

1.12 Information on litigations in which the Tenderer is involved:

Other Party (ies)	Employer	Details of dispute	Amount involved	Remarks showing present status
1	2	3	4	5

1.13 The proposed methodology and program of construction, backed with equipment planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 4: FORMATS OF ANNEXURES

ANNEXURES: CONTENTS

- Form of Tender
- Letter of Acceptance, Agreement form
- Appendix I-Letter of Bid
- Annex I - Details of Bidder
- Annex II (A) – Declaration of adopting Solar PV Modules & Cells
- Annex II (B) – Format for Declaration by the Bidder for the proposed technology
- ANNEXII(C) - Format for Technical Capacity
- Annex III - Financial Capacity of the Bidder
- Annex IIIA - Format for certificate from Chartered Accountant/Independent Auditor for Financial Capacity of the bidder
- Annex IV- Not applicable
- Annex V -Statement of Legal Capacity
- Annex VI – Anti Collusion Certificate
- Annex VII – Anti Blacklisting Affidavit
- Annex VIII – Declaration of Shareholding Pattern of the Bidder
- Annex IX – Information to be furnished by the Bidder
- Annex X - Format for “NO DEVIATION CERTIFICATE”
- ANNEX - XI Certification for not availing/ to avail subsidy/ grant/ central financial assistance from MNRE and/or any other State Government and/or any other Central Government

- ANNEXURE – XII Eligibility Clauses in Respect of Restrictions On Procurement from A Bidder of a Country Which Shares a Land Border with India
- ANNEXURE - XIII Restrictions on Sourcing of Equipments/Materials by The Bidder From a Vendor of a Country Which Shares a Land Border With India
- Appendix II - Power of Attorney for signing of Bid
- Appendix III – Not applicable
- Appendix IV - Format for Bank Guarantee/Insurance Surety Bond
- Appendix V – Not applicable
- Appendix VI – Site Details

All forms and formats must be submitted along with supporting documents specified in the forms. Any shortfall in supporting documents, the bid will be considered as a Non-responsive

Form of Tender
(to Be submitted with bid)

Description of the Work: Bid for "SELECTION OF EPC CONTRACTOR FOR DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT". Bid Enquiry No.

To :

Managing Director
KREDL, Head Office Bangalore
#6/13/1, 10th Block, 2nd Stage
Nagarabhavi, Bangalore-560072

Sir/Madam,

We offer to execute the works described above in accordance with the Conditions of Contract accompanying this Tender with the Contract Price quoted in Item-wise Financial Offer in e-procurement portal.

This Tender and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Tender you receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

We hereby confirm that this Tender complies with the Tender validity and Earnest Money Deposit required by the Tender documents.

We attach herewith our current income-tax clearance certificate (FY 23-24).

Yours faithfully,

Authorized Signature:
Name & Title of Signatory:
Name of Tenderer _____
Address: ----------

GSTIN:

Letter of Acceptance

(letterhead paper of the Employer – After selection of successful bidder)

_____[date]

To: _____[name and address of the Contractor]

Dear Sirs,

This is to notify you that your Tender dated _____ for execution of the _____

[name of the contract and identification number, as given in the Instructions to Tenderers] for the Contract Price of Rupees ——_____

(_____) [amount in words and figures], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by our Agency.

You are hereby requested to furnish Security deposit plus additional security for unbalanced tenders in terms of Clause 25.5 of ITT, in the form detailed in Clause 29.1 of ITT for an amount of Rs.————— within 20 days of the receipt of this letter of acceptance valid up to 30 days from the date of expiry of Defects Liability Period i.e. up to ..... and sign the contract, failing which action as stated in Para 29.4 of ITT will be taken.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Name of Agency

Issue of Notice to proceed with the work

(letterhead of the Employer)

————— (date)

To

————————————————— (name and address of the Contractor)
—————————————————

Dear Sirs:

Pursuant to your furnishing the requisite security deposit as stipulated in ITT Clause 29.1 and signing of the contract agreement for the construction of ——————— a Tender Price of Rs.———————, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form

Agreement (After selection of successful bidder)

This agreement, made the _____day of _____20_____, between_____[name and address of Employer] (hereinafter called "the Employer") of the one part and _____ _____[name and address of contractor+ (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute _____ _____[name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.
2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.
3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.
4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:
    i) Letter of Acceptance;
    ii) Notice to proceed with the work (Detailed work Award-DWA)s;
    iii) Contractor's Tender;
    iv) Contract Data;
    v) Conditions of contract (including Special Conditions of Contract);
    vi) Specifications;
    vii) Drawings;

viii) Bill of Quantities; and

ix) Any other document listed in the Contract Data as forming part of the contract.

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____
was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____
in the presence of:

Binding Signature of Employer _____

Binding Signature of Contractor _____

APPENDIX –I

Letter of Bid

(On the Letterhead of the Bidder)

Dated:

To

Managing Director

Karnataka Renewable Energy Development Limited

Sub: Bid for Selection of "EPC CONTRACTOR FOR DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT".

With reference to your RFP document dated *****, I/we, having examined the Bid Documents and understood their contents, hereby submit my/our Bid for the aforesaid Project. The Bid is unconditional and unqualified.

- I/We intend to participate in the bidding process as single entity.
- I/ We propose to develop the following project:…….
- All information provided in the Bid and in the Appendices is true and correct.
- This statement is made for the express purpose of qualifying as a Bidder for the design, finance, construction and operation & maintenance of the aforesaid Project.
- I/ We shall make available to KREDL any additional information it may find necessary or require to supplement or authenticate the Bid.
- I/ We acknowledge the right of KREDL to reject our Bid without assigning any reason or otherwise and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.

- We certify that in the last three years, we have neither failed to perform on any contract, as evidenced by imposition of a penalty or a judicial pronouncement or arbitration award, nor been expelled from any project or contract nor

have had any contract terminated for breach on our part.

I/ We declare that:

(i) I/ We have examined and have no reservations to the Bidding Documents, including any Addendum issued by KREDL.

(ii) I/ We do not have any Conflict of Interest in accordance with the RFP document;

(iii) I/We have not directly or indirectly or through an agent engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as defined in Section4 of the RFP document, in respect of any tender or request for proposal issued by or any agreement entered into with KREDL or any other public sector enterprise or any government, Central or State; and

(iv) I/ We hereby certify that we have taken steps to ensure that in conformity with the provisions of Section4 of the RFP, no person acting for us or on our behalf has engaged or will engage in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.

(v) The undertakings given by us along with the Bid in response to the RFP for the Project were true and correct as on date of making the Bid and are also true and correct as on the Bid Due Date and Due Date and I/We shall continue to abide them.

(vi) We confirm that there is no ongoing litigation or litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Group Business Entities is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfilment of its obligations under this Agreement.

(vii) I/ We understand that you may cancel the Bidding Process at any time and that you are neither bound to accept any Bid that you may receive nor to invite the Bidders to Bid for the Project, without incurring any liability to the Bidders, in accordance with the RFP document.

(viii) I/ We believe that we satisfy(ies) the Financial Capacity and meet(s) the requirements as specified in the RFP document and are/ is qualified to submit a Bid in accordance with the RFP document

(ix) I/ We certify that in regard to matters other than security and integrity of the country, we have not been convicted by a Court of Law or indicted or adverse orders passed by a regulatory authority which could cast a doubt on our ability to undertake the Project or which relates to a grave offence that outrages the moral sense of the community.

(x) I/ We further certify that in regard to matters relating to security and integrity of the country, we have not been charge-sheeted by any agency of the Government or convicted by a Court of Law for any offence committed by us or by any of our Group Business Entity's.

(xi) The Statement of Legal Capacity as per format provided at Annex-V in Appendix-I of the RFP document, and duly signed, is enclosed. The power of attorney for signing of Bid as per format provided at Appendix II of the RFP, are also enclosed.

(xii) I/ We further certify that we are not barred by the Central/ State Government, or any entity controlled by them, from participating in any project, and the bar subsists as on the date of Bid, would not be eligible to submit a Bid, either individually or as member of a Consortium.

(xiii) I/ We further certify that no investigation by a regulatory authority is pending either against us or against our Group Business Entities or against our CEO or any of our Directors/ Managers/ employees.

(xiv) I/ We undertake that in case due to any change in facts or circumstances during the Bidding Process, we are attracted by the provisions of disqualification in terms of the guidelines referred to above, we shall intimate KREDL of the same immediately.

(xv) I/We hereby irrevocably waive any right which we may have at any stage at law or howsoever otherwise arising to challenge or question any decision taken by KREDL in connection with the selection of the Bidder, or in connection with the Bidding Process itself, in respect of the above mentioned Project and the terms and implementation thereof.

(xvi) In the event of my/ our being declared as the Selected Bidder, I/We agree to enter into a contract in accordance with the tender terms that has been provided to me/us prior to the Bid Due Date. We agree not to seek any changes in the aforesaid RFP/Tender and agree to abide by the same.

(xvii) I/We have studied all the Bidding Documents carefully. We understand that except

to the extent as expressly set forth in the specifications, we shall have no claim, right or title arising out of any documents or information provided to us by KREDL or in respect of any matter arising out of or concerning or relating to the Bidding Process including the award of Rights.

(xviii) The Total Price has been quoted by me/us after taking into consideration all the terms and conditions stated in the RFP;

(xix) I/We offer a Bid Security of INR 8,30,000/- (Indian Rupees Eight Lakh Thirty Thousand only) to KREDL in accordance with the RFP Document.

(xx) I/We agree and understand that the Bid is subject to the provisions of the Bidding Documents. In no case, I/We shall have any claim or right of whatsoever nature if the Project is not awarded to me/us or our Bid is not opened.

(xxi) I/We agree to keep this offer valid for 180 (One Hundred and Eighty) days from the Bid Due Date specified in the RFP.

(xxii) I/We agree and undertake to abide by all the terms and conditions of the RFP document.

In witness thereof, I/we submit this Bid under and in accordance with the terms of the RFP document.

Yours faithfully,

Date: (Signature of the Authorised signatory)

(Name and designation of the of the Authorised signatory)

Place: Name and seal of Bidder

ANNEX-I
Details of Bidder
(On the Letterhead of the Bidder)

1. (a) Name:
(b) Country of incorporation:
(c) Address of the corporate headquarters and its branch office(s), if any, in India:
(d) Date of incorporation and/ or commencement of business:

2. Brief description of the Company including details of its main lines of business and proposed role and responsibilities in [this/ these Project(s)]:

3. Details of individual(s) who will serve as the point of contact/ communication for KREDL:
(a) Name:
(b) Designation:
(c) Company:
(d) Address:
(e) Telephone Number:
(f) E-Mail Address:
(g) Fax Number:

4. Particulars of the Authorised Signatory of the Bidder:
(a) Name:
(b) Designation:
(c) Address:
(d) Phone Number:
(e) Fax Number:

5. A statement by the Bidder disclosing material non-performance or contractual non-compliance in past projects, contractual disputes and litigation/ ongoing litigation/ arbitration in the recent past is given below (Attach extra sheets, if necessary. We confirm that there is no ongoing litigation or litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Group Business Entities is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfilment of its obligations under this Agreement.

I/We wish to furnish the list /statement of the cases faced/facing by me/us in the past/recent projects as below;

Sl. No	Details of material non-performance /contractual non-compliance in past projects,	Status of the dispute (resolved/ pending)	Details of contractual non-compliance litigation/ arbitration in the recent past	Status of the dispute(resolved/pending)

6. Copy of Incorporation certificate, GST, PAN, TIN and last 3 year income tax return certificate are attached here

(Signature of the Authorised signatory)

ANNEX – II(A)
Declaration of adopting Solar PV Modules & Cells

Declaration of adopting Solar PV Modules & Cells as per latest ALMM list-I and List-II respectively as published by MNRE.

I/We understand that, as per Tender / Bid conditions, we hereby declare that I/We will be using Solar PV Modules & Cells as per latest ALMM list-I and List-II respectively as published by MNRE as on bid due date.

We further confirm that we are aware that our Bid for the Project would be liable for rejection in case any material misrepresentation is made or discovered with regard to the requirements of this RFP at any stage of the Bidding Process or thereafter during the agreement period.

Dated this ……. Day of ……., 20….

Name of the Bidder

Signature of the Authorised person

Name of the Authorised Person

ANNEX – II(B)

Format for Declaration by the Bidder for the proposed technology

Sl. No.	Particulars		
1.	Name of Bidding Company		
2.	Project Location		
3.	Capacity proposed	MWAC	
4.	Technology proposed to be adopted for the Solar Project		
6.	Estimated DC Capacity Utilization Factor (Minimum 19%)		%
7.	Estimated Annual Generation of Electrical Energy (Minimum 2.67 Million units)		Million units

Signature of the Authorized Signatory

Name of the Authorized Signatory

ANNEX – II(C)

Format for Technical Capacity

[On the letterhead of Bidder]

To,

Managing Director (MD)

Karnataka Renewable Energy Development Limited

Dear Sir,

Sub: Response to RFP No. _____

We hereby confirm and certify that

Work performed of similar nature in the last Five years as per section 3 of qualification information submitted

Note: Forms as per section 3 and The documentary proof of fulfilling the qualifying requirements shall be uploaded along with the bid. The bidder shall upload the P.O, LOI/LOA/ DWA, Work done Certificates/ Performance Certificates issued by the end users not below the rank of Executive/ Divisional Engineer/Owner/Engineer in charge along with the bid.

(Signature & Name of the person Authorized)

ANNEX - III

Financial Capacity of the Bidder

(On the Letterhead of the Bidder)

Bidder type	Net Worth (INR Crores)
Single Business Entity Bidder	
TOTAL	

Instructions:

1. For conversion of US Dollars to Rupees, the rate of conversion shall be exchange rate as on the Bid Due Date as issued by Reserve Bank of India. In case of any other currency, the same shall first be converted to US Dollars as on the date 60 (sixty) days prior to the Bid Due Date, and the amount so derived in US Dollars shall be converted into Rupees at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the International Monetary Fund for the relevant date.

1. The Bidder shall attach copies of the balance sheets, financial statements and Annual Reports as on March 31, 2024. The financial statements shall:

- reflect the financial situation of the Bidder and its Group Business Entity where the Bidder is relying on its Group Business Entity's financials;
- be audited by a Chartered Accountant;
- be complete, including all notes to the financial statements; and
- correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).
- In case the annual accounts for the latest financial year are not audited and therefore the Bidder could not make it available, the Bidder shall give an undertaking to this effect and the Chartered Accountant shall certify the same.

2. For avoidance of doubt, "net worth" as per section 2 (57) of the Companies Act 2013 means the aggregate value of the paid-up share capital and all reserves created out of the profits and securities premium account, after deducting the aggregate value of the accumulated losses, deferred expenditure and miscellaneous expenditure not written off, as per the audited balance sheet, but does not include reserves created out of revaluation of assets, write-back of depreciation and amalgamation.

3. The Bidder shall also provide the name and address of the Bankers to the Bidder.

The Bidder shall provide a certificate from the Chartered Accountant specifying the net worth of the Bidder and also specifying the methodology adopted for calculating such net worth.

(Signature & Name of the person Authorized)

ANNEX – III A

Format for Certificate from Chartered Accountant/Independent Auditor for Financial Capacity of the Bidder

(On the Letterhead of the Chartered Accountant)

Date:

We have verified the relevant statutory and other records of M/s _____

_____ [Name of the Single Business Entity] and certify that the net worth is INR Crores (Indian Rupees____Crores) as on the last date of the Financial Year, as per the equivalent law in respective foreign countries.).

All figures are in Crore INR

Particulars	**FY 2023-24**
Aggregate value of the paid-up share capital ➢ Fully, compulsorily and mandatorily convertible Preference shares ➢ Fully, compulsorily and mandatorily convertible Debentures.	[Insert the amount in Crore INR]
Add: All reserves created out of the profits and securities premium account	[Insert the amount in Crore INR]
Subtract: Accumulated losses	[Insert the amount in Crore INR]
Subtract: Deferred expenditure	[Insert the amount in Crore INR]
Subtract: Miscellaneous expenditure not written off	[Insert the amount in Crore INR]
Net worth* as on the last date ending Financial Year/ Calendar Year, as per the equivalent law in respective foreign countries.	[Insert the amount in Crore INR]

Note: * The above Net worth does not include reserves created out of revaluation of assets, write-back of depreciation and amalgamation.

We have submitted the consolidated audited financial statements along with the supporting notes as annexure for the said FY 2023-24.

This certificate highlighting the breakup of the net worth including the reference of the various notes in the annual accounts is being issued to be produced before Karnataka Renewable Energy Development Company, for the "Selection of EPC CONTRACTOR FOR DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT" vide RFP no._

Signature and Seal and Registration number of Chartered Accountant

ANNEX IV

Format for Certificate from Chartered Accountant/Independent Auditor for Group Business Entity

(On the Letterhead of the Chartered Accountant)

“Not applicable”

ANNEX-V

Statement of Legal Capacity

(On the letterhead of the Bidder)

Ref. Date:

To,
Managing Director
Karnataka Renewable Energy Development Ltd. (KREDL)

Dear Sir,

I/We hereby confirm that we…… (constitution of which has been described in the Bid) satisfy the terms and conditions laid out in the RFP document.

We have agreed that……..(insert individual's name) will act as our representative and has been duly authorized to submit the RFP. Further, the authorised signatory is vested with requisite powers to furnish such letter and authenticate the same.

Thanking you, Yours faithfully,

(Signature, name and designation)

For and behalf of (name of the company)

*Please strike out whichever is not applicable

ANNEX - VI

Anti-Collusion Certificate

(On the Letterhead of the Bidder)

We hereby certify and confirm that in the preparation and submission of our Bid for Selection of "EPC CONTRACTOR FOR DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT" District of Karnataka, we have not acted in concert or in collusion with any other Bidder or other person(s) and also not done any act, deed or thing which is or could be regarded as anti-competitive.

We further confirm that we have not offered nor will offer any illegal gratification in cash or kind to any person or agency in connection with the instant Bid.

Dated this .....Day of....., (month/year)

.....

(Name of the Bidder)

.....

(Signature of the Authorised Person)

.....

(Name of the Authorised Person)

ANNEX VII

Format for Affidavit certifying that the Entity/Promoter/s / Director/s of Entity are not blacklisted

(On a Stamp Paper of appropriate value)

Anti-Blacklisting Affidavit

We, M/s. …… (Single Business Entity), (the names and addresses of the registered office) hereby certify and confirm that we or any of our promoter/s / director/s are not barred by Karnataka Renewable Energy Development Ltd. (KREDL) / any other entity of Government of Karnataka or blacklisted by any state government or central government / department / agency in India from participating in Project/s, either individually or as member of a Consortium as on the (Bid Due Date).

We further confirm that we are aware that our Bid for the Project would be liable for rejection in case any material misrepresentation is made or discovered with regard to the requirements of this RFP at any stage of the Bidding Process or thereafter during the agreement period.

Dated this ……..Day of , 20….

Name of the Bidder

Signature of the Authorised person

Name of the Authorised Person

ANNEX –VIII

Declaration of Shareholding Pattern of the Bidder

I/We hereby Declare information of all the entities holding 15% or more shareholding in the Bidder, directly/indirectly. The information includes any compulsorily convertible Preference Shares and/or Debentures, a declaration of the likely shareholding after conversion of such instruments. The information provided herein clearly indicates the foreign shareholding and domestic shareholding in the Bidder (Differentiate between Foreign Shareholding and Domestic Shareholding):

(Information on shareholding not more than seven (7) days from the date of submission of Technical Bid).

Sl. No	Name of the Shareholder	Domestic Share holder	Foreign Share holder	Percentage of Shareholding
1.				
2.				
…				

Yours faithfully,

(Signature of the Authorised signatory)

Note: If no entity is holding more than 15%, then the format shall be uploaded stating "Not Applicable".

ANNEX-IX

Information to be Furnished by the Bidder

Information and details to be furnished from the bidder. The details to be provided include the following:

- Checklist
- Detail of Bidders

ANNEX X

Format for "NO DEVIATION CERTIFICATE" certifying that the Bidding Entity has not taken any deviation

(On the Letter head of the Bidding Entity – Single Business Entity)

No Deviation Certificate

I/ We, M/s. (Single Business Entity), (the names and addresses of the registered office) hereby certify and confirm that we have read the clauses and provisions of the RFP, amendments, addendums & clarifications issued thereafter and the stipulation of all clauses and provisions are acceptable to us, and we have not taken any deviation whatsoever to any of the clauses and provisions:

Declaration of deviation considered by the Bidding entity, if any

Name of the conditions	Reference clause no.	Deviation considered
Bid Security/EMD (E-payment of Rs.8,30,000)		
Form of tender		
APPENDIX - I Letter of Bid		
ANNEX - I Details of Bidder		
ANNEX-II(A) (Declaration of adopting Solar PV Modules & Cells)		
ANNEX-II(B) (Format for Declaration by the Bidder for the proposed technology)		
ANNEX-II(C) (Format for Technical Capacity)		
ANNEX – III Financial Capacity of the Bidder		
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ANNEX - V Statement of Legal Capacity		
ANNEX - VI Anti-Collusion Certificate		
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ANNEX - VIII Declaration of Shareholding Pattern of the Bidder		
ANNEX - IX Information to be Furnished by the Bidder		
ANNEX - X No Deviation Certificate		
ANNEX - XI Certification for not availing/ to avail subsidy/ grant/ central financial assistance from MNRE and/or any other State Government and/or any other Central Government		
ANNEXURE – XII Eligibility Clauses in Respect of Restrictions On Procurement from A Bidder of a Country Which Shares a Land Border with India		
ANNEXURE - XIII Restrictions on Sourcing of Equipments/Materials by The Bidder From a Vendor of a Country Which Shares a Land Border With India		
APPENDIX - II Power of Attorney for signing of Bid		
APPENDIX - III Not applicable		
APPENDIX – IV – Not applicable Bank Guarantee/Insurance Surety Bond		
APPENDIX - V Not applicable		
Appendix VI – Site Details		
Any other deviation in RFP		

Instruction for the above table: Please mention “No deviation considered” against each line item in case the Bidder is not proposing deviation whatsoever to any of the clauses and provisions of the RFP”). The Bidding Entity shall be considered as Non-Responsive in case this ANNEX – X is not submitted by the Bidding Entity.

We further confirm that we are aware that our Bid for the Project would be liable for rejection in case any material misrepresentation is made or discovered with regard to the requirements of this RFP at any stage of the Bidding Process or thereafter during the agreement period.

Dated this ……..Day of , 20….
Name of the Bidder
Signature of the Authorised person
Name of the Authorised Person

ANNEX XI

(Certification for not availing/ to avail subsidy/ grant/ central financial assistance from MNRE and/or any other State Government and/or any other Central Government)

This is to certify that we, [insert the name of the Bidder] have applied for the installation of solar projects on either land or rooftop or floating area or canal top or combination of either of the abovefor the Project to be implemented at a location within the geographical boundary of the respective Talukas/ Legislative Constituencies of Karnataka for participating under this RFP and we have not availed any subsidy/ grant/ central financial assistance from Ministry of New and Renewable Energy (MNRE) and/or any other State Government and/or any other Central Government, in this regard.

We hereby further also agree not to claim any subsidy/ grant/ central financial assistance either from MNRE and/or any other State Government and/or any other Central Government for the same. In case it is found that we have availed any subsidy/ grant/ central financial assistance from MNRE and/or any other State Government and/or any other Central Government then KREDL, at its own discretion, can cancel all the capacities quoted in our Bids and the Bid Security/ Performance Security (if any) as submitted by us can also be forfeited. Further, KREDL can blacklist us for participating in any further Bid in KREDL up to the level of participating in any tender for Government of Karnataka.

Signature of the Bidder:

Date & Place:

ANNEXURE - XII

ELIGIBILITY CLAUSES IN RESPECT OF RESTRICTIONS ON PROCUREMENT FROM A BIDDER OF A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA

Sl. No.	ELIGIBILITY CLAUSES
1	Any bidder from a country which shares a land with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.
1.1	"Bidder" (including the term 'tenderer', consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
1.2	"Bidder from country which shares a land border with India" for the purpose of this Order means:- 1. An entity incorporated, established or registered in such a country; or
	2. A subsidiary of an entity incorporated, established or registered in such a country; or
	3. An entity substantially controlled through entities incorporated, established or registered in such a country; or
	4. An entity whose *beneficial owner* is situated in such a country; or
	5. An Indian (or other) agent of such an entity; or
	6. A natural person who is a citizen of such a country; or
	7. A consortium where any member of the consortium falls under any of the above.
1.3	I. The *beneficial owner* for the purpose of above clause will be as under: (i) In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means. Explanation- • "Controlling ownership interest' means ownership of or entitlement to more than twenty-five percent of shares or capital or profits of the company; • "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
	(ii) In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
	(iii) In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

Sl. No.	ELIGIBILITY CLAUSES
	(iv) Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
	(v) In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
	"Transfer of Technology" means dissemination and transfer of all forms of commercially usable knowledge such as transfer of know-how, skills, technical expertise, designs, processes and procedures, trade secrets, which enables the acquirer of such technology to perform activities using the transferred technology independently. (Matters of interpretation of this term shall be referred to the Registration Committee constituted by the Department of Promotion of Industry and Internal Trade, Government of India and the interpretation of the Committee shall be final).
	"Specified Transfer of Technology" means a transfer of technology in the sectors and/ or technologies, specified in paragraph 14 **of G.O No.FD455 Exp-12 2020 Bengaluru dated 01.04.2023 of GoK.**, occurring on or after 25.08.2020
1.4	An Agent is a person employed to do any act for another, or to represent another in dealings with third person.
	The Registration from the Competent Authority shall be valid at the time of Submission of Bid and at the time of acceptance of Bid.
	If the Bidder was validly registered at the time of Acceptance/Placement of order, Registration shall not be a relevant consideration during Contract execution.
	Certificates/Undertakings to be furnished by the Bidder and Consortium Partner(In case of Consortium) as per G.O No.FD455 Exp-12 2020 Bengaluru dated 01.04.2023 of GoK.
1.5	A certificate for having read the above clauses is required to be submitted/uploaded by the tenderer separately in the following format: *"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration by the Competent Authority shall be attached.)"*
1.6	**IN CASES WHERE SUB CONTRACTING IS PROVIDED:Deleted**
1.7	A certificate for having read the above clauses is required to be submitted/uploaded by the tenderer separately in the following format: 1. I have read the clause regarding restrictions on procurement from a bidder/vendor having Transfer of Technology (TOT) arrangement. I certify that this bidder/vendor does not have any TOT arrangement requiring registration with the competent authority. **OR** I have read the clause regarding restrictions on procurement from a bidder/vendor having Transfer of Technology (TOT) arrangement. I certify that this bidder/vendor has valid registration to participate in this procurement.

Sl. No.	ELIGIBILITY CLAUSES
	Note: As per GOK circular dated 10.03.2021 and 29.03.2021 regarding Registration with Competent Authority, the following are the clarifications: 1. *A Bidder is permitted to procure raw material, components, sub-assemblies etc., from the vendors from the countries which shares a land border with India. Such vendors will not be required to be registered with the Competent Authority, as it is not regarded as "sub-contracting".* 2. *However, in case a bidder has proposed to supply finished goods, procured directly /indirectly from the vendors from the countries sharing land border with India, such vendors will be required to be registered with the Competent Authority.* 3. *Procurement of spare parts and other essential service support like Annual Maintenance Contract (AMC)/Comprehensive Maintenance Contract (CMC), including consumables for closed systems, from Original Equipment Manufacturers (OEMs) or their authorized agents, are exempted from the requirement of registration as mandated under Government Order No: FD 455 Exp-12/2020, Bengaluru, dated: 28.08.2020.*

RESTRICTIONS ON SOURCING OF EQUIPMENTS/MATERIALS BY THE BIDDER FROM A VENDOR OF A COUNTRY WHICH SHARES A LAND BORDER WITH INDIA

The Vendors of the equipments/materials proposed to be supplied to the subject work shall meet the eligibility clauses specified regarding restrictions on procurement from a bidder of a country which shares a land border with India as specified in Annexure- XII of the tender document. The Bidder shall source the equipments/materials only from such Vendors who meet the clauses specified in the Annexure- XIII.

A certificate is to be submitted/uploaded by the Bidder agreeing to source the equipment/material for the work from the Vendors who meet the eligibility clauses regarding restrictions on procurement from a country which shares a land border with India separately in the following format:

"I have read the clause regarding restrictions on procurement from a bidder/vendor of a country which shares a land border with India; I certify that this bidder/vendor is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder/vendor fulfills all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration by the Competent Authority shall be attached.)"

Note:

As per GOK circular dated 10.03.2021 and 29.03.2021 regarding Registration with Competent Authority, the following are the clarifications:

- *A Bidder is permitted to procure raw material, components, sub-assemblies etc., from the vendors from the countries which shares a land border with India. Such vendors will not be required to be registered with the Competent Authority, as it is not regarded as "sub-contracting".*
- *However, in case a bidder has proposed to supply finished goods, procured directly /indirectly from the vendors from the countries sharing land border with India, such vendors will be required to be registered with the Competent Authority.*
- *Procurement of spare parts and other essential service support like Annual Maintenance Contract (AMC)/Comprehensive Maintenance Contract (CMC), including consumables for closed systems, from Original Equipment Manufacturers (OEMs) or their authorized agents, are exempted from the requirement of registration as mandated under Government Order No: FD 455 Exp-12/2020, Bengaluru, dated: 28.08.2020.*

APPENDIX – II

Power of Attorney for signing of Bid

(To be executed on Stamp paper of appropriate value)

Know all men by these presents, We,___(name of the firm and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorise Mr. / Ms (Name), son/daughter/wife of _____and presently residing at_____, who is [presently employed with us and holding the position of_____, as our true and lawful attorney (hereinafter referred to as the "Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our Bid for the "**Selection of "EPC CONTRACTOR FOR DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND- MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR THE PROPOSED 300 KW HYDROGEN PLANT" of Karnataka as per RFP no.__dated_____**, proposed by the Karnataka Renewable Energy Development Limited (the "KREDL") including but not limited to signing and submission of all applications, Bids and other documents and writings, participate in Bidders' and other conferences and providing information / responses to KREDL, representing us in all matters before KREDL, signing and execution of all contracts including undertakings consequent to acceptance of our Bid, and generally dealing with KREDL in all matters in connection with or relating to or arising out of our Bid for the said Project and/or upon award thereof to us and/or till completion of contract.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things lawfully done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE,_____, THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS___DAY OF_____,

20**.

For_____(Signature)

(Name, Title and Address)

Witnesses:

1

2

Accepted [Notarised]

(Signature)

(Name, Title and Address of the Attorney)

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)

- Also, the Bidder should submit the extract of the charter documents such as a Board resolution, power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder for verification.

- For a Power of Attorney executed and issued overseas, the document will also have to be legalised by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention 1961 are not required to be legalised by the Indian Embassy if it carries a conforming Appostille certificate.

- Board resolution / charter documents which confirms the person/director who is authorizing having valid power till validity of the bid. Otherwise board resolution or power of attorney should be signed by all directors as per GST certificate submitted.

APPENDIX – III

Power of Attorney for Lead Member of Consortium

" Not Applicable"

APPENDIX – IV

Bank Guarantee/Insurance Surety Bond for Bid Security

Not Applicable

APPENDIX V

Joint Bidding Agreement

" Not applicable"

Appendix VI – Site Details

KPCL – Bellary Thermal Power Station and it's land

The latitude and longitude coordinates of the lake are in the range of 15°12'10"N & 76°43'01"E. The lake is located at directly north of the BTPS plant and is a good idealspot for nearby H2 production and supply. The city of Bellary is at elevation of about 500 meter above Sea Level. The land area is spread over 200 acres. A detailed land analysis and soil bearing capacity studies needs to be conducted to determine the foundation mechanisms for the ground mount solar pilot and should be a part of the overall contractor scope. After assessing the lake suitability for ground mount Solar onsite, Green Hydrogen production cost also needs to be assessed, based on the distance from Solar to hydrogen plant, extra cabling requirements, Civil works needs to be assessed.

Based on the site audit conducted the land has adequate space available for the pilot solar PV plant of 1.62MWp near the pumphouse area itself with evacuation closeby. The land located right next to the pump house transformer station is enough for the Green Hydrogen electrolyzer, compressor and storage area with sufficient transport access. The transformer room has 2X1.25MW and 2X1.6MW transformers and one of the 1.6MW transformers can be used to export the power produced by the solar PV plant with net metering so that the complete 24X7 operation of hydrogen electrolyser, compressor and storage power can be completely using green electricity. Hence this location is ideal for our pilot plant.

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 5

CONDITIONS OF CONTRACT

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G. Special Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Bold letters are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Tender.

Compensation events are those defined in Clause 38 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Employer in accordance with Sub Clause 46.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.2 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Tender to carry out the Works has been accepted by the Employer.

The **Contractor's Tender** is the completed Tender document submitted by the Contractor to the Employer.

The **Contract price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects liability period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Employer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

Plant Facilities includes Solar PV and Green Hydrogen and all its associated Infrastructure.

The **Site** is the area defined as such in the Contract Data.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Employer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

A **Variation** is an instruction given by the Employer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement
(2) Letter of Acceptance
(3) Contractor's Tender
(4) Contract Data
(5) Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bill of quantities and
(9) any other document listed in the Contract Data as forming part of the Contract.

3. Law governing contract

3.1 The law governing the Contract is the Laws of India supplanted by the Karnataka Local Acts.

4. Employer's decisions

4.1 Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor.

5. Delegation

5.1 The Employer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

7. Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).Subcontracting

7.1 The Contractor may subcontract with the approval of the Employer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer.

9. Personnel

9.1 The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by GOK from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer.

9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer's and Contractor's risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's risks

11.1 The Employer is responsible for the excepted risks which are:

(a) rebellion, riot commotion or disorder unless solely restricted to employees of the Contractor or his Sub-Contractors arising from the conduct of the Works; or

(b) any operation of the forces of nature (in so far as it occurs on the Site) which an experienced contractor:

(i) could not have reasonably foreseen; or

(ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures;

(A) prevent loss or damage to physical property from occurring by taking appropriate measures or

(B) insure against such loss or damage

12. Contractor's risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract are the sole responsibility of the Contractor.

13. Insurance:

13.1 The Contractor shall prior to commencing the works, effect and thereafter maintain insurances , in the Contractor, (cover from the first working day after the Start Date to the end of Contract completion Period) as per prevailing government norms

13.2 Necessary Policies and certificates for insurance shall be kept at site at all times for verification of Government agencies or as per Law

13.3 If the Contractor fails to effect or keep in force any of the insurances referred to in the previous sub-clauses or fails to provide satisfactory evidence, policies or receipts, performance of the Contract is the sole responsibility of the Contractor

13.4 Deleted

13.5 Deleted

14. Site Investigation Reports:

14.1 The Contractor, in preparing the tender, shall rely on any site investigation reports referred to in the Contract data, supplemented by any information available to the Tenderer.

14.2 Contractor is solely responsible for verification of the data collected from KREDL and other parties

15. Queries about the Contract Data

15.1 The Employer will clarify queries on the Contract Data.

16. Contractor to construct the Works

16.1 The Contractor shall construct the Works in accordance with the Specification and Drawings.

17. The Works to be completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Employer, and complete them by the Intended Completion Date.

18. Approval by the Employer:

18.1 The Contractor shall submit Specification and drawings showing the proposed Temporary Works to the Employer, who is to approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be solely responsible for the design, construction , erection, testing and commissioning and also maintenance of the project

18.3 Deleted

18.4 Deleted

18.5 Deleted

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the

Site is the property of the Employer/As per laws of India . The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

21. Possession of the Site

21.1 The Employer shall give possession of all parts of the Site to the Contractor after execution sub lease agreement.

22. Access to the Site

22.1 The Contractor shall allow the Employer and any person authorized by the Employer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

23. Instructions

23.1The Contractor shall carry out all instructions of the Employer which comply with the applicable laws where the Site is located.

24. Procedure for resolution of Disputes:

24.1 If the Contractor is not satisfied with the decision taken by the Employer, the dispute shall be referred by either party to Arbitration within 30 days of the notification of the Employer's decision.

24.2 If neither party refers the dispute to Arbitration within the above 30 days, the Employer's decision will be final and binding.

24.3 The Arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

B. Time Control

25. Program

25.1 Within the time stated in the Contract Data the Contractor shall submit to the Employer for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works.

25.2 The Employer's approval of the Program shall not alter the Contractor's obligations. The

Contractor may revise the Program and submit it to the Employer again at any time.

26. Extension of the Intended Completion Date

26.1 The Employer/KPCL shall extend the Intended Completion Date if a force majeure event occurs which makes it impossible for Completion to be achieved by the Intended Completion Date.

26.2 The Employer/KPCL shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Employer for a decision upon the effect of a such Event by submitting full supporting information.

27. Delays ordered by the Employer

27.1 The Employer may instruct the Contractor to delay the start or progress of any activity within the Works if any force majeure event occurred

28. Management meetings

28.1 The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for remaining work.

28.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

C. Quality Control

29. Identifying defects

29.1 The Employer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Employer may instruct the Contractor to search for a Defect and to uncover and test any work that the Employer considers may have a Defect if required

30. Tests

30.1If the Employer may instructs the Contractor to carry out a test within the provision of this RFP if required

31. Correction of defects

31.1 The Employer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

31.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Employer's notice.

32. Uncorrected defects

32.1 If the Contractor has not corrected a Defect within the time specified in the Employer's notice, the Employer will assess the cost of having the Defect corrected, and the Contractor will pay this amount if it is deemed absolutely necessary as per Government law or SLDC/KPCL requirement

D. Cost Control

33. Bill of Quantities (BOQ):

33.1 The BOQ shall contain items for the Land identification, design, supply, construction, installation, testing, and commissioning and O&M for 10 years work to be done by the Contractor.

33.2 The BOQ is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate as per terms & conditions of the Contract.

33.3 List of Materials to be Supplied, erected, tested, commissioned and civil works etc, by the Contractor is brought out in Technical specifications and Bid document. The Bidders shall quote unit charges shall be inclusive of all charges, incidentals, cost towards boarding, lodging and transportation of bidder's staff, labour etc. and the CGST, SGST, IGST, UTGST, levies, surcharge/ cess etc.,

34. Variations:

34.1 It is a lumpsum turnkey EPC contract. Qty variation not applicable. However In exceptional case being pilot project the flowing may be applicable by the approval of competent authority in case of exigencies. The Employer shall have power to order the Contractor to do any or all of the following as

considered necessary or advisable during the progress of the work by him

- Increase or decrease of any item of work included in the Bill of Quantities (BOQ)/ Work Award;
- Omit any item of work;
- Change the character or quality or kind of any item of work;
- Change the levels, lines, positions and dimensions of any part of the work;
- Execute additional items of work of any kind necessary for the completion of the works; and
- Change in any specified sequence, methods or timing of construction of any part of the work.

34.2 The Contractor shall be bound to carry out the work in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not vitiate or invalidate the contract.

34.3 Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for increase or decrease in the quantity of an item appearing in the BOQ/Work Award so long as the work executed conforms to the approved drawings/Designs.

34.4 The Contractor shall promptly request in writing to the Employer to confirm verbal orders and the officer issuing oral instructions shall confirm it in writing within 30 days, failing which the work shall be carried out as though there is no variation. In case variation is approved it shall be accompanied by BOQ, failing which the contractor shall be responsible for deviation if any. Further, approval of Competent Authority has to be obtained for the variation as per Manual of Delegation of Powers, KREDL.

35. Payments for Variations/ Change of Quantity:

35.1 & 35.2 For both Electrical (Supply, Erection) and Civil Works: It is a lumpsum turnkey EPC contract. Price variation not applicable. However In exceptional case being pilot project the flowing may be applicable by the approval of competent authority in case of exigencies

During the execution of the Contract, the Owner reserves the right to increase the Quantities of items & Payment shall be as detailed below:

A. During non-freak rates(For both Electrical and Civil works):

1) Payment for increase in the quantities of an item in the BOQ upto 25% of that provided in the Bill of Quantities shall be made at the rates quoted by the Contractor.

2) For quantities in excess of 125% of the tendered quantity of an item as given in the BOQ, the Contractor shall be paid at the rate entered in or derived from in the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract.

B. During freak rates(For both Electrical and Civil works):

During the execution of the Contract, the Owner reserves the right to increase the Quantities of items without any ceiling limit under the Contract without any change in other terms and conditions of the contract except the unit rate of such freak item.

The unit rate applicable shall be as detailed below:

(1) For DWA (awarded) quantities, the contact shall be paid/admitted at unit rate quoted (or as awarded) by the Bidder.

(2) For quantities exceeding DWA (awarded) quantities, without any ceiling limit, the contractor shall be paid/admitted at the rate entered in the Major Works Scheduled of Rates (SR) (applicable at the time of according approval to award of contract) plus or minus the overall percentage of the original tendered rates over the updated estimate cost prevalent at the time of according approval to award of contract OR the unit rate quoted (or as awarded) by the Bidder as the case maybe, whichever is lower.

Note: Freak rate shall be determined based on the following:

1. Schedule of Rates (SR) for supply portion includes ESCOM/KPWD/KPTCL Major Works Schedule of Rates or updated Major Works Schedule of Rates updated as per IEEMA/ CACMAI and including all loading factors as per component abstract, as applicable at the time of according approval to award of contract.

Note: For materials which are not covered in ESCOM/KPWD/KPTCL MWSR, the SR at the time of award shall be the same as DPR rates (approved rates) considered while arriving at the amount put to tender.

2. Schedule of Rates (SR) for erection portion includes ESCOM/KPWDKPTCL Major Works Schedule of Rates including all loading factors as per component abstract as applicable at the time of according approval to award of contract.

Note: For materials which are not covered in ESCOM/KPWD/KPTCL MWSR, the SR at the time of award shall be the same as DPR rates (approved rates) considered while arriving at the amount put to tender.

3. Schedule of Rates (SR) for Civil Portion includes KPWDUNI SR as applicable at the time of according approval to award of contract.

Note: For materials which are not covered in KPWDUNI SR / KPTCL MWSR, the SR at the time of award shall be the same as DPR rates (approved rates) considered while arriving at the amount put to tender.

35.3 Non-DWA items-For both electrical &civil works:-

If unit rates or prices for any such changes are not available in the contract, the pricing of any such changes shall be calculated in accordance with the KPWDUNI SR/KPTCL schedule of rates or data rates as the case may be, whichever is lower without any ceiling limit.

35.4 If the rates for additional, substituted or altered item of work cannot be determined either as at 35.1 or 35.2 or 35.3 above, the Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed, within 7 days.

35.5 If the Contractor's quotation is determined unreasonable, the Employer may order the Variation and make a change to the Contract Price which shall be based on Employer's own forecast of the effects of the Variation on the Contractor's costs.

35.6 Deleted.

35.7 Under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates for items falling under this Clause.

35.8 The Contract Price shall accordingly be adjusted based on the Unit Rates available in the Contract for the change in Quantities as above. The base Unit Rates, as identified in the Contract shall however remain constant during the currency of the Contract, except as provided for in Clause 40 of CC.

36 Submission of Bills for Payment:

36.1 The Contractor shall submit to the Employer monthly bills of the value of the work completed less the cumulative amount paid previously.

36.2 The Employer shall check the Contractor's bill and determine the value of the work executed which shall comprise of value of the quantities of the items in the BOQ completed

36.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later information.

37 Payments:

37.1 Payments shall be adjusted for deductions other than recoveries in terms of contract and taxes, at source, as applicable under the law.

37.2 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

37.3 The Payment to the Contractor for the Performance of the Works under the Contract will be made by the Owner as per the guidelines and Conditions specified herein and as per the payment terms stipulated in RFP. The final Payment will be made on Completion of all Works and on fulfillment by the Contractor of all his liabilities under the Contract.

37.4 Currency of Payment

All Payments under the Contract shall be in Indian Rupees only.

37.5 Payment Schedule:

The Contractor shall prepare and Submit to the Engineer for approval a detailed break up of the Contract Price. This Contract Price break-up shall be inter-linked with the agreed detailed activity chart of the Contractor setting forth his starting and Completion dates for the various key phases of Works prepared. Any Payment under the Contract shall be made only after the Contractor's Price break-up is approved by the Engineer in charge

A **Plant and Equipment (Module, Inverter, Balance of Plant and Equipment) and Mandatory Spares**

In respect of Plant and Equipment along with Mandatory Spares supplied, the following payments shall be made:

Payment milestone	**Payment Terms**
On receipt of material at Site as a part of the Plant and Equipment subject to inspection and certification by the Facilities Manager/ Third Party consultant appointed by KREDL	50% (fifty percent) of Basic Price of the material (Part A of SOR-1(Price)) + 100% of the Tax
On achievement of Installation Services and Pre-Commissioning Testing of Plant and Equipment of relevant capacity certified and witnessed by CEIG/KREDL or any other applicable authority (as applicable)	30% (thirty percent) of Basic Price of the material (Part A of SOR-1(Price))

On Operational Acceptance by KREDL and issuance of Operational Acceptance certificate provided by KREDL (as applicable)	10% (ten percent) of Basic Price of the material (Part A of SOR-1(Price))
One (1) Year after the date of Operational Acceptance	10% (ten percent) of Basic Price of the material (Part A of SOR-1(Price))
Payment of Mandatory Spares after Commissioning and prior Operational Acceptance by KREDL supported by the certification from KREDL/ Third Party consultant appointed by KREDL (as applicable)	100% (one hundred percent) of Basic Price of the material (Part A of SOR-1(Price)) + 100% of the Tax for the receipt of material at Site as a part of Mandatory Spares

B **Installation Services**

In respect of Installation Services for Services and Civil Works, the following payments shall be made:

Payment milestone	**Payment Terms**
On achievement of Installation Services and Testing of Plant and Equipment of relevant certified by KREDL	60% (sixty percent) of Basic Price (Part B of SOR-1 (Price)) of the completed works as a part of Installation Services (Services and Civil) + 100% of the Tax for the completed the works as a part of Installation Services (Services and Civil)
On Operational Acceptance by KREDL and issuance of Operational	20% (twenty percent) of Basic Price (Part B of SOR-1 (Price)) of the completed works as a

Acceptance certificate provided by KREDL (as applicable)	part of Installation Services (Services and Civil)
One (1) Year after the date of Operational Acceptance	20% (twenty percent) of Basic Price (Part B of SOR-1(Price)) of the completed works as a part of Installation Services (Services and Civil)

C. O&M

On quarterly basis for the Basic Price (SOR-2 (O&M)) along with applicable Taxes for the quarter, for the O&M Period, subject to any early termination

D. PAYMENT PROCEDURE

The Procedures to be followed in making application for, certifying and making payments shall be as follows:

1. **Payment Schedule/Price Break-up for Payments**

1.1 Any payment under the Contract shall be made only after the Contractor's price break-up provided in Final Contract Price is approved by KREDL, submitted as a part of Letter of Award.

2. **Currency of Payment**

2.1 The Contract Price shall be paid in one currency INR (Indian Rupees) only.

3. **Application for Payment**

3.1 The Contractor shall submit application to the Facilities Manager for the payment in the proforma enclosed.

3.2 Each such application shall state the amount claimed and shall set forth in details, the order of the Payment Schedule, particulars of the Facilities including the Facilities executed at Site.

3.3 Every invoice shall be supported with a completion certificate signed by the Facilities Manager, without which the invoice will not be considered for further processing.

4. **Due Dates for Payment**

4.1 KREDL will make payment within 45 (forty five) Days from the date of receipt of invoice in complete respect.

5. **Mode of Payment**

5.1 The payment will be made through either demand draft or electronic transfer of funds.

6. **For payments related to supply of Plant and Equipment, Mandatory Spares, Installation Service for Civil Works and Services**

6.1 The Contractor shall maintain a account with a Scheduled Bank at Site for the purpose of receiving all the payments under the Contract(s) and for utilization of payments received from

KREDL for disbursement to subcontractors, sub-vendors, PRW's etc., of the Contractor. The Contractor shall maintain separate books of accounts for all payments under this Contract.

6.2 In case the Contractor violates the above provisions, KREDL will have the right to give suitable instructions to the Bank to regulate/freeze the account.

37.6 Application for Payment:

The Contractor shall submit application for the Payment in the prescribed proforma of the Owner. Each of such application shall state the amount Claimed and shall set forth in detail, in the Order of the Payment Schedule, particulars of the Works including the Works executed at Site and of the Equipment shipped/brought on to the Site pursuant to the Contract up to the date mentioned in the application and for the period covered since the last preceding Certificate, if any. Every interim Payment Certificate shall certify the Contract value of the Works executed up to the date mentioned in the application for the Payment Certificate provided that no Sum shall be included in any interim Payment Certificate in respect of the Works that, according to the decision of the Engineer, does not comply with the Contract, or has been performed, at the date of Certificate prematurely.

FORM OF APPLICATION FOR PAYMENTS

Facilities:	Date:
Plant and Equipment and Mandatory Spares/ Installation Services:	Contract No.:
Name and Address of Contractor: GST no.:	Contract Name:
Contract Value:	Application serial no.
Unit Reference:	

To,

Karnataka Renewable Energy Development Limited (KREDL),
Head Office, #6/13/1, 10th Block, 2nd Stage,
Nagarbhavi, Bangalore – 560072.
Karnataka

Dear Sir,

Application for Payment

1. Pursuant to the above referred Contract Agreement dated _____ the undersigned hereby applies for payment of the sum of _____(Specify amount).
2. The above amount is on account of: (Insert the payment milestone as mentioned under Terms of Payment)

   Others (specify)

   Final payment (Schedule **) as detailed in the attached schedule(s) which form an integral part of this application.
3. The payment claimed is as per item(s) No (s) _____of the payment schedule annexed to the above mentioned Contract.
4. The application consists of this page, a summary of claim statement (Schedule **), and the following signed schedules

   1. _____
   2. _____
   3. _____

   The following document are also enclosed:

   1. _____
   2. _____
   3. _____

   Signature of the Contractor/ Authorized Signatory

*Application for payment will be made to 'Facilities Manager' as to be designated for this purpose at the time of Notification of Award.

**Proforma for the Schedules will be mutually discussed and agreed to during the finalization of the Contract Agreement.

37.7 Mode of Payment:

Payment due on dispatch of equipment shall be made by the Owner directly to the Contractor as per the payment schedule. The payment of the advance, test charges if any other supply payment, all applicable CGST, SGST, IGST, UTGST, cess if any, duties and insurance in the erection portion of the

works shall be made directly to the Contractor by the Owner.

All direct payment shall be made by cheque on any one of the Nationalised Banks/Scheduled Banks approved by Reserve Bank of India, in Karnataka. The bank charges involved in making the payment will be to the account of the Contractor.

37.8 Deductions from Contract Price:

All Costs, Damages or expenses which the Owner may have paid, for which under the Contract the Contractor is 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 bills shall be supported by appropriate and certified vouchers or explanations, to enable the Contractor to properly identify such Claims. Such Claims shall be paid by the Contractor within thirty (30) 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 monies due or becoming due by him to the Contractor under the Contract or may be recovered by actions of Law or otherwise.

38 Compensation Events:

38.1 The following are Compensation events unless they are caused by the Contractor with approval of competent authority:

a) The Employer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.

b) The Employer unreasonably delays issuing a Certificate of Completion.

c) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

38.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Employer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended based on the approval received from competent authority.

38.3 As soon as information demonstrating the effect of each Compensation event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Employer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed

unreasonable, the Employer shall adjust the Contract Price based on Employer's own forecast. The Employer will assume that the Contractor will react competently and promptly to the event.

38.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Employer.

39. Taxes:

39.1 The rates quoted by the Contractor shall be deemed to be inclusive of all applicable taxes, duties and Levies that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

40. Price Adjustment:

40.1 Deleted

40.2 Deleted

41. Penalty:

41.1 The Contractor shall pay Penalty to the Employer at the rate per day stated in clause no. 41.3 that the Commissioning Date is later than the Intended Commissioning Date (for the whole of the works or the milestone/stages as stated in approved Activity chart). The total amount of Penalty shall not exceed the amount as in clause no. 41.3.4. The Employer may deduct Penalty from payments due to the Contractor. Payment of Penalty does not affect the Contractor's liabilities.

41.2 If the Intended Commissioning Date is extended after Penalty have been paid, the Employer shall correct any overpayment of Penalty by the Contractor by adjusting the next payment of bill.

41.3 **PENALTY FOR DELAY IN COMPLETION**:

41.3.1 The Bidder shall clearly note that time is the essence of the Contract and the project should be completed within the Time frame specified in Clause No.17 of Conditions of Contract and hence no time extension shall be allowed on any account.

41.3.2 If the Contractor fails to successfully complete the Commissioning within the time fixed under the Contract, the Contractor shall pay to the Owner as Penalty, a Sum specified for each specified period of Delay. Equipment and Materials will be deemed to have been delivered only when all its Components, Parts are also delivered. If certain Components are not delivered in time, the Equipment and Materials will be considered as delayed until such time the missing Parts are also delivered. The total amount of Penalty for delay under the Contract will be subject to a maximum 10% of the Contract Price excluding O&M.

41.3.3 If the Contractor fails to successfully complete the trial operation in terms of the contract, within the time fixed under the contract or any extension thereof granted by the Owner by way of amendment to the notification of Award/Contract agreement, the contractor shall pay to the owner, as Penalty of 0.5% per week

41.3.4 The total amount of Penalty for delay under the Contract will be subject to a maximum of Ten percent (10%) of the value of Contract & the Owner has got every right to terminate the Contract without any liability if it crosses 10%.

41.3.5 Deleted

41.3.6 Penalty for not meeting performance guarantees during the performance and tests conducted during guarantee period shall be assessed and recovered from the contractor as detailed in technical specification/special conditions of contract. Such penalty shall be without any limitation whatsoever and shall be in addition to penalties/damages if any, payable under any other clause of condition of contract.

Recovery amount = Shortfall generation in units X PPA rate approved by KERC

Note: the amount shall be recovered through deduction in O&M payment upto the extent of 10% total contract price for O&M or by encashing performance Bank Guarantee/Insurance Surety Bond

42. Advance Payments:

42.1 Deleted

42.2 Deleted

42.3 Deleted

43. Securities:

43.1 The Security deposit/Contract performance Guarantee shall be provided to the Employer no later than the date specified in the Letter of Intent to Award the Contract and shall be issued in an amount and form and type of instrument acceptable to the Employer. The Security deposit shall be valid until a date 90 days from the date of expiry of Defects Liability period.

44. Cost of Repairs:

44.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

45. Completion:

45.1 The Contractor shall request the Employer to issue a Certificate of Commissioning of the Works and the Employer will do so upon deciding that the Work is commissioned in all respects.

46. TAKING OVER AND PRE-COMMISSIONING TESTS:

46.1 The Employer shall take over the Site upon completion of contract after O&M as per contract terms and conditions.

46.2 Pre-Commissioning Tests:

On Completion of Erection of the Equipments and before Charging, each item shall be thoroughly cleaned and then inspected jointly by the Owner or his duly authorised Representative and the Contractor for correctness and Completeness of Installation and acceptability for Charging leading to initial Pre - Commissioning. The Pre – Commissioning tests shall be as per the technical specification and relevant standards. The Contractor’s Commissioning Engineers, specifically identified as far as possible, shall be responsible for carrying out all the Pre-Commissioning checks. On Completion of inspection, checking and after the Pre-Commissioning Tests are satisfactorily over, the Complete solar plant shall be ready for Charging.

During the Pre-Commissioning checks, the Operations shall be under the supervision of the Contractor, but the Schedule of Operations shall be agreed to by the Owner and the Contractor.

During the Tests, the safety of the KPCL line Materials etc., is the responsibility of the Contractor. During the pre-Commissioning, Commissioning and Performance Guarantee Tests, the Operations will be under the supervision of the Contractor, if the Tests are being carried out by him. In case the Tests are being carried out by a third Party, the Operations will be under the control of the Owner. In both cases, all aspects of the Tests shall be agreed to by the Owner and the Contractor The safety of the Equipment shall be the responsibility of the Contractor.

46.3 Rejection:

46.3.1 The Owner will reject any Material/Equipment supplied by the Contractor if, during Tests, or Service, any of the following conditions arise when the provisions under the relevant Clause of the

46.3.2 Conditions of Contract shall immediately become applicable:

1) Material/Equipment, including its Components, are proved to have been manufactured not in accordance with the agreed Specifications.

2) Material/Equipment fails on any Test indicated in the Technical Specification.

46.3.3 The Owner reserves the right to retain the rejected Equipment and take it into service until the Bidder replaces, at no extra Cost to the Owner, the defective Material by a new Material. Alternately the Bidder shall Repair or Replace the Equipment within a reasonable period to the satisfaction of the Owner at no extra Cost to the Owner. Till the equipments are replaced, the performance Bank Guarantee/Insurance Surety Bond will not be released by the owner.

46.4 Maintenance of Registers:

46.4.1 The Contractor shall maintain a Register, duly indicating all the details spares, faults, repair works, warranty, service team contact details, tools and tackles, etc

46.4.2 The extract of this Register shall be sent to the Owner once a Month and two bound copies at the end of the Contract along with other Documents.

47. Final Account:

47.1 The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor if it is correct and complete. If it is not, the Employer shall issue a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Employer shall decide on the amount payable to the Contractor and make payment accordingly.

48. As built drawings and /or Operating and Maintenance Manuals:

48.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data in both hard and Soft Copy.

48.2 If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they do not receive the Employer's approval, the Employer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

49. Termination:

49.1 The Employer may terminate the Contract if the other party causes a fundamental breach of the Contract.

49.2 Fundamental breaches of Contract include, but shall not be limited to the following:

- The Contractor stops work for 45 days when no stoppage of work is shown on the current Program/Activity Chart and the stoppage has not been authorized by the Employer;
- Deleted
- The Contractor becomes bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- Deleted
- The Employer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Employer;
- The Contractor does not maintain a security which is required;

- The Contractor has delayed the completion of works by the number of days for which the maximum amount of Penalty can be paid as defined in the Contract data; and
- If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract.

For the purpose of this paragraph : "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition."

49.3 When either party to the Contract gives notice of a breach of contract to the Employer for a cause other than those listed under Sub Clause 49.2 above, the Employer shall decide whether the breach is fundamental or not.

49.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

49.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

49.6 **Suspension of Work:**

49.6.1 The Owner reserves the right to suspend and reinstate execution of the whole or any part of the Works without invalidating the provisions of the Contract. Orders for suspension or reinstatement of the Works will be issued by the Engineer to the Contractor in writing. The time for Completion of the Works will be extended for a period equal to duration of the suspension.

49.6.2 Any necessary and demonstrable Cost incurred by the Contractor as a result of such suspension of the Works will be paid by the Owner with approval from competent authority, provided such Costs are substantiated to the satisfaction of the Engineer. The Owner shall not be responsible for any liabilities if suspension or delay is due to some default on the part of the Contractor or his Sub-Contractor.

49.7 **Contractor's Default**

49.7.1 If the Contractor shall neglect to execute the Works with due diligence and expediency or shall refuse or neglect to comply with any reasonable Order given to him, in writing by the Engineer in connection with the Works or shall contravene the provisions of the Contract, the Owner may give Notice in writing to the Contractor to make good the failure / neglect or contravention complained of. Should the Contractor fail to comply with the Notice within thirty (30) days from the date of serving the Notice, then and in such case the Owner shall be at liberty to employ other Workmen and forthwith execute such part of the Works as the Contractor may have neglected to do or if the Owner shall think fit, without prejudice to any other right he may have under the Contract to take the Work wholly or in part out of the Contractor's hands and re-Contract with any other Persons or Persons to complete the Works or any part thereof and in that event the Owner shall have free use of all Contractor's Equipment that may have been at the time on the Site in connection with the Works without being responsible to the Contractor for fair wear and tear thereof and to the exclusion of any right of the Contractor over the same, and the Owner shall be entitled to retain and apply balance which may otherwise be due on the Contract by him to the Contractor, or such part of the Works or of completing the Works as the case may be. If the Cost of completing the Works or executing a part there of as aforesaid shall exceed the balance due to the Contractor, the Contractor shall pay such excess amount. Such Payment of excess amount shall be independent of the Penalty for delay, which the Contractor shall have to pay if the Completion of Works is delayed.

49.7.2 In addition, such action by the Owner as aforesaid shall not relieve the Contractor of his liability to pay Penalty for delay in Completion of Works as defined in Clause 41 of CC.

49.7.3 Such action by the Owner as aforesaid the termination of the Contract under this Clause shall not entitle the Contractor to reduce the value of the Contract Performance Guarantee nor the time thereof. The Contract Performance Guarantee shall be valid for the full value and for the full period of the Contract including Guarantee period.

49.8 **Termination of Contract on Owner's Initiative**

49.8.1 The Owner reserves the right to terminate the Contract either in part or in full due to reasons other than those mentioned under Clause entitled Contractor's Default. The Owner shall in such an event give fifteen (15) days Notice in writing to the Contractor of his decision to do so. The Contractor, upon receipt of such Notice, shall discontinue the Work on the date and to the extent specified in the

Notice, make all reasonable efforts to obtain cancellation of all Orders and Contracts to the extent they are related to the Work terminated and terms Satisfactory to the Owner. Stop all further Sub-Contracting or Purchasing activity related to the Work terminated, and assist the Owner in Maintenance, Protection, and Disposition of the Works acquired under the Contract by the Owner.

49.8.2 In the event of such a termination the Contractor shall be paid the amount due to him for the work already under taken. If the Contractor is an individual or a Proprietary Concern and the individual or the proprietor dies and if the Contractor is a Partnership Concern and one of the Partners dies, then unless the Owner is satisfied that the legal Representatives of the individual Contractor or of the Proprietor of the Propriety Concern and in the case of Partnership, the surviving Partners, are capable of carrying out and completing the Contract, the Owner shall be entitled to cancel the Contract as to its incomplete part without being in any way liable to Payment of any compensation to the estate of deceased Contractor and/or to the Surviving Partners of the Contractor's Firm on account of the cancellation of the Contract except the amount which has already become due and payable. The decision of the Owner that the legal Representatives of the deceased Contractor or Surviving Partners of the Contractor, cannot carryover and complete the Contract, shall be final and binding on the Parties. In the event of such cancellation the Owner shall not hold the estate of the deceased Contractor and/or the Surviving Partners of the Contractor's Firm liable to Damages for not completing the Contract.

49.9 **Delays in the Contractor's Performance:**

Delay by the Contractor in the Performance of his obligations under the Contract shall render the Contractor liable for any, or all of the following sanctions:

a. Forfeiture of his Performance Guarantee.
b. Imposition of Penalty and/or
c. Termination of Contract for default as detailed herein.

If, at any time during Performance of the Contract, the Contractor should encounter conditions impending timely delivery of the Goods and for Performance of Services, the Contractor shall promptly notify the Owner, in writing, of the fact of the delay, its likely duration and its cause(s). Upon receipt of the Contractor's request, the Owner shall evaluate the situation and may, at his discretion, extend the time for Performance, in which case the extension shall be ratified by an amendment to Notification of Award/Contract Agreement.

49.10 Frustration of Contract:

49.10.1 In the event of Frustration of the Contract because of supervening impossibility in terms of Section 56 of the Indian Contract Act, the Parties shall be absolved of their responsibility to perform the balance portion of the Contract, subject to provisions contained in sub-Clause 49.10.3 below.

49.10.2 In the event of non-availability or suspension of Funds for any reasons whatsoever (except for reason of willful or flagrant breach by the Owner) and or Contractor then the Work under the Contract shall be suspended. Furthermore, if the Owner is unable to make Satisfactory, alternative arrangements for Financing to the Contractor in accordance with the terms of the Contract within three Months of the event, the Parties hereto shall be relieved from carrying out further obligations under the Contract treating it as Frustration of the Contract.

49.10.3 In the events referred to in Sub-Clauses 49.10.1 and 49.10.2 above, the Parties shall mutually discuss to arrive at reasonable settlement on all issues including amounts due to either Party for the Work already done on "Quantum Merit" basis that shall be determined by mutual agreement between the Parties.

49.10.4 **Grafts and Commissions etc:**

Any Graft, Commission, Gift or advantage given, promised or Offered by or on behalf of' the Contractor or his Partner, Agent, Officers, Director, Employee or Servant or any one on his or their behalf in relation to the obtaining or to the execution of this or any other Contract with the Owner, shall in addition to any Criminal liability which it may incur subject the Contractor to the cancellation of this and all other Contracts and also to Payment of any loss or Damage to the Owner resulting from any cancellation. The Owner shall then be entitled to deduct the amount so payable from any money otherwise due to Contractor, under the Contract.

50. Payment upon Termination:

50.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Employer shall prepare bill for the value of the work done less advance payments received up to the date of the bill, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated

in the Contract Data. Additional Penalty shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

50.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Employer shall prepare bill for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

51. Property:

51.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor's default.

52. Release from Performance:

52.1 If the Contract is frustrated by any event entirely outside the control of either the Employer or the Contractor the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. Special Conditions of Contract

1. Labour:

The Contractor shall make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, in such form and at such intervals as the Employer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Employer may require by the Law.

2. Compliance with labour regulations:

During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority.

The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

3. Protection of Environment:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

4. Arbitration (Clause 24)

4.1 The procedure for arbitration shall be as follows:

(a) In case of dispute or difference arising between the Employer and the Contractor relating to any matter arising out of or connected with this agreement it shall be settled in accordance with the Arbitration and Conciliation Act 1996. The disputes or differences shall be referred to a Sole Arbitrator. The Sole Arbitrator shall be appointed by agreement between the parties; failing such agreement, by the Appointing Authority (any one of the Organizations as per list enclosed below)

LIST OF ORGANIZATIONS WHO ARE CONSIDERED AS APPOINTING AUTHORITY FOR APPOINTMENT OF ARBITRATORS

1. Indian Council of Arbitration, New Delhi;
2. International Centre for Alternative Disputes Resolution (India);
3. Indian Roads Congress;
4. Indian Building Congress;
5. Indian Institute of Bridge Engineers;
6. Indian Institute of Public Health Engineers;
7. Institute of Water Works

(b) Arbitration proceedings shall be held at District courts, Karnataka, India

(c) The cost and expenses of arbitration proceedings will be paid as determined by the Arbitrator. However the expenses incurred by each party in connection with the preparation, presentation, etc., shall be borne by each party itself.

(d) **Performance under the contract shall continue during the arbitration proceedings and payments due the Contractor by the Employer shall not be withheld, unless they are the subject matter of the arbitration proceedings.**

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 6:

CONTRACT DATA

The following documents are also part of the Contract:	Clause Reference
1. The Project Schedule and Operating and Maintenance Manuals	[48]
2. The Methodology and Program of Construction	[25]
3. Site Investigation Reports	[14]
4. The Schedule of Key and Critical Equipment to be deployed on the work as per agreed program of construction	[25]

The Employer is:

Name:
KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED
(KREDL)
Address:
Managing Director
KREDL, Head Office Bangalore
#6/13/1, 10th Block, 2nd Stage
Nagarabhavi, Bangalore-560072 [1.1]

Name of authorized Representative:
Managing Director

The name and identification number of the Contract is "SELECTION OF EPC CONTRACTOR FOR "DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF 1.2 MW (AC) / 1.62 MWp (DC) GROUND-MOUNTED, GRID-CONNECTED SOLAR PV PLANT WITH COMPREHENSIVE OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES FOR PROPOSED 300 KW HYDROGEN PLANT".

The Works consist of Development of 1.2 MW(ac)/1.62MWp(dc) Solar PV Plant for 300 KW GREEN HYDROGEN PLANT [1.1]

The start date shall be the date of issue of notice to proceed with the work [1.1]

The Intended Completion Date for the whole of the Works is Development of 1.2 MW(ac)/1.62MWp(dc) Solar PV Plant with the following milestones [17, 26]

Milestone dates:
Physical works to be completed Period from the date of issue of Notice to proceed with the work

Milestone 1 i.e., Supply of PV plant– within 8 months from the date of Issuance of notice to proceed

Milestone 2 i.e., Solar plant Contractual COD – Within 12 months from the date of Issuance of notice to proceed

The Defects Liability Period is in accordance with O&M agreement [31]

Insurance requirements are as under

Type of Cover		**Minimum cover for Insurance**
(i)	Works and of Plant and materials	In accordance with the statutory requirements applicable to Karnataka
(ii)	Loss or damage to equipment	
(iii)	Loss or damage to property of Third Party	
(iv)	Personal injury or death insurance	
	(a) for Third Party	
	(b) for Contractor's employees or labour	

[13]

The Site is located at KPCL-Bellary Thermal Power Station, Ballari, Karnataka 583152 [1.1]

The liquidated damages for the whole of the works are applicable for the delay beyond contractual COD

The liquidated damages for the whole of the works are 0.5% per week. The maximum amount of liquidated damages for the whole of the works is ten percent of final contract price. [41]

The following events shall also be fundamental breach of the contract: [49.2]

The contractor has contravened Sub-clause 7.1 and Clause 9 of CC.

The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be 30 percent. [50.1]

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 7:

SPECIFICATIONS

7.0 DETAILED TECHNICAL SPECIFICATIONS FOR SOLAR POWER PLANT

Solar project shall be developed in line with MNRE latest specifications and amendments therein. However brief specification is provided for tender purpose

PHOTOVOLTAIC MODULES

The Solar PV Module of Mono Crystalline technology type. The PV Module shall have Certifications of Standard Testing Conditions (STC: defined as Standard Testing Condition with air mass AM1.5, irradiance 1000W/m2, and cell temperature 25°C) as per the latest edition of IEC 61215 and IEC 61730-2nd Edition and as tested by IEC / MNRE recognized test laboratory.

- The PV modules to be employed shall be of minimum 72/144 cell configuration with rated power of module ≥545 Wp as certified for solar PV module power performance test as prescribe by latest edition of IEC 61215 and IEC 61730 and as tested by IEC / MNRE recognized test laboratory. No negative tolerance in the rated capacity of solar PV module is allowed.
- All modules shall be certified IEC 61215 2nd Ed. (Design qualification and type approval for Crystalline Si modules), IEC 61730 (PV module safety qualification testing @ 1500 V DC or higher). IEC 62804 Certified PV modules should be PID free, documents for the same should be submitted with conditions of the PID test should be for a humidity of 85 % and a cell temperature of 85°C at 1000Volts or higher IEC 62716, IEC 61701.
- The certified Bill of Material (BOM) to be used in the PV Modules should be the same as used during the IEC certification of reference PV Module certified by renowned agency like TUV, UL, etc.
- Minimum certified module efficiency shall be 19% for crystalline with minimum fill factor of 0.75. The temperature co-efficient of power for the modules shall not be more than 0.50%/ °C.
- The glass used to make the crystalline silicon modules shall be toughened low iron glass with minimum thickness not less than can be 3.2 mm (with support bars) for 72/144 cell module The glass used shall have transmittance of above 90% and with bending less than 0.3% to meet the specifications.
- The back sheet used in the crystalline silicon based modules shall be of PET based structure. The thickness of back sheet should be of minimum 250 microns with water vapour transmission rate less than 3g/m2/day. The Back sheet shall have voltage tolerance of more than 1500 V.
- The EVA used for the modules should be of UV resistant in nature. No yellowing of the back sheet with prolonged exposure shall occur.
- 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.

- The junction box used in the modules shall have protective 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 sealing shall comply IP67 degree of protection.
- Modules should have rugged design to withstand tough environmental conditions and should withstand at maximum wind load of 2400 pascal defined as per IEC standard.
- PV modules must be warranted for their output peak watt capacity, First year maximum allowable degradation shall be 2.5% of the rated capacity. YoY the maximum allowable degradation is 0.55% only. Additionally, each solar PV module used in solar power plant /system must provide a linear power output peak watt rated capacity. Actual power output of the product may reach at least 97.5% of the nameplate power output specified on the product during the first year. For the second year, the actual power output will decline annually by no more than 0.55% for a period of 24 years, so that by the end of 25th year, an actual output of at least 81.5% of the nameplate power output specified on the product will be achieved.
- SPV module shall have module safety class-II and should be highly reliable, light weight and must have a service life of more than 25 years.
- The modules shall be warranted for minimum of 10 years against all material / manufacturing defects and workmanship and 25 Years for the Performance (with reference to COD date)
- The flash data of all modules to be supplied are required to be submitted at the time of supply and the sample IV curve of the rated watt class to be provided.
- Each module used in the Project shall use a RFID tag bearing the following details: The RFID must be placed outside the lamination of the PV module.

o Name of manufacturer, name of manufacturer of solar cells symbol of bidder;
o Country of Origin (separately for cells and modules)
    1. Unique model number
    2. Unique Serial number
o Month and Year of manufacture (separately for cells and module).
    i. Date and Year of obtaining IEC PV module qualification certificate.
    ii. Name of Test Lab issuing IEC certificate.
o Other relevant information on traceability of solar cells and module as per ISO 9000.

i. Polarity of terminals or leads (colour coding is permissible).
ii. Maximum system voltage for which the module is suitable.
iii. Date & place of manufacture.
iv. I-V Curve for the module at standard test condition (1000W/sqm, AM1.5, 25 °C).
v. Wattage, Wp, Pmax, Imp, Vmp, Isc & FF for the module.

- The accessibility to the list of module IDs along with the above parametric data for

each module shall be provided.

- The module's power mismatch of the modules connected to an Inverter should be less than 2%.
- The module frame shall be made of corrosion resistant material, which shall be electrically compatible with the structural material used for mounting the modules. In case of metal frames for modules, it is required to have provision for earthing.
- The module frame should have been made of Aluminium or corrosion resistant material, which shall be electrolytically compatible with the structural material used for mounting the modules with sufficient no. of grounding/installation.
- The sampling test shall be carried out on random basis on the PV MODULE at accreted labs.
- ALMM Specifications and amendments shall be complied

(a) INVERTER

i. Inverter shall confirm to the following standards and appropriately certified by the labs:

a)	Efficiency measurement:	IEC 61683
b)	Environmental Testing:	IEC 60068-2 or IEC 62093
c)	EMC, harmonics, etc.:	IEC 61000 series, 6-2, 6-4 and other relevant Standards.
d)	Electrical safety:	IEC 62109 (1&2), EN 50178 or equivalent

ii. Recommended practice for PV – Utility interconnections: IEEE standard 929 – 2000 or equivalent
   1) Protection against islanding of grid: IEEE1547/ UL1741/ IEC 62116 ore equivalent
   2) Grid Connectivity: Relevant CEIG/ CEA/ CERC regulation and grid code (Latest version)
   3) Reliability test standard: IEC 62093 or equivalent

iii. Inverter shall consist of an electronic Inverter along with associated control, protection and data logging devices.

iv. The rated power/name plate capacity of the Inverters shall be the AC output of the Inverter at 50°C. Any Inverters with AC output at 50°C, below the name plate/rated power of the Inverter shall not be allowed.

v. The Inverter supplied shall be suitable for 60% additional DC input Capacity. (E.g. if Inverter is supplied with rated capacity of 295 kW (AC) shall accept at least 425 kW of DC power for fixed system). Rated AC capacity of the individual inverter shall not exceed 500kW.

vi. All Inverters should consist of associated control, protection and data logging devices and remote monitoring hardware and compatible with software used for string level monitoring.

vii. Dimension and weight of the Inverter shall be indicated by the Bidder in the offer.

viii. Only those Inverters which are commissioned for more than 10 MW capacity solar PV projects till date shall be considered for this project.

ix. The minimum European efficiency of the Inverter shall be 98% load as per IEC 61683 standard for measuring efficiency. The conversion efficiency of different loads i.e. 25%, 50%, 75% and 100% shall be specified along with the overload capacity.

x. The Inverter shall be tropicalized and design shall be compatible with conditions prevailing at site. Provision of exhaust fan with proper ducting for cooling of Inverter's should be incorporated in the Inverter's, keeping in mind the extreme climatic condition of the site as per the recommendations of OEM to achieve desired performance and life expectancy.

xi. The Inverters shall be of outdoor containerized central type or string inverters with protection to minimum of IP 55

xii. Nuts & bolts and the Inverter enclosure shall have to be adequately protected taking into consideration the atmosphere and weather prevailing in the area.

xiii. 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 inverter shall adjust the voltage & frequency levels to suit the Grid.

xiv. All three phases shall be supervised with respect to rise/fall in programmable threshold values of frequency.

xv. 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 and feeding this information to the feedback loop of the Inverter. Thus control variable then controls the output voltage and frequency of the Inverter, so that Inverter is always synchronized with the grid. The Inverter shall be self-commutated with MPPT technology. This should be capable of synchronize maximum within 1 Minute.

Operational Requirements for Inverter

i. The Inverter must have the feature to work in tandem with other similar Inverter's and be able to be successively switched "ON" and "OFF" automatically based on solar radiation variations during the day.

ii. The Inverter shall be capable of controlling power factor dynamically.

iii. Maximum power point tracker (MPPT) shall be integrated in the inverter to maximize energy drawn from the Solar PV array. The MPPT should be microprocessor based to minimize power losses. The details of working mechanism of MPPT shall be mentioned by the Bidder in its offer. The MPPT unit shall confirm to IEC 62093 for design qualification.

iv. The system shall automatically "wake up" in the morning and begin to export power provided there is sufficient solar energy and the grid voltage and frequency is in range.

v. Sleep Mode: Automatic sleep mode shall be provided so that unnecessary losses are minimized at night. The inverter must also automatically re-enter standby mode when threshold of standby mode reached.

vi. Stand – By 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.

vii. Basic System Operation (Full Auto 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.

viii. Inverter shall have provisions/features to allow interfacing with monitoring software and hardware devices.

ix. Inverter should have Display in the front.

x. Inverter should have master slave configuration.

Protection against faults for inverter

i. The inverter shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of inverter component failure or from parameters beyond the inverter's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the inverter front panel to cause the inverter to be operated in a manner which may be unsafe or damaging.

ii. Faults due to malfunctioning within the inverter, including commutation failure, shall be cleared by the Inverter protective devices. In addition, it shall have following minimum protection against various possible faults.

iii. Grounding Leakage Faults: The inverter shall have the required protection arrangements against grounding leakage faults.

iv. Over Voltage & Current: In addition, over voltage protection shall be provided between positive and negative conductor and earth ground such as Surge Protection Devices (SPD).

v. Inverter shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.

vi. Galvanic Isolation shall be achieved through Inverter duty transformer.

vii. Each solid state electronic device shall have to be protected to ensure long life of the Inverter as well as smooth functioning of the Inverter.

viii. Anti-islanding (Protection against Islanding of grid): The inverter shall have anti islanding protection. (IEEE 1547/UL 1741/ equivalent BIS standard)

ix. Unequal Phases: The system shall tend to balance unequal phase voltage (with 3- phase systems).

x. Reactive Power: The output power factor of the inverter should be of suitable range to supply or sink reactive power. The inverter shall have internal protection arrangement against any sustained fault in the feeder line and against lightning in the feeder line.

xi. Isolation: The inverter shall have provision for input & output isolation. Each solid- state electronic device shall have to be protected to ensure long life as well as smooth functioning of the inverter.

xii. All Inverters shall be three phase using static solid state components. DC lines shall have suitably rated isolators to allow safe start up and shut down of the system. Fuses & Circuit breakers used in the DC lines must be rated suitably.

xiii. Inverter shall be of Central type to optimize the power output.

xiv. Desired Technical Specifications of Inverter.

1. Sinusoidal current modulation with excellent dynamic response.
2. Compact and weather proof housing (indoor/ outdoor)
3. Comprehensive network management functions (including the LVRT and capability to inject reactive power to the grid)
4. No load loss < 1% of rated power and maximum loss in sleep mode shall be less than 0.05%
5. Optional VAR control
6. Unit wise & integrated Data logging
7. Dedicated Prefabs / Ethernet for networking

xv. Inverter must provide protection against:

1. Over current
2. Sync loss
3. Over temperature
4. DC bus over voltage
5. Cooling Fan failure (If provided)
6. Short circuit
7. Lightning
8. Earth fault
9. Surge voltage induced at output due to external source
10. Power regulation in the event of thermal overloading
11. Set point pre-selection for VAR control
12. Bus communication via -interface for integration
13. Remote control via telephone modem or mini web server
14. Integrated protection in the DC and three phase system
15. Insulation monitoring of the PV array with sequential fault location

xvi. Ground fault detector which is essential for large PV generators in view of appreciable discharge current with respect to ground.

xvii. Over voltage protection against atmospheric lightning discharge to the PV array is required.

xviii. The inverter must be entirely self-managing and stable in operation.

xix. A self-diagnostic system check should occur on start up. Functions should include a test of key parameters on start up.

xx. Inverter front panel shall be provided with display (LCD or equivalent) to monitor, but not limited to, the following:

1. DC power input
2. DC input voltage
3. DC Current
4. 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. Frequency
9. Display of sine wave with distortion, if any.

In case of outdoor inverter same shall be available in SCADA and Remote UI

xxi. Detailed Specifications of STRING INVERTER

S No	Particulars	Details
1.	Nominal AC Output Power	295 kW ≥ 500kW
2.	Nominal AC Output Voltage	(300 - 1000) V ±10%
3.	Maximum Input Voltage	(600V-1500) V DC
4.	Wave Form	Pure Sine wave
5.	DC voltage range, MPPT	As per design
6.	Minimum Efficiency at 100% load The rated European efficiency (Euro Eta Efficiency) and peak efficiency	> 98%, measured as per IEC 61683 standard for measuring efficiency * Inverter No Load / Full Load Loss Calculation must be submitted by the Bidder.
7.	Output frequency	50 Hz +3% to - 5% Hz
8.	Power Factor	0.85 lag- 0.85 lead
9.	Max. THD at rated power	Less than 3 %
10.	Ambient dry bulb temperature range	0 to 50˚ deg C
11.	Humidity	15% to 95 % non- condensing
12.	Enclosure	IP 21/ IP 54 (Indoor/ Outdoor rated) IEC-60068-2 (environmental)
13.	Protection rating (as per IEC-60721- 3-3)	Classification of chemically active substances: 3C2 Classification of chemically active substances: 3S2
14.	Grid Specifications	IEC 61727, VDE 0126
15.	Nominal Voltage & Frequency	(300 - 1000) V ±10%
16.	Voltage Tolerance	+ 10% and -10% or better than that
17.	DC Overloading	Suitable for 135% of DC overloading
18.	Communication to PLC	Ethernet

1. PCU shall confirm to IEC 60068-2 standards for Environmental Testing.
2. All inverters shall be IEC 61000 compliant for electromagnetic compatibility, harmonics, etc.
3. All inverters shall be safety rated as per IEC 62109 (1 &2), EN 50178 or equivalent DIN or UL standard.

4. Each PCU shall be compliant with IEEE standard 929 – 200 or equivalent. The Bidder should select the Central inverter as per its own system design so as to optimize the power output.

(b) TRANSFORMER

i. AC converted by the inverter is transmitted through the appropriate Busduct from the Inverter to appropriately sized Inverter transformer and then it shall be connected to HT panel through AC cable, in accordance with the Central Electricity Authority (CEA) guidelines, including any amendments issued from time to time. Necessary firewall, spacing, etc., to be considered as per CEIG/CEA guidelines

Relevant national & international codes to be follows: -

S No	Particulars	Relevant IS	Relevant IEC
.	Power transformer	IS 2026	IEC 76
.	Fittings & Accessories	IS 3639	
.	Climate Proofing	IS 3202	IEC 354
.	Loading of Transformer	IS 6600	IEC 296
.	Oil	IS 335	IEC 137
.	Bushings	IS 2099	IEC 144
.	Degree of Protection	IS 2147	IEC 76
.	Testing, Tolerances on guaranteed Particulars	IS 2026	IEC 76
.	Buchholz Relay	IS 3637	
0.	Electrical Insulation	IS 1271	IEC 85
1.	Current transformer	IS: 2705 Part 1 to 4	IEC: 185
2.	Voltage Transformer	IS: 3156 Part 1 to 4	
3.	Lightning arrestors	IS: 3070 part 1 to 3	
4.	Porcelain insulators for system above 1000 V	IS: 2544	
5.	Alternating current dis-connectors (isolators) and earthing switches rating, design, construction, tests etc.	IS: 9921 Part 1 to 5	
6.	Part III – post insulator units for systems greater than 1000V	IS: 5350	
7.	Hollow Insulators for use in electrical equipment	IS: 5621	
8.	Serrated lock washers – specification	IS: 5556	

ii. Outdoor inverter panel with IP55 or above are acceptable. Inverter station should be properly

provided with canopy structure and working platform.

iii. Bus-bars shall be of high conductivity Aluminium alloy or Copper of adequate size. The bus-bars shall be adequately supported by non-hygroscopic, non-combustible track resistant and high strength type polyester fibre glass moulded insulators. Separate supports shall be provided for each phase and neutral busbar. The bus-bars joints shall be provided with high tensile steel bolts, Belleville washers and nuts, so as to ensure good contacts at the joints. The bus-bars shall be colour coded as per IS 375.

iv. Removable gland plates with gaskets shall be provided in the cable alleys for glanding the power and control cables. The distance between the gland plate and the incomer terminals shall not be less than 450 mm.

v. Inverter transformer shall be sized by keeping 10% design margin. Inverter transformer shall of 2 or 3 winding type (maximum 2 winding on the LV side). Each LV winding shall not be connected more than one number of LT panel.
The responsibility for the design rests with the Bidder; however, the design must comply with the technical specifications outlined in the tender document.

a) Inverter Duty Transformer

i. Inverter Transformer must be protected with HV VCB Panel Capacity.

ii. 3 phase, Oil Filled, (0.4 to 0.8kV) /11 kV, 50 Hz, Inverter Transformers of the selected inverter rating and associated Switchgear of approved make should be utilized as per IS 6600. Inverter transformers can be off-load tap change type. The transformers shall be suitable for outdoor installation in which the neutral can be kept floated and they should be suitable for service under fluctuations in supply voltage up to plus 5% to minus 10% in step of 2.5% for inverter transformer

iii. Cumulative loss shall be as per IGBC / CBIP guidelines. All electrical equipment and installation shall confirm to the latest Indian Electricity Rules as regards safety, earthing and other essential provisions specified for installation and operation of electrical plants.

iv. All items of equipment and materials shall be thoroughly cleaned and painted in accordance with relevant Indian Standards. The finish paint shall be done with two coats of epoxy based final paint of colour Shade RAL 7032 of IS:5 for indoor equipment

v. Any fitting or accessories which may not have been specifically mentioned in the specification but which are usual or necessary in the equipment of similar plant or for efficient working of

the plant shall be deemed to be included in the contract and shall be provided by the Contractor without extra charges. All plant and apparatus shall be complete in all details whether such details are mentioned in the specifications or not.

vi. All equipment shall be designed for operation in tropical humid climate at the required capacity in an ambient air temperature of 50°C. Equipment shall be suitable for an ambient temperature of 50°C. Maximum relative humidity of 100% shall also be taken into consideration for design of equipment.

vii. The reference ambient temperatures for which the transformers are to be designed are as site data provided in Site Data section.

viii. All working parts, insofar as possible, are to be arranged for convenience of operation, inspection, lubrication and ease of replacement with minimum downtime. All parts of equipment or of duplicate equipment offered shall be interchangeable.

ix. The quality of materials of construction and the workmanship of the finished products/ components shall be in accordance with the highest standard and practices adopted for the equipment covered by the specification.

x. The rating and electrical characteristics of the outdoor type INVERTER DUTY TRANSFORMER (typical) shall be as under:

S No	Particulars	Description
1.	Continuous kVA ratings	1.3 MVA (Minimum)
2.	Type	Oil immersed
3.	Frequency	50HZ
4.	Type of cooling	Oil Natural Air Natural
5.	No of Phases	Three
6.	Rating voltage H.V. side	11KV
7.	Highest System voltage on H.V. side	12KV
8.	Rated voltage on L.V. side	Output of solar inverter
9.	Vector Group	As per design
10.	Connections a) H.V. Winding b) L.V. winding	 Delta/Star Delta/Star
11.	On load taps on H.V. Side (for H.V. Variation)	+ 5 % to – 10.0 % (in steps of 2.5%)

12.	Impedance voltage (%)	As per IS2026
13.	Minimum Creepage distance	25 mm/ kV
14.	Transformer connections (As per CEA requirements)	LV side – Busduct HV Side – cable
15.	Winding material	Copper

b) AUXILIARY TRANSFORMER

i. Necessary taping arrangement and infrastructure till the Auxiliary transformer which is to be installed near the Switchgear room.

ii. Necessary cabling shall be done for connecting Auxiliary transformer output to PMCC panel.

iii. The rating and electrical characteristics of the outdoor type AUXILIARY TRANSFORMER (typical) shall be as under:

S No	Particulars	Description
1.	Continuous kVA ratings	500 KVA minimum (To be sized as per the requirements of Solar + Hydrogen plant loads)
2.	Type	Oil immersed
3.	Frequency	50HZ
4.	Type of cooling	Oil Natural Air Natural
5.	No of Phases	Three
6.	Rating voltage H.V. side	800 V
7.	Highest System voltage on H.V. side	1000 V
8.	Rated voltage on L.V. side	415V
9.	Vector Group	Dyn11
10.	Connections a) H.V. Winding b) L.V. winding	 Delta Star
11.	OFF load taps on H.V. Side (for H.V. Variation)	+ 10 % to – 10.0 % (in steps of 2.5%)
12.	Impedance voltage (%)	As per IS2026
13.	Minimum Creepage distance	25mm/ kV

Type test of similar rating transformer should be submitted during detailed Engineering and it should be valid till commissioning of the project for acceptance of the make.

c) POTENTIAL TRANSFORMER (SWITCHYARD)

i. The instrument transformers i.e. current and voltage transformers shall be single phase transformer units and shall be supplied with a common marshalling box for a set of three single phase units. The tank as well as top metallic shall be hot dip galvanized.

ii. The instrument transformers shall be oil filled hermetically sealed units. The instrument transformers shall be provided with filling and drain plugs.

iii. Polarity marks shall indelibly be marked on each instrument transformer and at the lead terminals at the associated terminal block. The insulators shall have cantilever strength of more than 500 kg.

iv. Current Transformer, Voltage Transformer, Circuit Breaker and Relays in the Switchyard shall match requirements of the KPCL norms defined from time to time.

S No	Particulars	Description of PT
1.	Highest system Voltage (Um)	Suitable for Evacuation voltage
2.	System Neutral Earthing	Effectively earthed
3.	Installation	Outdoor / Indoor
4.	System fault level	Appropriate
5.	Rated min power frequency withstand voltage (rms value)	As per relevant Standard
6.	Rated lightning impulse withstand voltage (peak value)	As per relevant Standard
7.	Standard reference range of frequencies for which the accuracy are valid	96% to 102% for protection and 99% to 101% for measurement
8.	Rated voltage factor	1.2 continuous & 1.9 for 30 sec
9.	Class of Accuracy	0.5 / 3P, IS3156/1992
10.	Minimum Creepage distance	31mm/kV
11.	Temperature rise	As per -IS 2705/1992
12.	Stray capacitance and stray conductance of LV terminal over entire carrier frequency range	As per IEC:358

13.	One Minute Power frequency Withstand voltage for secondary winding	As per IS/IEC
14.	Temp. rise over an ambient temp. of 50 deg. C	As per IS 3156/1992
15.	Number of terminals in control spare	All terminals of control circuits wired Cabinet up to marshalling box plus 10 terminals
16.	Rated total thermal burden	300 VA min.
17.	Number of cores	2 (two) - 1 for protection and one for metering with 0.5 class accuracy.
18.	Rated Output, insulation level, transformation ratio, rated voltage factor	Should be provided by the Contractor.

d) CURRENT TRANSFORMER (SWITCHYARD)

i. Current transformers may be either of the bushing type or wound type. The bushing types are normally accommodated within the transformer bushings and the wound types are invariably separately mounted. The location of the current transformer with respect to associated circuit breaker has an important bearing upon the protection scheme as well as layout of, substation. Current transformer class and ratio is determined by electrical protection, metering consideration.

ii. Technical specifications – Current ratings, design, Temperature rise and testing etc. should be in accordance with IS: 2705 (part I to IV).

iii. Type and Rating

1. The current transformer should be of outdoor/ indoor type, single phase, oil immersed, self-cooled and suitable for operation in 3 phase solidly grounded system.
2. Each current transformer should have the following particulars under the site conditions for the system under design
3. Each current transformer should have the following particulars under the site conditions for the system under design

S No	Particulars	Description of CT
1.	Highest system Voltage (Um)	Suitable for Evacuation voltage

2.	Rated frequency	50 Hz
3.	Installation	Outdoor / Indoor
4.	Rated short time thermal current	Min 25 kA for 3 sec or appropriate thermal current as per design calculations
5.	Rated dynamic current	Shall be of appropriate dynamic current as per design calculations
6.	Rated min power frequency withstand voltage (rms value)	As per relevant Standard
7.	Rated lightning impulse withstand voltage (peak value)	As per relevant Standard
8.	Accuracy Class	0.2 S metering, 5P20 for protection
9.	Minimum Creepage distance	31mm/kV
10.	Temperature rise	As per -IS 2705/1992
11.	Type of insulation	Class A
12.	Number of cores	For Transformer : Three (3) with One (1) protection core and One (1) metering core (1) Trafo Diff protection For ABT Meter Line Side : Two (2) with ABT metering core Main & Check
13.	CT secondary current	Protection cores – 1 Amp. Metering Core – 1 Amp (With Highest Accuracy Class)
14.	Number of terminals in marshalling box	All terminals of control circuits wired up to marshalling box plus 20 terminals spare
15.	CT ratio & Rated VA Burden, short time thermal rating, class of accuracy	Minimum burden required 1. Metering core – 5VA min. Protection core – 10VA min.

Technical Requirements of Energy Meters for ABT Requirement

i. Contractor shall supply One metering cubicle with ABT meter (Main+ check) at solar plant end and ABT meter with remote monitoring should be provided in KPCL interface panel as per the technical specification given below and further it should meet the CEA/utility guidelines.

ii. Shall be microprocessor-based conforming to IEC 62052-11, IEC 62053¬22, IS 14697

iii. Shall carry out measurement of active energy (both import and export) and reactive energy (both import and export) by 3-phase, 4 wire principle suitable for balanced/ unbalanced 3 phase load.

iv. 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.

v. The active and reactive energy shall be directly computed in CT & VT primary ratings.

vi. Separate CTs and VTs shall be provided for main/check and standby meters.

vii. The reactive energy shall be recorded for each metering interval in four different registers as MVARh (lag) when active export, MVARh (Lag) when active import, MVARh (lead) when active export, MVARh (Lead) when active import.

viii. Two separate registers shall be provided to record MVARH when system voltage is >103% and when system voltage is < 97%.

ix. Shall compute the net MWh and MVARh during each successive 15 minute block metering interval along with a plus/minus sign, instantaneous MWh, instantaneous MVARh, average frequency of each 15 minutes, net active energy at midnight, net reactive energy for voltage low and high conditions at each midnight.

x. Each energy meter shall have a display unit. It shall display the net MWh and MVARh with a plus/minus sign and average frequency during the previous metering interval; peak MWhdemand since the last demand reset; accumulated total (instantaneous) MWh and MVARh with a plus/minus sign, date and time; and instantaneous current and voltage on each phases.

xi. 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. All the net active/reactive energy values displayed or stored shall be with a plus /minus sign for export/import.

xii. At least the following data shall be stored before being overwritten for the following parameters.

S No	Parameters	Details	Min No of days
1.	Net MWH	15 min block	40 days in meter
2.	Aver Freq	15 min block	40 days in meter
3.	Net MVARH for V > 103%	15 min block	40 days in meter
4.	Net MVARH for V < 97%	15 min block	40 days in meter

5.	Cumulative Net MWH at every midnight		10 days in meter/ 40 days in PC
6.	Cumulative Net MVARH for V> 103% at every midnight		10 days in meter/ 40 days in PC
7.	Cumulative Net MVARH for V < 97% At every midnight		10 days in meter/ 40 days in PC
8.	Date and time blocks of VT failure on any phase.		

xiii. Shall have a built in clock and calendar with an accuracy of less than 15 seconds per month drift without assistance of external time synchronizing pulse.

xiv. Date/time shall be displayed on demand. The clock shall be synchronized by GPS time synchronization equipment being supplied by the contractor.

xv. The voltage monitoring of shall be inbuilt feature provided to signal failures to the Substation Automation System, The meter shall be suitable to operate with power drawn from the VT supplies. The burden of the meters shall be less than 2 VA (or as Accepted by ESCOM)

xvi. The power supply to the meter shall be healthy even with a single-phase VT supply. An automatic backup, in the event of non-availability of voltage in all the phases, shall be provided by a built in long life battery and shall not need replacement for at least 10 years with a continuous VT interruption of at least 2 years. Even under absence of VT input, energy meter display shall be available and it shall be possible to download data from the energy meter. In case data downloading is not possible in absence of VT supply, meter with provision of 110V DC auxiliary power shall be provided. Date and time of VT interruption and restoration shall be automatically stored in a non-volatile memory.

xvii. Shall have an optical port on the front of the meter for data collection from either a hand held meter reading instrument (MRI) having a display for energy readings or from a notebook computer with suitable software . The contractor shall supply the MRI and/or notebook complete with all optical interface unit required.

xviii. The meter shall have means to test MWh and MVARh accuracy and calibration at site in-situ and test terminal blocks shall be provided for the same.

xix. Each meter shall have a unique identification code provided by the Owner and shall be permanently marked on the front of the meter and stored in the non-volatile memory of the meter.

xx. The above specifications is the minimum requirement of Project. However the Metering system shall also meet the technical and quantity requirements prescribed by KPCL/ESCOM/SLDC and any other regulatory bodies' defined from time to time.

(c) HT SWITCHGEAR

i. CODE AND STANDARDS

IEC: 62271, IS:13118 and IS:3427

ii. Type of Switchgear

Free standing, Floor mounted, metal clad, fully compartmentalized draw-out type, ICOG (Outdoor) with inbuit battery charger of required capacity or outdoor type PC VCB

iii. Circuit Breaker

Vacuum type, restrike free, trip free, stored energy operated and with electrical anti-pumping features

iv. OPERATIONAL REQUIREMENT

Each breaker panel shall be provided with the following devices for control, indication and inter locking

1. Spring return to neutral type control switch (with NAC/NAT position)
2. Stay – put type selector switches. Voltmeter with selector switch shall be provided with each bus-section.
3. 'On', 'Off', 'Auto trip' 'Spring charged and "Control Supply healthy" indicating lamps. The lamps shall be high intensity cluster type LED Service & test position indication shall be provided on all panels through additional lamps.
4. Thermostatically controlled space heater with switch, illumination and power plug point.
5. All meters/instruments shall be flush mounted on front panel, atleast 96 sq.mm size with 90 deg. scales and accuracy class of 1.0. All feeders shall have an ammeter and ammeter selector switch, voltmeter with voltmeter selector switch for each bus.

The circuit breaker shall meet the following requirements:

1. The breaker shall be controlled locally and remotely. Facilities shall be provided for mechanical tripping of breaker and manual charging of closing spring to cater to emergency condition.
2. Surge arrestor shall be provided for all feeder.
3. Shall have an Operation duty O-0.3 sec.-CO-3min-CO

4. Closing and tripping coils operating under extreme conditions of control voltage variation.
5. Supervision relays provided for trip coil monitoring.
6. Suitable mechanical inter lock shall be provided to prevent inadvertent earthing of any live part.
7. Testing of circuit breaker shall be possible in isolated position by keeping the control plug connected.
8. Only motor wound closing spring charging arrangement is acceptable.
9. Core balance CTs shall be provided for transformer feeders having CT ratios greater than 50/1A.
10. Each breaker truck shall have Service - Isolated - Withdrawn Position.
11. Primary fuse replacement shall be possible with VT in isolated position.

12. Each feeder shall have local/remote selector switch. Closing from local shall be possible only in test position whereas closing from remote shall be possible in either service or test position. Tripping from local shall be possible only when local/remote selector switch is in local position. Tripping from remote shall be possible either with breaker in service position or selector switch being in remote position.

v. Surge Arrestor:

The surge arrestors shall be provided for all feeders and shall be metal oxide, gapless type generally in accordance with IEC 60099-4 and suitable for indoor duty. These shall be mounted within the switchgear cubicle between line and earth, preferably in the cable compartment. Surge arrestor selected shall be suitable for non-effectively earthed system and rating shall be in such a way that the value of steep fronted switching over voltage generated at the switchgear terminals shall be limited to the requirements of switchgear.

vi. Protection, Control and Metering

The switchgears shall have Communicable Numerical relays for Protection, scheme, Metering and Status monitoring. Employer shall network the Numerical relays through Data Concentrators of the main plant to HMI and further integrated to DCS/DDCMIS system for diagnostics and status monitoring. All the feeders shall be remote controlled from SCADA and from the local console of the numerical relays.

vii. General requirements of Numerical Relays

1. All numerical relays, auxiliary relays and devices shall be of types, proven for the application; satisfying requirements specified elsewhere and shall be subject to Owner's approval. Numerical Relays shall have appropriate setting ranges, accuracy, resetting ratio, transient overreach and other characteristics to provide required sensitivity to the satisfaction of the Owner. All the numerical relays shall have communications on two ports, local front port communication to laptop and a second port on Rs485 port.

2. All relays and timers shall be rated for control supply voltage as mentioned elsewhere under parameters and shall be capable of satisfactory continuous operation between 80-120% of the rated voltage. Making, carrying and breaking current ratings of their contacts shall be adequate for the circuits in which they are used. Interrogation voltage for the binary inputs shall be suitably selected to ensure avoidance of mal operation due to stray voltages.

3. The protective relays shall have at least 8 Nos potential free contacts (Programmable) Auxiliary relays shall have contacts as required. Relay output contacts shall be suitable for directly wiring in the breaker closing and trip circuit operating from 110 V DC control voltage.

4. Failure of a control or auxiliary supply and de energisation of a relay shall not initiate any circuit breaker /contactor operation. All relays shall withstand a minimum test voltage of 2 KV AC Rms for one minute.

5. All the numerical relays shall have communications on two ports; Main port shall be with IEC 61850.

6. Relays shall be suitable for electrical measurement including voltage, current, power (active/reactive) and energy parameters

7. Mapping details of all the details shall be submitted in IEC format.

8. Relays shall have separate output for individual functionality and the master trip shall be software configurable in case of multi output relays. Relays shall have event recording feature, recording of abnormalities and operating parameters with time stamping

9. Preferably comprehensive single numerical relay shall have provision of both current and voltage inputs. The current operated relay shall have provision for 4 sets of CT inputs, 3 nos. for phase fault & 1 CT input for earth fault. Relay shall be suitable for both residually connected CT input as well as CBCT input. The voltage-operated relay shall have provision for 3 PT inputs. Relays shall be suitable for CT secondary current of 1A/5A selectable at site. Relays used in incomers and bus couplers shall have provision of two sets of voltage signal inputs for the purpose of synchronization

10. All CT & PT terminals shall be provided as fixed type terminals on the relay to avoid any hazard due to loose connection leading to CT opening or any other loose connection. In

no circumstances Plug In type connectors shall be used for CT / PT connections. Vendor to ensure the same for all protective relay models offered.

11. All numerical relay shall have key pad / keys to allow relay settings from relay front. All hand reset relays shall have reset button on the relay front. Relay to be self or hand reset shall be software selectable. Manual resetting shall be possible from remote.

12. Relays shall have suitable output contact for breaker failure protection.

13. Relays shall have self-diagnostic feature with self-check for power failure, programmable routines, memory and main CPU failures.

14. Relays shall have at least two sets or groups of two different sets of adaptable settings. Relays shall have multiple IEC/ ANSI programmable characteristics.

15. Design of the relay must be immune to any kind of electromagnetic interference. Vendor to submit all related type test reports for the offered model along with the offer.

viii. Transformer Feeder Protections

1. Three Phase Over current and Earth Fault protection (50 & 50 N1/50 N2)) (The earth fault element should be suitable for both residually connected CT input as well as CBCT input.)
2. Restricted Earth Fault protection (64 R) (As per CEA/CEIG requirements)
3. Transformer Differential protection (87 T) (As per CEA/CEIG requirements)
4. Stand by earth fault protection (51 N)
5. Transformer buchholz and WTI/OTI high trips
6. Energy Metering

ix. Protections for Incomers, Bus couplers and Tie feeders.

1. Over current and earth fault protection.
2. Synchronizing check relay as a part of fast change over scheme.
3. Energy Metering
4. Line differential

x. Design and Construction Features

All HT switchgear panels and circuit breakers shall have the following features

i. Conductor

High conductivity aluminium alloy or copper for the horizontal busbars, vertical droppers and connectors to the fixed end of isolating contacts

ii. Height of the Switchgear Panel

Not to exceed 2600 mm.

iii. Insulators

Shall be track-resistant, high strength, non-hygroscopic, non-combustible type and suitable withstand stresses due to over-voltages and short citcuit current. Interlope barrier of inflammable material like hylam not acceptable

iv. Sealing

Bushing or other sealing arrangement shall be provided between breaker and busbar / cable compartments to avoid air communication around isolating contacts in the safety shutter area with truck in service position.

v. Construction

1. The switchgear assembly shall be rodent and vermin proof.
2. In switchgear design where the breaker front itself serves as a door suitable blanking covers one for each size of panel per switch board shall be included.
3. The switchgear enclosure shall be constructed with rolled steel section of rolled sheet steel of at least 2.0 mm thickness.
4. Pressure relief device shall be provided in each high voltage compartment to vent out safely the gases produced in case of a fault.
5. During detailed- engineering stage the adequacy of support insulator and busbar sizes for the declared continuous & short time current ratings shall be ensured.
6. Breaker trucks shall have a secure locking in SERVICE position so that they are not displaced during a short circuit.
7. Current ratings of all switchgears, circuit breakers, CT's etc. shall be sufficient for carrying the connected load currents without exceeding the permissible temperature limits or reduction in service life. Use of two breakers in parallel to meet the required rating shall not be acceptable.
8. Standalone ICOG panel are also accepted, One set of spare breaker, CT and PT with all accessories shall be provided in spares
9. Suitable trolley arrangement, if required, shall be provided. One trolley per switchgear room shall be provided suitable for each type of rating of breakers

vi. Earthing Arrangement

1. Internal earthbus shall be provided which has a capacity to withstand short circuit currents for one second and all enclosures shall be connected to this bus.
2. Earthing arrangement through and integral earth switch or through separate earthing

truck shall be provided. Suitable mechanical interlocks shall be provided to prevent the closing of earth switch circuit on live circuit. In case of later arrangement one set of different types of earthing trucks per switch board shall be provided.

3. Earthing switch/Earthing truck shall be short time (One second) current withstand capability equal to the breaker.
4. A clearly visible warning label "ISOLATE ELSEWHERE BEFORE EARTHING" shall be provided on shutters of incoming and other connections which could be energised from other end.

vii. Cable Entry

Switchgear panel shall be suitable for bottom entry and provided with removable gland plates

viii. Instrument transformer

CTs and VTs shall be provided for protection and metering and shall be cast resin encapsulated type. Insulation class 'E' or better. VTs shall have suitable HRC current limiting fuses to both primary and secondary sides, under voltage relays, timers, etc. for remote annunciation on supply failure. Accuracy class of CTs and VTs shall be as follows

	CTs	VTs
Protection	5P 20	3P
Metering	0.2S	0.2

CTs/VTs shall have accuracy class of 0.2 wherever MFM of 0.2 class are connected to these CTs.

ix. MFM shall be provided in all the verticals including spare feeders. MFM shall have RS 485 data communication.

(d) CABLES AND WIRES

i. All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions for 25 years and voltages as per latest IEC standards. (Note: IEC standards for DC cables for PV systems is under development, the cables of 600-2600 volts DC for outdoor installations should comply with the draft EN 50618 for service life expectancy of 25 years). DC Cable of Positive & Negative must be colour coded as per draft EN50618.

ii. Wires with sufficient ampacity and parameters shall be designed and used so that average voltage-drop at full power from the PV modules to inverter should be maximum1.5% (including diode voltage drop). PV Modules should be connected with USE-2/RHW-2 cables array to

junction box conductors and junction box to photovoltaic disconnector with the THHN/THWN-2 sunlight resistant with 90ºC wet rated insulation cable. Due consideration shall be made for the de-rating of the cables with respect to the laying pattern in buried trenches / on cable trays, while sizing the cables. The Contractor shall provide voltage drop calculations in excel sheet to Consultant for approval during execution.

iii. All cables shall be supplied in the single largest length to restrict the straight-through joints to the minimum number. Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted. All wires used on the LT side shall conform to IS and should be of appropriate voltage grade. Copper conductor wires of reputed make shall be used. Armoured Aluminium cable connecting SMB and Inverter and also for lT applications are allowed

iv. All cables shall be armoured except Solar Cables. Solar cable between panels shall be tied with MMS structures, Cables between MMS tables & to SMB shall be laid in DWC Conduits.

v. OFC cable shall be laid in DWC conduits.

vi. Ethernet cables shall be CAT-6.

vii. All wires used for connecting the modules and array should conform to the NEC standards. Modules should be connected with USE-2/RHW-2 cables array to junction box conductors and junction box to photovoltaic disconnector with the THHN/THWN-2 sunlight resistant with 90ºC wet rated insulation cable

viii. All high voltage cables connecting the inverters to the transformers should be XLPE insulated grade conforming to IS 7098-Iand cables shall also conform to IEC 60189 for test and measuring the methods.

ix. Irrespective of utilization voltage and current rating all type of power cables shall be minimum of 1100 V/2600V grade XLPE insulated conforming to IS 7098& IS 1554/ IS 694 for working voltage less than 150 V control cable shall be of minimum 600 V grade, the control and power cable has to be laid separately. All LT XLPE cables shall confirm to IS: 7098 Part I &
II. All HT XLPE Cables (up to 11kV) Shall confirm IS: 7098 PART-3 & IEC-60287, IEC-60332 and the Contractor to submit technical data sheet, Voltage drop calculation, Power Loss Calculation and type test report for the approval of PMC.

x. The cables shall be adequately insulated for the voltage required and shall be suitably colour coded for the required service. Bending radius for cables shall be as per manufacturer's recommendations and IS: 1255

S No	Item	IS	IEC
1.	Conductors of Insulated Cables	IS: 8130 - 1984	IEC: 228

2.	Impulse tests on cables and their accessories		IEC: 230
3.	Extruded solid dielectric-insulated power cables for rated voltage from 1 KV upto 30 KV		IEC: 502
4.	Test methods for insulations and sheaths of electric cables and chords		IEC: 540
5.	Test on cable over a sheath which has special protective functions and are applied by extrusion		IEC: 229
6.	Calculations of continuous current rating of cables (100% load factor		IEC: 287
7.	Cross-linked polyethylene insulated PVC sheathed cable for voltage from 3.3 KV upto 33 KV	IS: 7098 (Part II& III)	
8.	PVC insulation & sheath of electrical cables	IS: 5831 - 1984	
9.	Mild steel wires, formed wires and tapes for armouring of cables.	IS: 3975	
10.	Electrical test methods for electric cables partial discharge test.		IEC: 885(2) - 1987 (Part II)
11.	Methods of test for cables.	IS: 10810	
12.	Common test methods for insulating and sheathing materials of electric cables.		IEC: 811
13.	Impulse test on cables & other accessories		IEC: 230
14.	Cable termination for gas insulated switchgear		IEC: 859

a) Technical Specification of LT Cables

a. Solar Cable Upto Inverter

1. All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions including High temperatures, UV radiation, rain, humidity, dirt, burial and attack by moss and microbes for 25 years and voltages as per

latest IEC standards. (Note: IEC standards for DC cables for PV systems is under development, the cables of 600 – 2600 volts DC for outdoor installations should comply with the draft EN 50618/ TUV 2PfG 1169/09.07 for service life expectancy of 25 years, SMU to Inverter cables shall be run through DWC/UPVC Pipes (with filling factor of 40%) from SMU to ground level. Between SMU and Inverter, underground armoured XLPE Cables directly buried as per relevant IS standard of latest edition. Cables shall not be directly exposed to atmosphere.

2. Insulation: Outer sheath of cables shall be electron beam cross-linked XLPO type and black in colour. In addition, Cable drum no. / Batch no. to be embossed/ printed at every one meter. Cable Jacket should also be electron beam cross-linked XLPO, Flame Retardant, UV resistant and black in colour.
3. Wires with sufficient ampere capacity and parameters shall be used so that maximum voltage-drop at full power from the PV modules to Inverter should be less than 1.5% (including diode voltage drop). Selected Bidder shall provide voltage drop calculations in excel sheet.
4. Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted. All wires used on the LT side shall conform to IS and should be of appropriate voltage grade. Only copper conductor wires compliant with IEC 60228, Class 5 of reputed make shall be used.

b. Other LT Cables:

1. General Constructional Features: The medium voltage cables shall be supplied, laid, connected, tested and commissioned in accordance with the drawings, specifications, relevant Indian Standards specifications, manufacturer's instructions. The cables shall be delivered at site in original drums with manufacturer's name, size, and type, clearly written on the drums.
2. Material: All LT cable shall be XLPE insulated, PVC sheathed with FRLS, aluminium or copper conductor, armoured conforming to IS: 7098 Part I.
3. Type: The cables shall be circular, multi core, annealed copper or aluminium conductor, XLPE insulated and PVC sheathed, armoured.
4. Conductor: Uncoated, annealed copper, of high conductivity upto 4 mm^2 size, the conductor shall be solid and above 4 mm^2, conductors shall be concentrically stranded as per IEC: 228.
5. Insulation: XLPE rated 90° C. extruded insulation

1. Core Identification:
    - Two core: Red and Black
    - Three core: Red, Yellow and Blue
    - Four core: Red, Yellow, Blue and Black
    - Single core: Green cable with Yellow strips for earthing

- Black shall always be used for neutral

2. Assembly: Two, three or four insulated conductors shall be laid up, filled with non-hygroscopic material and covered with an additional layer of thermoplastic material
3. Armour: Galvanised steel flat strip / round wires applied helically in single layers complete with covering the assembly of cores
    - For cable size upto 25 Sq. mm. : Armour of 1.4 mm dia G.I. round wire
    - For cable size above 25 Sq. mm. Armour of 4 mm wide 0.8 mm thick G.I strip
4. Sheath: The cable shall be rated extruded for XLPE 90 deg.c. Inner sheath shall be extruded type and shall be compatible with the insulation provided for the cables. Outer sheath shall be of an extruded type layer of suitable PVC material compatible with the specified ambient temp 50 deg. C and operating temperature of cables. The sheath shall be resistant to water, ultraviolet radiation, fungus, termite and rodent attacks. The colour of outer sheath shall be black. Sequential length marking required at every 1.0 meter interval on outer sheath shall be available. The contractor has to furnish resistance / reactance / capacitances of the cable in the technical datasheet.
5. Rating: 1100 Volts or higher.

b) Technical Specification of HT (UE) Cables

General Constructional Features

1. Conductors: The conductor shall be of circular stranded Aluminium confirming to IS: 8130 & IEC: 228. It shall be clean, reasonably uniform in size & shape smooth & free from harmful defects. Any other form of conductor may also be accepted if in line with modern trends.
2. Semi-Conductor Barrier Tape/Tapes: The semi-conducting barrier tape/tapes shall be provided over the conductors
3. Conductor Screen: The conductor screen shall consist of an extruded layer of thermosetting semi-conducting compound which shall be extruded simultaneously with the core insulation.
4. Insulation: The insulation shall be super clean XLPE FRLS compound applied by extrusion and vulcanized to form a compact homogenous body.

1. Insulation Screen:
    - Each insulation have an insulation screen in two parts consisting of:
    - A water barrier tape/Non-metallic semi-conducting swellable tape part and a metallic screen part.
    - The non-metallic part shall be directly applied upon the insulation of each core and may consist of an impregnated but nylon/PVC tape or a similar approved material or, an extruded semi-conducting material extruded simultaneously with the conductor screen and insulation (triple extrusion).
    - The semi-conductor shall be readily strippable and must not be bonded in such a

manner that it has to be shaved or scraped to remove.

- The metallic part shall consist of a copper tape helical applied with a 30% overlap over the water barrier tape/blocking tape. A binder tape of copper shall be applied over the copper wire metallic screen.

2. Laying Up:
    - The cores shall be identified on the non-metallic part of the insulation screen by legible printing on the length of each conductor or, by the inclusion of a marker tape.
    - The cores shall be laid up with a right hand direction of lay.
    - Binder tape/Moisture barrier:
    - During layup, a suitable open spiral binder may be applied, at the manufacturer's discretion, before the application of an extruded inner covering.
    - Fillers: Fillers shall be polypropylene.
    - Inner Covering/Sheath: The inner covering shall be extruded over the laid up cores to form compact and circular bedding for the metallic layer.
    - Metallic Layer: The metallic layer shall be galvanised steel wire.
    - Outer Sheath: The tough outer sheath, black coloured best resisting PVC polyethylene compound type ST-2 as per IS: 5831 for the operating temperature of the cable shall be provided over the armour as specified in relevant standards by extrusion process
3. Cable Marking:
    - Embossing on outer sheath:
    - The following particulars shall be properly legible embossed on the cable sheath at the intervals of not exceeding one meter throughout the length of the cable. The cables with poor and illegible embossing shall be liable for rejection
    - Voltage grade
    - Year of manufacture
    - Manufactures name
    - Successive Length
    - Size of cable
    - ISI mark
4. Packing and marking shall be as per clause No. 18 of IS 7098 (part I)/1988 amended up to date.
5. Cables inside the control room and in the switchyard shall be laid in Galvanized Cable Trays mounted on mild steel supports duly painted, in constructed trenches with RCC raft and brick sidewalls and provided with removable RCC covers.
6. Cable terminations shall be made with suitable cable lugs & sockets etc, crimped properly and passed through brass compression type cable glands at the entry & exit point of the cubicles.
7. All cable/wires shall be provided with Punched Aluminium tags only. The marking on tags

shall be done with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.

8. The wiring for modules interconnection shall be in the GI pipe /HDPE/ DWC Pipe of approved make.
9. Data sheets of individual cable sizes (HT & LT) shall be submitted for approval by the Owner. Drum numbers and drum length details shall be submitted with each consignment.
10. Cable end terminations and joint kits shall comply with the latest version of the relevant IS standard.
11. The cable ends shall be terminated with adequate size copper/ Aluminium/ Bimetallic lugs and sockets etc, single/double compression cable glands. Cable glands shall be of robust construction capable of clamping cable and cable armour (for armoured cables) firmly without injury to insulation. The metallic glands shall be earthed at min one location. Suitable lock type crimping lugs shall be used for cable end terminations. Where cables are raising from ground, suitable PVC pipe guarding shall be provided for cable raising with sealing of the guarding PVC pipe including a suitable clamp.
12. HT cable termination kits and straight through joints shall be selected as per the cable specifications. Installation shall be as per the instructions given in the manufacturer's manual. Heat shrinkable type kits only shall be used for HT and LT cables.
13. During Execution Contractor shall submit the Data sheets of the joints and kits to PMC for approval.

(e) POWER EVACUATION

i. The Energy generated from the Solar power plant shall be evacuated to suitable voltage level of KPCL from the proposed project site. Contractor shall construct UG Cable line for this project.

ii. The necessary survey for the finalizing the UG Cable route and length shall be done at the time of execution.

iii. All the necessary infrastructure in the KPCL Existing Substation for evacuating the generated power shall be provided as per KPCL standards. Necessary bus extension to be done by contractor

iv. Voltage drop in the transmission line shall be within the KPCL permissible limits.

(f) LOW VOLTAGE SWITCHGEAR

i. Power Motor Control Centre (PMCC) shall be 415V TP&N, free standing Fixed type, with Aluminium bas bars, IP54

ii. The PMCC shall be rated for the maximum output of the supply transformer feeding the system.

iii. The short circuit withstand rating (1 sec) at rated voltage of the switchgear shall be minimum

of 20 kA (rms) and corresponding dynamic rating shall be 50 kA (peak).

iv. The configuration of the PMCCs shall be as per the system requirement. With 10% spare feeder (min 1 no of feeder in each type & rating). PMCC shall be fuse less type. Incomer shall be ACB/MCCB, outgoing feeder shall be MCCB and Motor feeder shall be OLR and contactor in addition. Incomer rating shall be designed with 20% design margin. MFM with RS 485 .

Following equipments shall be powered from PMCC

1. Green Hydrogen plant 300 KW min
2. UPS
3. DC Battery Charger
4. MLDB
5. AC system
6. Raw power sockets & other requirement
7. Welding sockets
8. Module Cleaning system
9. RO Plant
10. Bore well pump
11. Sump pumps
12. Others

v. Single front / compartmentalized, modular design with provision of extension on both sides.

vi. The colour finish shade of switchgear enclosure for interior shall be glossy white & for exterior it shall be light grey, semi glossy shade 631 of IS: 5. If a different exterior shade is desired by the PMC, the same shall be intimated to the supplier.

vii. The PMCC shall be fabricated out of CRGO sheet steel with 2 mm thickness for the enclosure

viii. The internal walls and separators shall be of 1.6 mm thick CRGO sheet steel.

ix. The gland plates shall be 3 mm thick.

x. Control Circuit:

1. Control supply for breaker closing / tripping - 110V DC
2. Air Circuit Breaker spring charge motor – 110V DC
3. Moulded Case Circuit Breakers – 110V DC
4. Indications, annunciation – 110V DC
5. Space heater, sockets, etc. – 240 V AC

xi. Bus Bar

1. The material for main bus bars and tap off bus bars shall be electrolytic grade aluminium with HR PVC sleeved insulation.
2. Bus bars shall be suitable for short circuit rating and current suitable for all connected load.
3. Bottom cable entry for incoming and outgoing cables.

4. A suitable gland plate shall be supplied for termination of power, control and instrumentation cables.
5. Whenever feeders are housed in multi-tier configuration, these tiers shall be segregated by sheet metal barriers.
6. Earthing: Earthing bus bar shall be terminated at both ends of the switchgear to suit the connections to outside earthing conductor. All components inside the module are required to be earthed individually and are to be looped and connected to the horizontal earth bus.

xii. Terminals

1. CT circuit - Isolating link type terminals with shorting Facilities.
2. PT circuit – clip on type terminals.
3. Spare contacts shall be wired up to terminal block. 10% spare terminals shall be provided for each module

xiii. Specific Requirement

1. Incomer ACB/MCCBs shall be 4 pole, electrically operated, with closing coil, spring charge motor, trip coil, TNC switch for close and trip, manual closing and tripping push buttons, door I/L, test and service position micro switches, emergency P.B., safety shutters, etc. The circuit breaker shall be provided with anti-pumping feature.
2. Incomer shall be with microprocessor release and shall be provided with over current, short circuit and earth fault protections.
3. All current transformers shall have 5/1A secondary and all meters shall be suitable for 5/1A operation.
4. All indicating lamps shall be of LED cluster type. Incomer feeder shall be provided with ON, OFF, AUTOTRIP, SPRING CHARGED, TEST, SERVICE, TRIP CIRCUIT HEALTHY indications. Colour code shall be followed as applicable.
5. All indicating instruments shall be flush mounting, Digital, 96 sq.m size.
6. MFM shall be provided in incomer and shall be able to communicate through RS485.
7. Necessary auxiliary relays for contact multiplication shall be provided in the panel. The maximum temperature of the bus bars, droppers and contacts at continuous current rating under site reference ambient temperature of 50º C shall not exceed 105º C.
8. All the necessary (defined by PMC during execution) controls, feedback and monitoring signals shall be communicated to SCADA system.
9. All control cables shall be minimum of 1.5sqmm
10. For CT secondary circuits 2.5 sq.mm wire shall be used.

(g) UNINTERRUPTED POWER SUPPLY (UPS) SYSTEM

i. The Uninterrupted Power Supply (UPS) system (3phase, 415V, Industrial grade) shall be designed to meet the electrical power requirements of SCADA systems, Screens, Inverter and other requirement in Control room and inverter room. The UPS System shall be designed to give the voltage at approximate mid-level of the tolerance band of the power supply modules/packs of Control System, when the charger is feeding the load. This shall also take in consideration the voltage drop in cables from DCDB to the control panels (if required). In case the Power Supply Output of a charger exceeds the voltage band tolerated by the power supply modules/packs of Control System, provision for safe tripping of that charger is to be ensured.

ii. Bidder shall clearly bring out in the proposal the redundancy feature along with configuration diagram, single line diagram and data sheets etc. & this shall be finalized subject to PMC's approval during detailed engineering.

iii. UPS system shall consist of 1X 100% charger and inverter, 1X 100% Battery bank for 3 hour, Bypass Line Transformers and Voltage Stabilizer, static switch, manual bypass switch, 2X 100% ACDB, and other necessary Protective devices and accessories.

iv. During the sizing of the UPS, the following loads shall be considered (but not limited to)

1. Data logger / SCADA
2. GPRS Modem / VSAT equipments
3. Fire Detection/ Alarm Panel
4. HMI of SCADA
5. Emergency Lighting
6. Inverter's Auxiliary supply
7. CCTV
8. Other necessary equipments

v. Design

The minimum capacity of the UPS at load factor of 0.8 lagging inclusive of 20% design margin at 50°C. The UPS system shall meet the following requirements as a minimum. If UPS KVA rating is applicable at a lower ambient temperature than specified 50°C, the bidder shall consider a derating factor of at least 1.5%/°C for arriving at the specified UPS capacity at 50°C ambient. The UPS shall have an overload capacity of 125% rated capacity for 10minutes and 150% rated capacity for 10 seconds. The inverter shall have sufficient capability to clear fault in the maximum rated branch circuit, limited to 8 percent of finally selected ups capacity. Isolation Transformer, Voltage Stabiliser, Static Inverters Static Switch and Manual Bypass Switch shall be provided. The type and other details shall be subject to PMC approval.

vi. Chargers

1. The chargers shall be self-regulating, solid state silicon controlled, full-wave rectifier type

designed for single and parallel operation with battery and shall have automatic voltage regulators for close voltage stability even when AC supply voltage fluctuates, effective current limiting features and filters to minimize harmonics. The charger should be capable to fully charge the required batteries as well as supply the full rated load through inverter. Furthermore the charger should be able to re-charge the fully discharged battery within 8 hours. The charger output regulation shall be ± 1% from no load to full load with an input power supply variation of ± 10% in voltage and ± 5% in frequency. In addition to indications/display on charger panel, alarms along with relevant analog measurements shall also be provided by employing RS 485 Port Modbus Protocol / Ethernet TCP/IP protocol for use in solar SCADA. The list of alarm output & 4-20 mA signals shall be as approved by PMC during detailed engineering.

2. The charger shall be current limited for charger circuit protection and protection of battery from overcharge shall also be provided. The current limit shall be continuously adjustable. The chargers shall have a slow walk in circuit which shall prevent application of full load DC current in less than 10 seconds after AC power is energised.

3. The chargers shall be fed from 300V-400V AC, 50 HZ, 3 phase, 3 wire system. Charger design shall ensure that there is no component failure due to fluctuations of input supply or loss of supply and restoration.

4. The minimum full load efficiency at nominal input and output shall be 90% The ripple content shall be limited to +/- 2 % of Charger output voltage. The UPS battery shall have sufficient amp-hour capacity to supply the steady state KVA rating of the UPS specified for 120 minute, irrespective of the actual load on UPS.

5. The UPS system shall be capable of operating without D.C. battery in circuit under all conditions of load and the performance of various components of UPS like inverter, charger, static switch etc. shall be guaranteed without the battery in circuit.

6. The UPS system design shall ensure that in case of failure of mains input power supply to one of the chargers, the other charger whose mains input power supply is healthy, shall feed to one or both the inverters as the case may be as per manufacturer's standard practice & continue to charge the

7. D.C. battery at all load conditions. The Bidder should note that this situation should not in any way lead to the discharge of the D.C. Battery.

vii. Batteries

Contractor shall supply VRLA type sealed batteries. The detailed specification for the batteries has been mentioned elsewhere in this specification. Battery with charger for DC load of Switchgear and for UPS

at Main pooling Switchgear shall be Separate/ independent. However, at Inverters rooms/Sub pooling switchgears, proposal for using common battery for UPS and Switchgear DC load shall be subject to approval during detail engineering. For sizing calculation, an aging factor of 0.8 and a temperature correction factor as per manufacturer's standard at 4°C electrolyte temperature (Based on temperature characteristics curve to be submitted by the Contractor at a temperature of 4°C), Capacity factor, float correction (if applicable) shall be taken into consideration. The sizing of the battery shall be as approved by PMC during detailed engineering. The Contractor shall typically consider a voltage drop of 4V from battery room to the inverter input while sizing the battery for UPS System.

(h) WEATHER MONITORING SYSTEM (WMS)

i. As a part of weather monitoring station, Bidder shall provide following measuring instruments with all necessary software & hardware required to integrate with SCADA so as to enable availability of data in SCADA. Twice a year the output of WMS shall be calibrated for accuracy.

ii. PYRANOMETER

Minimum one (01) number of pyranometer for measuring incident global solar radiation shall be provided for one region. One of them shall be placed on horizontal surface and the other on adjustable inclined plane. The specification for pyranometer shall be as follows:

S No	Details	Values
1.	Spectral Response.	0.31 to 2.8 micron
2.	Sensitivity	Min 7 micro-volt/w/m^2
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^2
8.	Zero offset temperature change	±2 w/m^2
9.	Operating temperature range	0 deg to +80 deg.
10.	Uncertainty (95% confidence Level)	Hourly-Max-3%, Daily-Max-2%
11.	Non stability	Max ±0.8%
12.	Resolution	Min + / -1 W/m2
13.	Input Power for Instrument & Peripherals	230 Vac
14.	Output Signal	Analogue form which is compatible with the data

Each instrument shall be supplied with necessary cables. Calibration certificate with calibration traceability to World Radiation Reference (WRR) or World Radiation Centre (WRC) shall be furnished along with the equipment. The signal cable length shall not exceed 20m. Bidder shall provide Instrument manual in hard and soft form

iii. THERMOMETER

Contractor shall provide minimum two thermometers (one for ambient temperature measurement with shielding case and other for module temperature measurement). The thermometers shall be RTD / semiconductor type measuring instrument. Instrument shall have a range of 0°C to 80°C. The instrument shall have valid calibration certificate.

iv. ANEMOMETER

Minimum one no. anemometer with Ultrasonic Type to be provided

S 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 ± 5 deg

v. Data Logger

Data logger shall be kept inside IP65 enclosure near/on WMS pole. Necessary cooling/heat resistant arrangement provided. Should have TCP/IP communication port and FTP transfer options. It should have inbuilt storage capacity of 2 years data minimum

The instrument shall have valid calibration certificate.

(i) CCTV

i. IP PTZ type CCTV cameras not less than 28X shall be fixed in installed in following location
   1. Focusing Main Entrance
   2. Focusing Inverter and Transformer yard
   3. In Plant area- Entire plant area to be covered

ii. CCTV Cameras shall be rotatable in Pan 360° continuous /controlled rotation; Tilt of 0° to 90° with stand -35°C to 60°C.

iii. The protection grade shall be IP66, light proof, surge proof, weather proof, wave proof.

iv. Camera Specification (Outdoor):

1/3" CMOS HD sensor, Out Door Bullet H.264 Compression, 2 mega Pixels CMOS, 3DNR, The highest resolution can be up to 1920 × 1080 Low Lux, DWDR, Support Voice talk, 1CH Audio in/1CH Audio Out, Mobile P2P Viewing, Support Protocol: TCP, UDP, IP, HTTP, FTP, SMTP, DHCP, DNS ,ARP, ICMP, POP3, NTP and RTSP, Support ONVIF 2.0, Lens ： 2.8-12mm Megapixel lens (4-9mm lens optional), IR Distance: 20-30m, POE (802.3af). Support ROI function, Built-in Micro SD/SDHC/SDXC card slot, Video Bit Rate 32 Kbps –8 Mbps, Audio Compression G.711/G.722.1/G.726/MP2L2, Dual Stream, BLC, ROI STANDARD: ONVIF, PSIA, CGI, ISAPI, Operating Conditions -35°C to 60°C.

v. CCTV shall have separate monitoring system with 35 days recording and shall have be able to monitor from remote location through internet.

(j) SCADA AND REMOTE MONITORING SYSTEM

i. The plant shall be automatically operated and shall be controlled by microprocessor based control system SCADA and should be Open Platform Communications (OPC) compliant. There shall be simultaneous data logging, recording and display system for continuous monitoring of data for different parameters of different sub systems, power supply of the power plant at DC side and AC side.

ii. An integrated SCADA shall be supplied which should be capable of communicating with all Inverters and provide information of the entire Solar PV Grid interactive power plant.

iii. Computer-aided data acquisition unit shall be a separate & individual system comprising of different transducers to read the different variable parameters, A/D converter, multiplexer, de multiplexer, interfacing hardware & software, which will be robust & rugged suitable to operate in the control room Environment.

iv. Reliable sensors for solar insolation, temperature, and other weather and electrical parameters are to be supplied with the data logger unit.

v. All data shall be recorded chronologically date wise. The data file should be MS Excel compatible. The data logger shall have internal reliable battery backup and data storage capacity to record all sorts of data simultaneously round the clock. All data shall be stored in a common work sheet chronologically and representation of monitored data shall be in graphics mode or in tabulation form. All instantaneous data can be shown in the Computer Screen.

vi. SCADA shall measure and continuously record electrical parameters of following equipments with time interval of 5-15 minute.

1. Energy export to grid
2. String Monitoring Unit
3. Inverter level parameters
4. Parameters at LV terminal (300-1000V)
5. Power characteristics of HT side
6. Ambient temperature near array field
7. Module surface temperature
8. Wind Speed and direction
9. Solar irradiation/isolation
10. UPS, Battery Charger
11. Fire Detection & Alarm system.
12. Any other parameter considered necessary by supplier based on current prudent practice

vii. SCADA shall provide 15 minute daily, monthly and annual average of following parameters:

1. Exported Energy to grid
2. Energy, DC and AC voltage, power and pf of each Inverter
3. Solar Radiation
4. Temperature (ambient and module surface)

viii. All data shall be recorded chronologically date wise. The data file should be MS Excel compatible. The data logger shall have internal reliable battery backup and data storage capacity to record all sorts of data simultaneously round the clock. All data shall be stored in a common work sheet chronologically. Representation of monitored data should be in graphics mode or in tabulation form. All instantaneous data should be shown in the Computer Screen.

ix. All the HT breakers signals from numerical relay shall be communicated to SCADA through IEC 61850 communication protocol. LV switchgear MFM readings shall be configured in the SCADA system.

x. All the nodes connected to SCADA shall have the time synchronization through GPS clock.

xi. SCADA shall have feature to be integrated with the local system as well remotely using a GSM /WIFI modem. The SCADA system shall have compatible software and hardware so that data can be transmitted via modem with 100% redundancy for the communication part. If there is any limitation in GPRS communication at project site, VSAT system for communication along with necessary license shall be provided.

xii. The COMPUTER (Engineering & Operator Station) shall be of Industrial type, rugged & robust in nature to operate in a hostile environment. The SYSTEM shall have minimum Intel Core i7 processor having 1TB HDD with 16 GB RAM. 32'' LED HD Colour monitor (for engineering station), DVD Drive with Writer, USB drive, wireless optical Mouse & key board, along with necessary licensed operating software, anti-virus software and necessary applications. In addition 60"monitor along with Wi-Fi keyboard & mouse for the operator shall be provided. The printer shall be equipped for printing, scanning, and copying in A4 & A3 size. There shall be one number of 40"monitor along with Laptop with Intel Corei5 processor having 1TB HDD with 8 GB RAM, DVD Drive with Writer, USB drive, with licensed operating software, anti-virus software and necessary applications at OWNER corporate office for monitoring the plant data.

xiii The complete plant SCADA (Software based) with SCADA server having string level monitoring capabilities over remote server shall be considered. Cable shall be laid in appropriate cable trench, connect with suitable connectors and terminate to the SCADA server inside control room.

i. The necessary provision in RTU shall be provided for communication with SLDC. Periodically the required Technical Data Sheet for String RTU, TCP String, Central RTU etc., in the prescribed format defined from time to time shall be submitted.
ii. All the SCADA system shall be compatible to the requirements for continuous & uninterrupted monitoring and reporting the performance-ratio and all other parameters of the power plant.

Note for Solar + Green Hydrogen Plant (As applicable):

- The EPC shall install and maintain GPS enabled Automatic Weather Station (AWS) as per the technical specifications and standards specified by relevant Central Government agency. The AWS shall form part of an integrated system for real-time monitoring and data acquisition. Availability of the data from such AWS shall be ensured as specified by the appropriate Load Dispatch Centre and other Central Government agencies in accordance with the provisions of Indian Electricity Grid Code and instructions from the appropriate Load Dispatch Centre from time to time.
- The EPC shall complies with applicable cyber security regulations, directives, and guidelines issued by the Central Government Authorities dealing with cyber security.

ILLUMINATION SYSTEM

i. This specification covers design of Array yard and sub-station, street light using 18W 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. The bidder will also design, supply and install lighting fixtures and accessories based on LED for equipment room and control room building and entry points/ gates.

ii. All LED luminaires shall be supplied with proper diffuser to avoid direct visibility of LED with proposer thermal management for longer life. Renowned brands available in the market need to be used.

iii. Lighting Levels

1. The average LUX level of 10 lm is to be maintained in switchyard. However, a lux level of 20 lm (10+10) additional switchable on requirement only) is to be maintained in switchyard on transformer.
2. Lighting in other areas such as control room, office rooms and battery room & other areas(i.e. street light) shall be such that the average LUX level to be maintained shall be as under:

Area	LUX
Control Room and equipment rooms	500
Office	400
Battery & other rooms	150
Other areas including periphery wall	10
Transformer yard	20
H Pole and metering point	10
Security and Warehouse	20

iv. **Emergency Light Points:**

1. These lights shall be powered from UPS and have at least 3 hours backup
2. Separate wiring and distribution board shall be provided from these lights.
3. The lighting level shall take into account appropriate light output ratio of luminaires, coefficient of utilization maintenance factor (of 0.7 or less) to take into account deterioration with time and dust deposition.

v. **Additional information:**

1. The LED luminaire housing, heat sink, pole mounting bracket, individual LED reflectors and front heat resistant tempered glass should be provided.
2. The LED luminaire housing should be made of non-corrosive high pressure die cast aluminium and the housing should be power coated grey, so as to ensure good weatherability.
3. Each individual LED source should be provided with a asymmetrical distribution high reflectance aluminized reflector, which should ensure that the light distribution of the luminaire is suitable for road lighting applications (wide beam distribution) and should ensure high pole to pole spacing.
4. The luminaire should be provided with in built power unit and electronic driver. The luminaire should be should be so constructed to ensure that the gear and LED modules are replaceable, if required.

5. The luminaire should be suitable for both standard street light poles with a typical pole diameter of 50 mm – 60 mm and should be suitable for both side entry and bottom entry (post top).

vi. **Area & Periphery Lighting**

1. Switchyard lighting shall be as per the relevant IS standards
2. Area lighting arrangement at strategic locations shall be made to illuminate the periphery, roads of site at an appropriate lux level for night hours or bad light hours
3. The area lighting shall be through standalone Solar street light with 3 days power autonomy
4. The lighting fixtures shall be of LED type of minimum 18W.
5. All the yard lighting towers and lighting fixtures shall be effectively grounded using adequate size of GI earthing wires / GI earthing strips.
6. Loop in – Loop out power cables shall be brought up to the junction box through of adequate size for cable protection.
7. The cables shall be properly glanded to the junction box gland plate.
8. XLPE / PVC insulated armoured CU/Al cables of adequate size shall be used for interconnection and supply of power to Yard lighting systems.
9. Cable terminations shall be made with suitable cable lugs & sockets etc. crimped properly and passed through brass compression type cable glands at the entry & exit point of the connector box and at the entry point to MCB distribution Box for controlling the yard lighting system.
10. The height of the area lighting poles & Periphery Lighting poles shall be atleast 3.0Mtr from ground.

EARTHING & LIGHTNING PROTECTION

i. EARTHING

1. Soil resistivity test shall be carried to atleast in five (05) location across the project site for designing the Earthing system.
2. Earth Grid resistivity shall be maintained less than 2 Ohm (As per latest CEA guidelines and amendments from time to time) And for every 100mtrs minimum one number of earth pit shall be provided. Number of earth pit shall be as per calculation, Separate Earthing grid shall be provided for AC & DC system and Lightning system. For instruments separate earth pits shall be provided. However CEA requirements must be met for the project and all individual equipments.
3. For Switchyard necessary earth mat shall be provided as per IS 3043.
4. Earth strips shall be galvanized with minimum thickness of 80microns.

5. The photovoltaic modules, BOS and other components of power plant requires adequate earthing for protecting against any serious faults as guided by IEC 60364.
6. The earthing system shall be designed with consideration of the earth resistivity of the project area. The earth resistivity values shall be measured prior to designing the earthing system. Unless otherwise specified, earthing system shall be in accordance with IS: 3043 and IEEE 80, Indian Electricity Rules, Codes of practice and regulations existing in the location where the system is being installed.
7. The permissible system fault power level at all the voltage shall be kept in consideration while designing the earthing system. Each array structure of the PV yard, LT power system, earthing grid for switchyard, all electrical equipment, control room, PCU, All junction boxes, ACDB& DCDB all motors and pumps etc. .shall be grounded properly as per IS 3043 - 1987. All metal casing / shielding of the plant shall be thoroughly grounded in accordance with Indian electricity act / IE Rules.
8. The earthing for array and LT power system shall be made of 3 meter long 16 mm2 Copper rod with chemical compound filled, double walled earthing electrodes including accessories, and providing masonry/ precast enclosure with cast iron cover plate/ Precast, chemical compound mix as required as per provisions of IS: 3043.
9. Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
10. Each string/ array and MMS of the plant shall be grounded properly. 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.
11. The complete earthing system shall be mechanically & electrically connected to provide independent return to earth.
12. In compliance to Rule 11 and 61 of Indian Electricity Rules, 1956 (as amended up to date), all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.
13. The Contractor should submit the earthing system design calculations along with the system layout for the PMC approval prior to the installation of the system
14. Unless otherwise specified, the earthing system primary and secondary grid conductors, equipment connections shall be constructed with galvanized iron flat. However, the earthing of transformer neutrals, PLC & inverter terminals and electronic earthing shall be provided using copper earthing conductor only.

ii. LIGHTENING PROTECTION

1. The source of over voltage can be lightning or other atmospheric disturbance. Main aim of over voltage protection is to reduce the over voltage to a tolerable level before it reaches the PV or other sub-system components as per IEC 60099 / IS: 2309 – 1989

(Reaffirmed – 2005), Edition 3.1 (2006-01). Lightening Protection System required for Solar PV Plant, Inverter Room, and Substation Structure & Control Room within the EPC scope of work. The intent of specification can be conventional as per IS : 2309 or can be Early Streamer Emission Type depending upon Area, Protected Equipment & Technical feasibility. Necessary concrete foundation for holding the lightning conductor in position to be made after giving due consideration to shadow on PV array, maximum wind speed and maintenance requirement at site in future. We recommended going with Early Stream Emission Air Terminal Technology as per NFC 17-102 / IEC 62305-2. Level of Protection must be defining as per Rolling Sphere Method LPL-I, LPL-II, LPL-III & LPL-IV where the radius shall be of 20mtr, 30mtr, 45mtr & 60mtr respectively.

2. Rp (h) : Protection radius at a given height (h) Rp(h) = √ 2rh - h2 + Δ(2r + Δ) (for h ≥ 5 m) For h < 5 m, refer to the table below h : Height of the OPR tip above the surface(s) to be protected r(m) : Standardized striking distance Δ(m) = 106 .ΔT (OPR efficiency)
3. The lightning conductor shall be earthed through flats and connected to the earth mats as per applicable Indian Standards with earth pits. Each lightning conductor shall be fitted with individual LA counter and earth pit as per required Standards including accessories, and providing masonry enclosure with cast iron cover plate having locking arrangement, chemical compound as per provisions of IS.
4. If necessary, more numbers of lightning conductors may be provided as per design calculation
5. The Contractor shall submit the drawings and detailed specifications of the PV array lightning protection equipment.
6. The design, manufacture, inspection, testing and performance of Lightning Arrester shall comply with all currently applicable statutes, safety codes, provision of latest Indian Electricity Act, Indian Electricity Rules and Regulations of Statutory Authorities.
7. Contractor shall provide dedicated two earth pits for Lightening Arrestor as per relevant IS standard.

FIRE DETECTION & PROTECTION SYSTEM

i. The installation shall meet all applicable statutory requirements, safety regulations in terms of fire protection.

ii. Liquefied CO2 fire extinguisher shall be upright type of capacity 10 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. Bidder shall provide portable fire extinguisher as per the recommendation by relevant fire safety authority.

iii. The minimum 5 no. of fire extinguishers (CO2 and Foam type each) shall be provided at every

building. Sand bucket should be wall mounted made from at least 24 SWG sheet with bracket fixing on wall conforming to IS 2546.

iv. Fire detection and alarm system shall be provided at Switch-gear room, inverter room and Control room as per the below specifications-

1. Microprocessor based fire alarm panel;
2. Contractor to provide intelligent microprocessor based main fire alarm panel of modular construction complete with central processing unit, input and output modules, power supply module and isolator modules.
3. Fire detection alarm system shall include but not limited to the following items:
    - Fire Alarm control Panel
    - Multi Sensor smoke detector
    - Hooter cum strobe
    - Manual call Point
    - Control Modules
    - Cables from Sensors to Fire panels.
    - Digital output from the fire detection system shall be integrated with SCADA

v. Multi sensor type smoke detectors shall be provided for below false ceiling areas of Control room, inverter rooms and switchgear rooms. Minimum one (1) sensor shall be provided for every room/partitions. For the room / partition size exceeding 25 sq. meter, fire sensors shall be provided in multiples @ one sensor for every 25 sq. meter.

vi. Fire Alarm Control Panel Indication

1. 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. A subsequent alarm received from another zone after acknowledgement shall illuminate the alarm LED and the panel display shall show the new alarm information.
2. Fire Alarm and Detection system shall meet the latest revision of IS 2189:1999.

CIVIL

i. Detailed Contour Survey & Soil Investigation of the Site: During execution detailed soil investigation and contour survey at required locations for the purposes of foundation design and other design/ planning required for the successful completion of the project. The contractor must submit the detailed soil investigation report, bore log records, ERT reports and contour survey to OWNER'S.

ii. Topographical survey: Topographical survey shall have to be done during the execution project

site at 5 m interval with the help of Total Station or any other suitable standard method of survey. All necessary Reduced Levels (RL) as entered in the Field Book have to be submitted along with pre contour layout of the total site. The formation levels of the proposed power plant have to be fixed with reference to High Flood Level of the proposed site. The ground level and plinth level of structures shall be fixed taking into consideration the highest flood level and surrounding ground profiles.

iii. Soil Tests: During Execution, detailed Geotechnical investigation to ascertain soil parameters of the proposed site for the use of planning / designing / construction / providing guarantee / warranty of all civil work including but not limited to foundations / piling for module mounting structures, HT lines, etc shall be carried out. The Soil investigation shall be verified through any Govt. approved / certified soil consultant. These reports shall be furnished to the PMC prior to commencing work. All RCC works shall be provided of required grade of concrete as per relevant IS specifications as well as soil data considering appropriate earthquake seismic zone, wind velocity, whether effect, soil characteristics etc.

iv. Soil Investigations: The scope of soil investigation covers execution of complete soil exploration including boring, drilling, collection of undisturbed soil sample where possible, otherwise disturbed soil samples, conducting laboratory test of samples to find out the various parameters mainly related to load bearing capacity, ground water level, settlement, and soil condition and submission of detail reports along with recommendation regarding suitable type of foundations for each bore hole along with recommendation for soil improvement where necessary.

v. Other investigations: Earthquake and wind velocity data for design of module mounting structure, and considering all parameters related to the weathers conditions like Temperature, humidity, flood, rainfall, ambient air etc shall be analysed before the start of work..

vi. The Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal use of space shall be verified.

vii. Land Development for site activities: During execution the EPC contractor shall make the site ready and easily approachable by clearing of bushes, felling of trees (if required with appropriate approval from concerned authority), levelling of ground (wherever required) etc. for commencing the project. It is to ensure that land must be graded and levelled 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. In case the filled earth is brought out from outside the plant, the contractor shall provide the necessary challans. On the other hand, additional earth, if any, must be disposed of properly. Bidder shall take reasonable care to ensure that the plant is

aesthetically designed.

viii. Foundations:

The detailed soil investigation shall be done and based on that the subsequent foundation design of the structures in the plant shall be planned. The foundation of the module mounting structures, buildings and other important structures must be approved by OWNER'S prior to construction. The detailed design and calculations of the foundation shall also be furnished.

The foundations should be designed considering the weight and distribution of the structure and assembly, and a maximum wind speed of 160 km per hour (In case the Project site is finalized near the coastal region wind speed of 180 km per hour for MMS design) . Seismic factors for the site have to be considered while making the design of the foundation.

ix. Switch yard civil works

Switchyard civil work includes step up transformer plinth, HT Switchgear kiosk plinth, two pole 4 pole structure foundation, earth pits, metal spreading curb wall in and around switchyard and fencing. 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 11kV ground clearance. Earth pit construction shall be of brickwork covered with RCC (1:2:4) slabs. 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 will be provided. Area enclosed within this perimeter must be filled with gravel.

OTHER NON-ELECTRICAL WORK

i. Module Mounting Structure (MMS):

1. The EPC Contractor to design, fabricate, supply and install module mounting structures with all required accessories like clamps, nuts, bolts, cable ties etc.
2. Module inclination angle shall be decided based on the site coordinates considering the best generation angle for that location. Upon finalization of the inclination angle, Contractor shall ensure the tolerance of the Module inclination angle of the tables shall be within ±1° from the finalized angle. However, within every single array table there shall not be any variation in the module inclination angle. And it is necessary to ensure the inclination angle is maintained till the end of the CMC period and rest of the life of the plant.
3. MMS design shall ensure that there is no shadow in the modules between 8.00am to 4.00pm throughout the year.
4. Mounting structures shall be designed to withstand the extreme weather conditions in the area. Design wind speed factors as per IS875 Part-III and minimum consideration of wind speed shall be of 160km/hr for MMS.
5. The frames and leg assemblies of the array structures shall be made of hot dip Galvanized

steel per ASTM A123 and minimum thickness of 80micros.

6. The design and the calculations for the MMS and the foundation system shall be submitted for prior approval of OWNER before commencement of construction and shall be based on the soil report
7. Structure shall be designed and analysed in accordance with finite element method using software (STAAD), with considering Dead load and wind load as per IS: 875 (Part 1& 3) or as per Wind Tunnel study done from a reputed international Facilities respectively. Analysis to be done as per appropriate load combinations in IS 800
8. All fasteners for Module mounting, Structural assembly shall be of Austenitic Stainless Steel Grade- SS304/UNS S 20430. They must have acid resistant, anti-seize & protective corrosion resistant finish for better durability considering the adverse climate conditions on site, two numbers of anti-theft fasteners of stainless steel on two diagonally opposite corners for each solar module shall also be provided. Flange Bolt & Flange Nut system should be used for effective installation to avoid human error
9. The structure shall be designed to allow easy replacement of any module and shall be in line with the site requirements. However two numbers of anti-theft bolts to be provided for every modules.
10. The support structure design & foundation shall be designed with reference to the existing soil conditions in order to withstand wind speed applicable for the zone (Site Location) or 150 kmph, whichever is higher, using relevant Indian wind load codes. The bidder shall furnish test certificate from the competent authority for the same. The structures and foundations shall also conform to the seismic conditions pertaining to the zone using relevant Standards and codes.
11. The Bidder should design the structure height considering highest flood level at the site. The minimum clearance between the lower edge of the module and the ground shall be the above highest flood level at the site or 500 mm whichever is higher.
12. Cables should run through from Pipes and Cable-ties shall be used to hold and guide the cables/wires from the modules to junction boxes. All the cables were aesthetically tied to module mounting structure.
13. Steel shall be procured from reputed manufacturers & the test certificate for the steel materials shall be submitted for OWNER's approval.

ii. Foundations: Necessary design and construct appropriate civil foundations for MMS, prefabricated structures/RCC, transformers, switchyard equipment, feeder bay etc shall be made during the execution. Grade of reinforced cement concrete shall be M25 with minimum 350kg of cement. Contractor has to submit mix design for reinforced cement concrete along with admixture. The batch report of each concrete batch shall be reviewed during execution. All necessary test related to materials of concrete mix like cement, sand, aggregates etc shall be carried out regularly as per relevant IS code. Test related to concrete cubes like compressive

strength, workability etc shall be carried out. If any treatment required for foundation surface for strengthening soil characteristics i.e. application epoxy for protection against soil nature shall be applied based on geo-technical investigation report. Unless otherwise specified all the backfilling i.e. in foundation, plinth, trenches after concrete shall be carried by using fine sand only.

iii. PEB Structures: Shall be allowed only for Security cabin at the plant main gate. Security cabin shall be minimum of 75Sqft.

iv. Storm Water Drainage System: Necessary storm water for the plant shall be designed considering rain fall, catchment area, natural gradient of the plot, outlet of the plot and in a such way that it can be easily drain off rain water and water required for module cleaning by providing sufficient slope and also ensure there is no water stagnant during the monsoon or any season of the year. Storm water drain shall be of Trapezoidal section. All the internal storm water drains i.e. on both side of main central road, approach road to all inverter rooms, control room, switchyard shall be of brick/ stone pitching which is backed up by cement mortar bed which is backed by PCC on side slope and at bottom of drain and all joints of Brick/Stone masonry are to be filled up with cement mortar in C.M. 1:4, further, plaster is to be applied in case of brick masonry surface. The Contractor shall provide RCC hume pipe (NP3 grade), RCC culvert at the crossing of road, cable corridor/network, other cross drains at required locations as cross drainage work. All along the peripheral drainage shall be constructed by simply excavating and by carrying out dressing & compacting and maintaining the side slope of the drains of required size and with required trapezoidal section in which no brick pitching is required. Also, the Contractor shall provide RCC hume pipe (NP3 grade) at the crossing of road and drains and at required locations. Necessary drains as per calculation shall be provided. Brick/stone masonary rectangular section or PCC lined drain both accepted for overall plant.

v. Water required for construction and suitable permanent arrangement of water (Through Bore well & water harvesting) with RO facilities shall be ensured to cater the day-to-day requirement of drinking water and permanent water supply for module cleaning and other needs of SPV power Plant.

vi. Solar PV Module Cleaning System: Cleaning frequency shall be decided a the time of CMC to meet the guaranteed generation but the cleaning cycle shall not exceed more than 15 days per cycle. Overhead water tank (RCC or PVC) of capacity 2 X 20Kilolitres with silting chamber for filtration of the water.

vii. Fencing: The Fence shall be chain linked with ISA 75 (with necessary foundation) all around the periphery of the plant. The fence height must be minimum of 1.5 meter from the FGL.

Maximum distance between the two poles shall be limited to 3.5 meters. The boundary wall must be provided with a rugged main entry gate. The construction of peripheral fence and the main entry gate must conform to the relevant IS standards and practice.

viii. Approach / peripheral / Internal Roads and Pathways: The Internal road from main entrance to Guest house/MCR/Parking bay shall be asphalt roads shall be made. All peripheral and internal roads shall be micro levelled and mechanically compacted type with width 4 mtr and 500mm shoulders.

ix. Cable Trenches: Construction of RCC cable trenches with cable trays and covers inside the inverter, switchgear room and control rooms, earthen excavated cable trench with alternate layers of sand and brick as per relevant IS from PV arrays to inverter room to control room to switchyard shall be provided.

x. Main Gate: The Main gate shall be of structural steel and with RCC material of appropriate design. Also, necessary arrangement has to be made to erect the main gate on pylon stone.

xi. Plant Safety Equipment: The appropriate numbers of foam type fire extinguishers / CO2 extinguishers, sand buckets and transformer discharge rod at Invertor Rooms, Control Room, Security Cabin and Switchyard/Substation shall be provided. Further, all high voltage places to be provided with danger sign boards with appropriate size and material to last for 25 years.

Min Mandatory spares to be supplied under this contract:

S.No.	Description	Quantity
1	PV Modules	0.5% of total supply
2	MC4 connectors	1% of total supply
3	Inverter Duty Transformer	
	(i) HV bushing with metal parts and gaskets	1 set
	(ii) LV bushing with metal parts and gaskets	1 set
	(iii) Complete set of gaskets 1 set	1 set
4	HT Switchgear	
	(i) Vacuum pole	1 Nos.
	(ii) Closing coil	1 Nos.
	(iii) Tripping coil	1 Nos.
	(iv) Spring charging motor	1 Nos.
	(v) Relay	1 Nos.
	(vi) Current Transformer	1 Nos.
	(vii) Fuse	10% of total supply
	(viii) Indicating lamp	10% of total supply

5	LT Switchgear	
	(i) MCCB	1 Nos.
	(ii) MCB	1 Nos.
	(iii) Fuse	10% of total supply
	(iv) Indicating lamp	10% of total supply
6	Solar Cable	5% of total supply
	DC Cable	5% of total supply
	AC Cable (Inverter to LT Panel)	5% of total supply
	Communication Cable	5% of total supply

PG Test Procedure

1. INTRODUCTION

This document lays down the procedures and requirements for conducting Functional Guarantee tests including scope of the tests, procedures for the tests, reporting formats and process for determining test results in accordance with the Tender Specifications, applicable standards and industry best practices.

2. FUNCTIONAL GUARANTEE TESTS FOR SOLAR PV PLANT

Functional Guarantee for Solar PV Plant shall comprise of following Guarantees:

1. Performance Ratio Guarantee test for operational acceptance.
2. Plant Facilities Performance Assessment .

2.1. PERFORMANCERATIO GUARANTEE TEST

A Performance Ratio Guarantee test shall be commenced within 60 days of 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 Ratio (PR) test period would be continuous measurement of 15 consecutive days. The test shall be conducted in accordance with the IEC-61724 as per the methodology described in Technical Specifications. The procedure of PR test is described further in Section 2.3.4. The report shall contain all the measured energy and Met data values, calculations, results and conclusions.

2.1.1 Performance Ratio

The Performance Ratio (PR) of the PV Plant is calculated as follows (according to IEC 61724 Ed.2)

$$PR = \frac{Eout}{\sum_{k} \left(\frac{(Ck*Po)*(Gi,k*\ \tau k)}{Gi,ref}\right)}$$

Where

PR: Temperature Corrected Performance Ratio
Eout: Cumulative AC energy measured at the Plant End (ABT meter) over the duration of reporting period (kWh)

τk Duration of the kth recording interval, i.e. (1/60) hour
$\sum_k$ Summation over all recording intervals in the reporting period, (1/4) hour
Ck: Power rating temperature adjustment factor and can be calculated as below

$Ck = 1 + \gamma \times (T_{avg\_mod,k} - T_{ref})$

γ: Temperature coefficient of power with negative sign (°C-1)

$T_{avg.mod,k}$ Average PV Module temperature measured at the commencement of time interval '' (°C)

T_{ref}: PV Module temperature at which Po is determined, i.e. 25°C

P_o: Installed nominal peak power of PV modules, i.e. Nameplate rating at STC (kWp)

$G_{i,k}$: Average irradiance measured at the Plane of Array (POA) at the commencement of time interval τk (kW/m_2) (average of all Pyranometres in various sites)

$G_{i,ref}$: Irradiance value at which Po is determined, i.e. 1 kW/m^2

2.1.2 General Requirement

- The Functional Guarantee shall comprise of a set of visual/mechanical/Electrical checks followed by a Performance Ratio (PR) test of the Plant Facilities.
- The PR test shall be carried out for a period of 15 consecutive days at site by the Contractor in presence of the Employer/ Employer's Representative/ Owner's Engineer.
- These tests shall be binding on both the parties to the contract to determine compliance of the equipment with the guaranteed performance parameters.
- The test will 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.
- PR is calculated as per the formula given in Clause no. 2.1 and recorded as per the format provided in RFP.
- The filled-in format shall be signed by both the parties (EPC Contractor and KREDL) and each party will keep one copy for record. The same will be recorded for 15 consecutive days.
- The Functional Guarantee condition for the purpose of Provisional Acceptance of the Plant Facilities shall be considered to have been met if the guaranteed Performance Ratio (PR) is achieved on a daily basis for 15 consecutive days* as per Clause 2.3.4 of this document.
- During this PR 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.
- Interruptions due to communication breakdown only may be exempted based on specific approval to the effect that generation is not affected and equipment failure (Refer Clause 2.3.4) is not attributable. In such case, the test shall be extended for affected no. of days (up to 5 days)

2.2. PRE-PR TEST

29.1.1 The EPC Contractor shall perform start-up tests after completion of Commissioning and Test Procedure as per Plant Documentation, Commissioning and Test Procedure and recording of punch points.

29.1.2 Functional Guarantee Test shall commence immediately after all issues arising from the functional/ startup test have been rectified.

Note:

a) All measurement(s) procedure should be carried out taking proper safety precaution.
b) Also, it should 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.

2.3. PR TEST PROCEDURE

The date of commencement of the PR Test shall be communicated in advance and agreed upon by both parties i.e. KREDL and EPC Contractor. Any consecutive 15 days period (excluding interruptions that last entire day on account of grid outage or as per hindrance record maintained at site only) for the purpose of conducting PR test shall be mutually discussed and agreed between KREDL and EPC Contractor. It shall comprise of the following procedures.

2.3.1 Pre-test Procedure

1. Before the commencement of Performance Ratio (PR) test, the plant shall have achieved visual/mechanical/Electrical completion as per Clause 2.2 above and SCADA system and WMS shall be fully commissioned and functional.

2. Trial Run: The PG Test for Plant Facilities shall commence with a trial run for 7 consecutive days. The EPC Contractor shall provide the data in requisite formats (specified elsewhere in the document) to KREDL. KREDL shall vet the data for any discrepancies and systemic errors and revert within 3 working days. Post the trial run period, the 15 days PR test will commence after communication from KREDL in this regard.

3. 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.

4. The average POA radiation of all the Pyranometers ($G_{i,k}$,) shall be considered for the calculation of PR. The average of module temperatures recorded by all the temperature sensors shall be used for calculation of PR. The Pyranometers and Temperature sensors used for the purpose of the PR Test shall have valid calibration certificates.

2.3.2 Following the completion of the pre-test procedures, Performance Ratio Test of plant shall commence in accordance with the procedures, conditions and requirements provided in the next section.

2.3.3 General Procedure for the PR Test

The PR Test Procedure shall include the following components:

1. **Data Collection:** PV Power Plant test related parameters are collected in one-minute and 15 intervals for the 15 (Fifteen) days (consecutive) reference period. The data shall consist of the following at a minimum:

   a) Irradiance at Collector's (i.e. PV Module) POA; (Source: SCADA, Temporal Resolution: 1 minute) Average values form all the sites will be considered
   b) Other Met Data received from installed WMS; (Source: SCADA, Temporal Resolution: 1 minute)
   c) Energy generated at Plant (kWh) (Source: Plant TVM Meter from SCADA, Temporal Resolution: 1 minute)
   d) Energy injected into grid (kWh) (Source: Plant End ABT Meter, Temporal Resolution: 15 minute)
   e) PV Module Temperature recorded from the temperature Sensors (ºC) (Source: SCADA, Temporal Resolution: 1 minute)

2. **Data 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 EPC Contractor shall document data which is to be eliminated along with reasons. The following criteria shall be excluded from the dataset used for this test:

- **Nuisance or bad data** – Nuisance data points or bad data that clearly exhibit a high degree of error including required 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 at site level). The same shall be corroborated/verified by KREDL.
- Time blocks with insufficient (less than equal to 10) 1-minute records.
- **Grid Interruptions** – Time periods (in 15-minute time blocks) of the grid interruptions at the utility substation, recorded manually jointly by EPC Contractor and KREDL 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/m2
- Shutdown explicitly demanded by the Owner/DISCOM/STU/CTU.
- As per the hindrance record maintained at site.

  Note: Minimum 24 Nos of 15-minute time blocks shall be considered to account the day for PR measurement. Otherwise the PR test shall be extended to another day.

2.3.4 Determination of PR Test

Daily PR shall be calculated as the average of the PR calculated for valid 15-minute time blocks (Refer Clause 2.3.3) for the 15-day duration. If the ABT Meter data is not available on daily basis, PR shall be calculated based on the MFM data and shared for record. However, at the end of the PR test period, the daily PR shall be re-calculated with the ABT Meter data for sign-off.

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.

The test shall be repeated for 15 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
- Tilted pyranometer
- Other WMS sensors.

2.3.5 **Raw Data Formats and Reports**

The EPC Contractor shall submit to KREDL the raw data from the Plant SCADA on daily basis in the following format.

Temporal Resolution: 1 Minute

Date & Time dd/mm/yyhh:mm:ss format	Wind speed (m/s)	Module Temp (ºC)	Ambient Temp (ºC)	Horizontal Irradiance (W/m^2)	POA Irradiance ((W/m^2))	POA Radiation (KW/hm^2)	Humidity (%)	Wind Direction (º)	Generation (KWh) Source (TVM)

Temporal Resolution: 15 Minute (Every 15th Min record from the 1 Min Data)

Date & Time dd/mm/yyh h:mm:ss format	Wind speed (m/s)	Module Temp (ºC)	Ambient Temp (ºC)	Horizontal Irradiance (W/m^2)	POA Irradiance ((W/m^2))	POA Radiation (KW/hm^2)	Humidity (%)	Wind Direction (º)	Generation (KWh) Source (TVM)	Explicit Removal Flag*	Remarks

* Explicit Removal Flag: 0 indicates time block considered; 1 indicates time block not considered.

PR Test Report shall be generated from the Raw Data after data filtering as per criteria laid out in (2). The Report shall contain the signature of both representatives (KREDL/Employer & EPC Contractor).

Note: In case of multiple pyranomters/temperature sensors, the radiation and temperature data for the purpose of calculation of PR shall be derived from the average values from tilted pyranometer /temperature sensors.

2.4. CAPACITY UTILIZATION FACTOR (CUF)

Capacity Utilization Factor for Solar Plant shall be calculated as per the following formula.

$$\mathbf{CUF} = \frac{\text{Eac}}{8760 \times \text{Pac} \times (1 - \text{DF} \times (\text{N} - 1)) \text{x RCF}}$$

where,

- Eac is the number of units recorded at the meter installed at 11kV solar meter side of RMU after factoring the energy loss, transmission loss till 11 kV side of RMU and excluding auxiliary consumption, kWh
- 8760 refers to the number of hours in non-leap year. It shall be replaced by 8784 hours during leap year
- Pac is the plant DC capacity, kWp
- DF is module degradation factor, 0.55% per year
- N is the number of years of operation after operational acceptance of the plant
- RCF is the Radiation Correction Factor: RCF = $\frac{Measuredirridation}{Referenceirridation}$

where Reference Irradiation = 1948 kWh/m2 and Measured Irradiation (GHImes) shall be recorded from the Pyranometer installed in horizontal plane at the site location. The radiation data of the Pyranometer shall be compared with the Reference Irradiation mentioned above. The radiation data from the Plant Pyranometer shall be used for computation of CUF, except in case of any discrepancy (i.e. more than ± 10% variation from the Reference Radiation, GHI_{ref}), in which case the radiation data from the nearest available Solar Radiation Resource Assessment (SRRA) station data will be used for computation of CUF. Missing data (GHI_{mes}) from the Plant Pyranometer shall be substituted by average of GHI measured for the same period in the past three (3) days.

CUF shall be calculated on annual basis from the date of operational acceptance of the plant till the end of O&M period. Module degradation factor will not be considered for first year CUF calculation. It is the Contactor's responsibility to envisage and install extra DC capacity to accommodate any degradation during first year. Module degradation factor, as per above will be considered from second year of operation.

Grid outage hours shall be subtracted from total number of hours in a year. The Contractor shall submit grid outage certification from competent authority.

3. Liquidated Damages for Shortfall in PR

For every 0.01 shortfall in PR below the committed PR value, a penalty of 1% of the total Contract Value (i.e., total sum of all the Supply, Service and absolute value of O & M Contract) shall be levied. In case the Contract Performance Security has already been encashed on account of any default/delays, the penalty amount will be recovered from any due payments to the contractor. The plant shall only be accepted by KREDL on demonstration of committed PR value by the contractor post rectifying the PR shortfalls noted during the PR test.

4. Operation and Maintenance for 10 years

i. The Contractor shall prepare the initial Annual Operating Plan for the Plant Facilities and shall also indicate the proposed resources manpower, material & machinery) that would be deployed for O&M.
ii. The Contractor shall be responsible for the smooth day-to-day operation of the Plant Facilities.
iii. The Contractor shall provide necessary routine and preventive maintenance schedules of the plant for the Employer's approval and shall carry out all routine and preventive maintenance accordingly.
iv. The Contractor shall perform periodic overhauls and preventive maintenance required for the Plant in accordance with the recommendations of equipment manufacturers and as per the O&M manuals.
v. Contractor shall perform all break down maintenance and other maintenance in the Plant Facilities. The Contractor shall be responsible for achieving the performance guarantee of the plant as indicated in the contract.
vi. The Contractor shall operate and maintain fire protection system and safety equipment for the plant.
vii. The Contractor shall do maintenance of Electricity system including overhead lines in the Plant Facilities area up to the grid at the site. Necessary co-ordination shall be made by the Contractor with KPCL and other agencies as may be required during the Operation and Maintenance term for smooth operation of the plant.
viii. Contractor shall work in coordination with the Employer or any Employer's designated party to optimize the Plant production.
ix. The Contractor shall provide required spare plant Equipment, Spare Parts, tools and tackles, consumables required for comprehensive operation and maintenance of the plant Facilities. The Contractor shall make arrangement to procure required spare parts, or equipment/s as required, overhauling of parts, tools and equipment, required to operate and maintain the Plant in accordance with the recommendations of individual original equipment manufacturer at his own cost. Cost of imported Equipment & spare parts, if any, shall be included in the O&M quoted cost. The List of Consumables, Spare Parts, tools and equipment shall be finalised in consultation with the Employer or Employer's representative. List of recommended spare parts shall be submitted by the Contractor at the beginning of services; however the complete

recommended spares will be in the scope of Contractor only. In case any equipment or spares is not listed in the mandatory spares list but is required vitally for the operation of the plant, then the same shall be procured and provided by the Contractor without any additional cost.

x. It is the responsibility of the Service Provider to store the materials in appropriate stock yard or container at the site so as to ensure timely availability of the materials.

xi. The Contractor shall employ only such personnel who are adequately qualified and experienced for operating and maintaining such power generating sets. The Contractor shall ensure that such personnel are on duty at the plant at all times, 24 (twenty-four) hours a day and 7 (seven) days a week commencing from the Date of Operational acceptance.

xii. Contractor shall carry out all day-to-day operation and maintenance for the Plant Facilities as set forth herein. Contractor shall perform the Work and supply all required spare parts in a prudent and efficient manner and in accordance with manufacturers and systems designers' specifications, the Annual Operating Plan for the Plant and all operation and maintenance manuals, all Indian applicable laws including environmental protection, pollution, sanitary, labour act, factory act, employment and safety laws, ("Government Rules") and Prudent Utility Practice. The Contractor shall adhere to all labour laws which are applicable and as specified in the EPC contract document.

xiii. Contractor shall arrange necessary security staff as required for watch and ward of the Plant Facilities round the clock at his own cost.

Contractor shall be responsible for:
Maximizing plant capacity utilization,
Reducing plant downtime,
Optimizing the useful life of the equipment of the power plant.

xiv. The Contractor shall maintain all accounting records regarding the Facilities in accordance with the generally acceptable accounting principles under the Laws of India.

xv. The Contractor shall maintain accurate and up-to-date operating logs, records and monthly reports regarding operation and maintenance of the Plant Facilities (Such records shall be distinctly recorded for plant Facilities (Solar PV and Green Hydrogen), in order to have clear data for assessment of any individual component of the Plant Facilities) which shall include details of power output, other operating data, repairs performed and status of equipment. All such records to be maintained for a minimum of 60 (sixty) months after the creation of such record or data and for any additional length of time required by regulatory agencies with jurisdiction over the Parties. Upon expiry of term, the Contractor shall hand over all such records to EMPLOYER. However, EMPLOYER shall have access to all such records at any time. Generation and O&M reports should be made available to EMPLOYER on daily and monthly basis in required formats as well as the Quarterly and Annual Performance Reports shall be provided. Contractor shall provide communications as well as daily, weekly, monthly, quarterly and annual reports to the employer in the desired format as per the Contract with the Employer or Employer's Engineer.

xvi. The Contractor shall develop and implement plans and procedures including those for fire fighting, maintenance planning, procuring and inventory control of stores and spares, plan to meet emergencies, plant safety and security; and such other facilities and systems as may be necessary to commence Contractor's ongoing responsibilities.

xvii. The Contractor shall provide copies of all necessary documents including the following:

- Operation and maintenance manuals shall be prepared, and approval shall be accorded from Employer within three months from the date of Operational acceptance.
- Failure Analysis/history/trouble shooting details of all the Equipment
- Identification of Equipment needing preventive maintenance
- List of Vendors indicating name and addresses during operation and maintenance with credentials
- root cause analysis report for any major failure.
- Record of consumables / spare parts

xviii. The Contractor shall be responsible for conveying following details to the Employer on daily basis as well as on monthly basis (by the end of 5th day of each month) by fax/ e-mail giving the detail of plant performance during previous month.

9. Power generated at all Solar PV Plant, Utilisation of GH2
10. Power fed to the grid
11. Internal power loss and internal consumption
12. Power consumption for captive use (if any)
13. Reactive power consumption
14. Downtime of Plant Facilities including Solar PV Plant, GH2 and other infrastructure of the Plant Facilities.

xix. The Contractor shall be responsible for liasioning with statutory authorities and local authorities in order to ensure smooth operation of the Power Plant.

xx. Contractor shall provide constant surveillance to the Plant Facilities

xxi. Contractor shall provide updates and revisions to Reference Documents, as and when applicable.

xxii. Shall implement software updates to control and monitoring systems including EMS/SCADA in order to meet the plant Facilities operating requirement in consonance with the grid operations and in compliance with the grid codes as applicable during the operation.

xxiii. Duly and timely provide the Employer (or parties designated by the Employer) with all notifications required under the Contract including in particular such notifications set forth in Certain Notifications by Contractor;

xxiv. Contractor shall provide access to the Employer to all data for the Plant Facilities from the EMS including the SCADA system.

xxv. Contractor shall at all times allow and provide Employer all necessary information for the operation of EMS including the SCADA system (with no notification or approval of access being required unless specifically and otherwise agreed to by the Parties) full, free, unconditional, safe and complete access to the EMS including the SCADA system. Contractor shall monitor and operate the Plant in accordance with the contract and shall ensure smooth operation of the plant.

xxvi. Provide the training to the Employer's personnel in relation to the operation of the complete plant Facilities. Training shall be provided to the employer within 190 days before end the contract.

xxvii. Contractor shall provide the insurances prescribed in insurance. The Contractor shall, with [prior intimation of 5 Business Days] at regular business hours, allow persons duly authorized by the Employer including but not limited to the officials of the insurance company of the Employer, to inspect the Project and provide to such personnel, access to all information which is necessary for their inspection, and is reasonably requested by the Employer.

xxviii. All representatives of the Employer shall strictly adhere to the Applicable Laws and the Health, Safety and Environmental (HSE) practices of the Contractor as provided in the Reference Documents;

xxix. Contractor shall provide for the watch and ward of the Plant at all times during the Term. The watch and ward deployment plan shall take care of comprehensive Project level security and the Contractor shall take necessary steps to prevent sabotage, theft, vandalism and malicious damage of the assets comprising the Plant, and shall also coordinate and liaison with law enforcement authorities. The Contractor shall take all possible measures to keep the plant operational and secure.

xxx. Contractor shall Coordinate with KPCL and other related entities/departments/local Panchayats as required for proper operation of the Plant Facilities. Also coordinate with relevant agencies for monthly Joint Meter Readings, meter testing, and any other requirements such as any audit or inspection by the government agencies or authorities, financiers, any designated third-party agency etc. for the Project operations.

xxxi. Contractor shall be responsible for appointing a Qualified Coordinating Agency at the Pooling

Substation Level and shall be responsible for carrying out the forecasting and scheduling of the energy generation from the plant Facilities (In accordance with the Deviation Settlement Mechanism Regulations, as applicable). Scheduling given by the Contractor is such that no penalty is levied on the Employer due to any deviation of actual generation from scheduling beyond the allowed limit. If any penalty is imposed on the Employer due to such deviations beyond allowed limit the same shall be passed on to the Contractor and the recovery of the same will be done from the O&M Price payable to the Contractor.

xxxii. The operation and maintenance of plant Facilities shall be done in coordination as defined in the Technical Specifications. In case any modification or any other requirement from the grid operator, then the same shall be discussed with Employer or Employer representative, and any such modification shall be done by the Contractor only on after Employer's approval.

xxxiii. Contractor will be required to maintain the plant Facilities as specified in the Technical Specifications requirement of Bid Document during the entire O&M period by means of replacement or augmentation of the Battery.

xxxiv. Water requirement for module cleaning arrangement and the cost for the same shall be borne by Contractor. The Contractor shall arrange for water on it's own, by ensuring ESIA norms.

xxxv. Contractor shall be responsible to comply with all applicable National and International Standards as well as local statutory provisions related to Environmental Protection Regulations, Health and Safety requirement.

xxxvi. Contractor will be responsible for coordinating with the OEMs for securing warrantee conditions and services from OEMs as per the warrantee of each equipment, as well also for the Project insurance claims.

xxxvii. Contractor shall carry out the performance monitoring for the Plant Facilities (Solar and Green hydrogen) on continuous basis and in case of any deviation, the Contractor shall perform the due diligence appropriately to find out the actual root cause of such deviation. Any test or inspection required such as thermal imaging, IV characteristics test etc. to analyse such deviation will be the responsibility of the Contractor. Thereafter the corrective action required to mitigate such deviation shall be undertaken by the Contractor without any additional cost.

xxxviii. Contractor shall be responsible for maintenance of all each and every civil infrastructures parts like Building, cable trench, fencing, drain, plumbing system fire-fighting system, CCTV system, security arrangement, road, earthing, any foundations, anti-weeding, clearing bushes in the solar field etc., as per the direction of employer's Engineering In-charge.

xxxix. **Defects liability period** - DLP is 12 months beyond expiry of O& M period

5. Annual CUF Guarantee

A. In consideration for the payment of the O&M Price, from the Commencement Date until the end of the Term, the Contractor grants to the Employer the CUF Guarantee on the terms and conditions set forth in the contract.

B. The Contractor guarantees the annual CUF committed herein over the O&M Period ("Annual CUF Guarantee") from the date of Operational Acceptance. In the event the CUF is less than the Guaranteed CUF, the Contractor shall immediately, upon demand, indemnify the Employer, as liquidated damages and not as penalty, amounts equivalent to remuneration of the equivalent Energy, subject to a maximum of hundred (100%) percent of the Total Annual O&M Price.

C. The Procedure for measurement and verification of the CUF Guarantee as per Performance Guarantee Test procedure.

D. The Procedure for measurement and verification of the plant Facilities Availability shall be as per relevant section

E. Liquidated Damages for Shortfall in Annual Generation for Solar PV Plant

   i. If the Contractor fails to achieve guaranteed annual generation as per the stipulated DC CUF of 19%, then the Contractor shall pay compensation to the Employer upto 100% of total O&M value.

   ii. Recovery amount = Shortfall generation in unit's X PPA rate approved by KERC

F. In case the Project fails to generate any power continuously for 1 month any time during the O&M period, apart from the force majeure and grid outages as certified by competent authority from KPCL, it shall be considered as "an event of default". In the case of default the entire Contract Performance Security will be forfeited.

G. Penalty during O&M period against breakdown of other Infrastructure of Plant Facilities that don't affect the generation of power directly, such as but not limited to, civil infrastructure, water supply system/network, other Infrastructure developed by the Contractor as a Scope of Work shall be penalized at Rs.15,000/day subject to maximum of 1 month beyond which, the contractor is liable of penalty payment of Rs.80,000/- Per day.. for non-compliance with PM Schedule (Initiation/Completion of Scheduled maintenance Activity as agreed under this Contract) beyond 48 hours. Cumulative value of such penalty shall be limited to 50% of yearly O&M cost. Cumulative value of such penalty shall be limited to 50% of yearly O&M cost.

H. The Penalty specified on account of delays, as specified in Liquidated Damages and Penalty specified on account of deviations in Functional Guarantees as above shall be assessed independent of each other. Above mentioned Penalties specified under this clause are independent of each other.

6. Recovery of Compensation

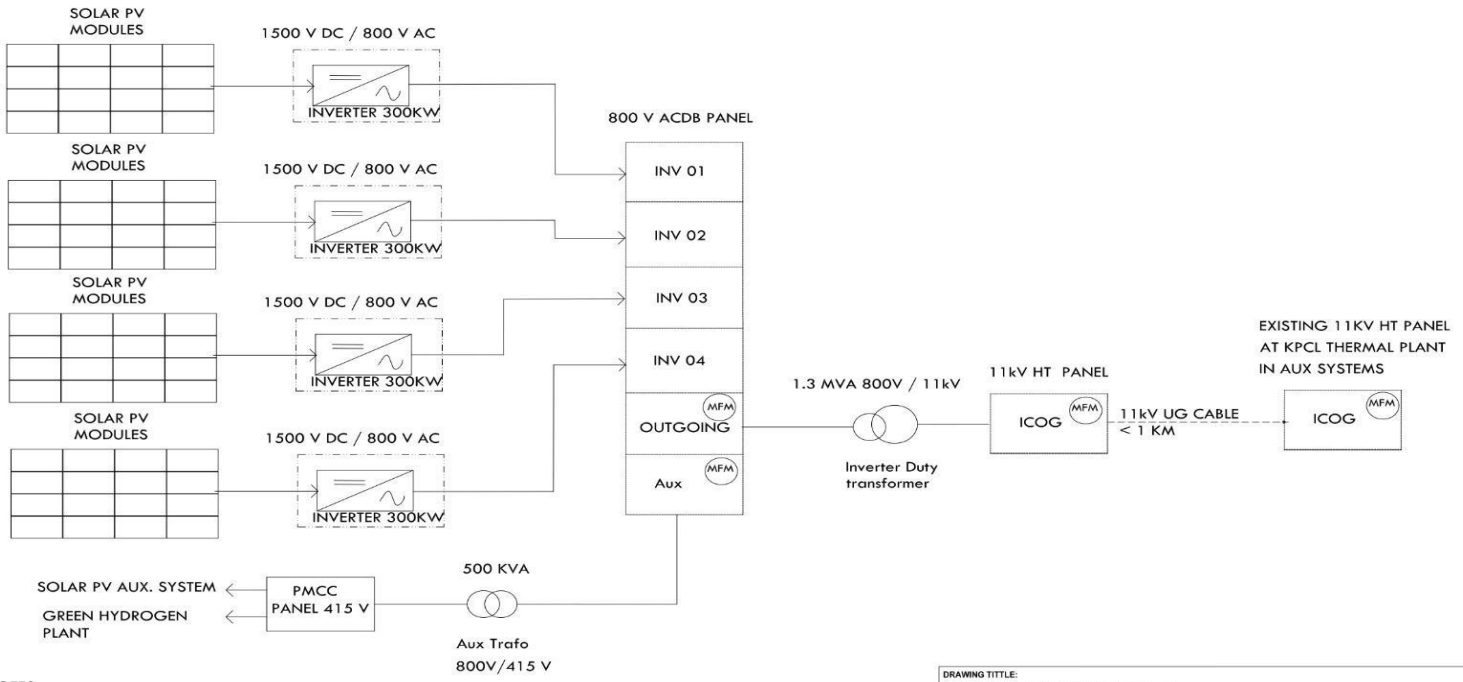
The above compensations shall be deducted from Contract Performance Security (CPS) or O&M payment submitted by the contractor

i. Recovery amount Solar = Shortfall generation in units X 3.07 Rs

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 8

DRAWINGS



NOTES:

1.THE PLANT LAYOUT ARRANGEMENT, SWITCHING SCHEME, INTERCONNECTION TO KPCL EXISTING PLANT PANELS SHALL BE AS PER PROJECT REQUIREMENT.
2.DETAILS PROVIDED IN SLD IS INDICATIVE ONLY FOR SHOWING POWER EVACUATION.
3.RATING OF SWITCHYARD AND OTHER EQUIPMENTS SHALL BE AS PER THE SYSTEM REQUIREMENT AND SAME SHALL BE FINALISED DURING DETAIL ENGINEERING.
4.11kV HT SWITCHGEAR PANEL SHALL HAVE BI DIRECTIONAL TRI VECTOR METER (ABT TOD) 0.2S CLASS RS 485 AND 0.2 S CLASS MFM WITH ETHERNET PORT FOR SCADA .
5.NUMERICAL AND OTHER PROTECTION RELAYS SHALL BE PROVIDED IN 11kV SWITCHGEAR PANEL AND ENSURE BATTERY WILL CHARGE FROM SOLAR POWER ONLY.

DRAWING TITTLE:	SINGLE LINE DIAGRAM		
PROJECT TITTLE:	1.2 MW (AC) SOLAR PV POWER PLANT (1.62 MWP DC) WITH 300 KW GREEN HYDROGEN PLANT		
LOCATION:	KPCL-BELLARY THERMAL POWER STATION, BALLARI, KARNATAKA		
OWNER:	Karnataka Renewable Energy Development Limited		
SCALE: 1:1	SHEET NO: 1 of 1	PAPER SIZE: A3	

KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 9:

BILL OF QUANTITIES

Refer Financial bid uploaded in e-procurement portal

SCHEDULE OF RATES [SOR-1]				
1.2 MW (AC) / 1.62 MWp (DC) GROUND-MOUNTED, GRID-CONNECTED SOLAR PV POWER PLANT DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING, AND OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES				
Sl. No.	**Description of Item**	**Quantity (Ls)**	**PRICES (INR)**	
			Estimated Value	**Total Price Excluding GST**
1	**2**	**3**	**4**	**5= 3X4**
PART A : SCHEDULE OF RATES [SOR-1] - SOLAR PART (1.2 MWAC/1.62 MWp)				
1	Supply of PV Modules as specified in the Tender Documents	1.00		-
2	Supply of Inverters as specified in the Tender Documents	1.00		-
3	Supply of Inverter Transformer as specified in the Tender Documents	1.00		-
4	Supply of Panels & Switchgears as specified in the Tender Documents	1.00		-
5	Supply of Module Mounting Structure as specified in the Tender Documents	1.00		-
6	Spare Modules (As Mandatory Spares, 0.50% of total supply of solar modules)	1.00		-
7	Mandatory Spares excluding Modules	1.00		-
8	Cables (All DC, LT & HT)	1.00		-
9	Weather Monitoring Station	1.00		-
10	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	1.00		-
	Sub Total - A			-
PART B: SERVICES FOR PART A , SOLAR PART (1200 kWAC)				
11	Freight & Insurance including Loading, Unloading, Storage, Handling at Site	1.00		-
12	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	1.00		-
13	Civil and allied works including construction of Trenches, Module Mounting Structure, foundations, etc of all the Equipments Supplied.	1.00		-
	Sub Total - B			-
PART C: OPERATION AND MAINTENANCE PART				
14	O&M amount for total 10years mentioned at CELL NO. D19 of SOR 2 will be considered for evaluation purpose.	1.00	0	-
	Sub Total - C			-
	TOTAL BID VALUE (A+B+C)			-

SCHEDULE OF RATES [SOR-2] [OPERATION AND MAINTENANCE]			
1.2 MW (AC) / 1.62 MWp (DC) GROUND-MOUNTED, GRID-CONNECTED SOLAR PV POWER PLANT DESIGN, FABRICATION, SUPPLY, INSTALLATION, TESTING, COMMISSIONING, AND OPERATION & MAINTENANCE FOR 10 YEARS WITHIN KPCL BELLARY PREMISES			
Sl. No.	**Description of Item**	**Year**	**PRICES (INR)**
			Yearly O&M Price (Excluding GST)
1	2	3	4
OPERATION & MAINTENANCE			
1	Operation and Maintenance of the Plant Facility for 1st YEAR	1	-
2	Operation and Maintenance of the Plant Facility for 2nd YEAR	2	-
3	Operation and Maintenance of the Plant Facility for 3rd YEAR	3	-
4	Operation and Maintenance of the Plant Facility for 4th YEAR	4	-
5	Operation and Maintenance of the Plant Facility for 5th YEAR	5	-
6	Operation and Maintenance of the Plant Facility for 6th YEAR	6	-
7	Operation and Maintenance of the Plant Facility for 7th YEAR	7	-
8	Operation and Maintenance of the Plant Facility for 8th YEAR	8	-
9	Operation and Maintenance of the Plant Facility for 9th YEAR	9	-
10	Operation and Maintenance of the Plant Facility for 10th YEAR	10	-
	TOTAL O&M FOR 10 YEARS (1+2+3+4+5+6+7+8+9+10)		

ARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

SECTION 10

Format Of Bank Guarantee/Insurance Surety Bond For Performance Bank Guarantee/ Security Deposit

PROFORMA OF BANK GUARANTEE/INSURANCE SURETY BOND

FOR Performance Bank Guarantee / SECURITY DESPOSIT

(To be stamped in accordance with stamp Act)

The non-Judicial stamp paper should be in the name of issuing Bank.

Ref…….. Bank Guarantee/Insurance Surety Bond No…..
Date .....

To

Dear Sirs,

In accordance with Invitation to Bid under your Specification No……M/s……. having its Registered/ Head Office at.....(hereinafter called the Bidder) wish to participate in the said Bid or… ..... and you, as a special favour, have agreed to accept an irrevocable and unconditional Bank Guarantee/Insurance Surety Bond for an amount of Rs.....Valid up to on behalf of Bidder in lieu of the Bid
deposit required to be made by the Bidder, as a Condition precedent for participation in the said Bid.

We, the……. Bank at ..... having our Head Office at ……. (local address) Guarantee and undertake to pay immediately on demand by KREDL the amount of ..... (in words & figures) merely on demand and **without any reservation, protest, demur and recourse. Any such demand made by said 'Owner' shall be conclusive and binding on us irrespective of any dispute or difference raised by the Bidder.**

This Guarantee shall be irrevocable and shall remain valid up to and including ****** If any further extension of this Guarantee is required, the same shall be extended to such required period (not exceeding one year) on receiving instructions from M/s…….on whose behalf this Guarantee is issued.

This Bank Guarantee/Insurance Surety Bond shall be effective only when the BG Message is transmitted by the issuing Bank through SFMS to IDBI Bank Ltd., Dollars Colony Branch, Bengaluru having IFSC code IBKL0000377 (Bank of Beneficiary) & written confirmation to that effect is issued by Bank of Beneficiary.

In witness whereof the Bank, through its authorised Officer, has set its hand and stamp on this ……day of…….20 …….at…….

WITNESS:

…… . .....

(Signature) (Signature)

……. ……

(Name) (Name)

…… ……

(Official Address) (Designation with Bank Stamp)

Attorney as per

Power of Attorney No

Date ……..

(******) This date shall be Forty Five (45) days after the last date for which the Bid is valid.

Charges and Bank details for Bank Guarantee/Insurance Surety Bond s issued through SFMS

If the Bank Guarantee/Insurance Surety Bond s towards Bid Security (EMD) and Performance Guarantees are issued by Banks through Structured Financial Messaging System (SFMS), in such cases,

The Bidder has to furnish Demand Draft in favour of Managing Director, KREDL towards applicable Bank Charges for obtaining the SFMS advice from KREDL Bank.

The SFMS message shall be sent to Bank of Beneficiary KARNATAKA RENEWABLE ENERGY DEVELOPMENT LTD (KREDL) IDBI Bank Ltd., Dollars Colony Branch by issuing Bank.

Bidder shall furnish the details of SFMS/SFMS Delivery report sent from issuing Bank to Beneficiary Bank (KREDL) along with original Bank Guarantee/Insurance Surety Bond.