

## **TENDER NOTICE**

Sealed Tender offers are invited for supply, installation testing & commissioning of 6.5 MWp solar plant under open access scheme in Maharashtra where solar radiation is higher, for Gokul Milk plant, B-1, MIDC, Gokulshirgaon, Dist.- Kolhapur. Tender details along with scope of work, technical specifications and Terms and Conditions are available on our website [www.gokulmilk.coop](http://www.gokulmilk.coop). Tender offers are to be submitted on or before 17.00 hrs on **25.09.2023**. Right to accept any or all Tenders without assigning any reason is reserved.

Managing Director Chairman  
Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd.,  
B-1, M.I.D.C., Gokul Shirgaon Tal. Karveer, Dist. Kolhapur - 416234

## KOLHAPUR ZILLA SAHAKARI DUDH UTPADAK SANGH LTD. KOLHAPUR

### General Terms & Conditions

1. Technical offer and commercial offer should be submitted by bidder separately.
2. Technical offer and commercial offer should be sent in a separate envelope duly marked as COMMERCIAL OFFER and TECHNICAL OFFER respectively. Sealed envelopes of Commercial offer & Technical offers to be put in a Common sealed cover duly marked as '**TENDER FOR 6.5 MWp SOLAR PLANT UNDER OPEN ACCESS CAPTIVE SCHEME**'
3. Bid must be accompanied by Earnest Money Deposit of **Rs. 30,00,000/- (Thirty Lakhs)** through RTGS. Please mentioned UTR No, date & amount in the technical offer. Remittance of EMD by any other mode shall not be accepted. Tender without EMD will not be considered. Earnest Money Deposit of unsuccessful Bidder will be returned within two months. RTGS details are given below

Name of Project Authority	Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd., Kolhapur
Address of Project Authority	B-1, MIDC, Gokul Shirgaon, Tal Karvir, Dist. Kolhapur, State Maharashtra Pin Code 416 234
Name of Bank	Bank of Maharashtra
Bank A/c No.	60182028384
IFSC Code	MAHB0001575
Branch Name & Address	B-1, MIDC, Gokul Shirgaon, Tal Karvir, Dist. Kolhapur, State Maharashtra Pin Code 416 234

4. Security Deposit for this Solar RFS – **INR 60 Lakhs** (For Successful Bidder ). It will be returned with final bill.
5. Successful bidder's EMD amount will be transferred to security deposit and for remaining **30 lakhs** amount he should be deposited through RTGS within one week from award of LOI/ P.O.
6. **Payment Terms.**
  - i) 20% payment will be given as advance after receipt of order acceptance and bank guarantee of the same amount. Bank Guarantee will released after receipt of material ( Solar Moudules and Inverters)
  - ii) 40 % against material receipt at site i.e. Modules and Inverters.
  - iii) 20 % against satisfactory commissioning of 6.5 MWp solar plant under open access captive scheme
  - iv) 10 % against synchronization of solar plant with MSEB grid
  - v) 10 % against performance Bank Guarantee for one year or after one year from satisfactory commissioning of the system.
7. Tender is to be submitted at our office At B-1, M.I.D.C. , Gokul Shirgaon, Kolhapur on or before **25.09.2023**
8. No escalation in the price will be given once the order is finalised

Managing Director



**REQUEST FOR SELECTION (RfS)**

**FOR PROCUREMENT OF 6.5 MWp CAPTIVE SOLAR THROUGH COMPETITIVE  
BIDDING FROM GRID CONNECTED OPEN ACCESS RENEWABLE PROJECTS IN  
MAHARASHTRA**

## TABLE OF CONTENTS

<b>DISCLAIMER</b>	<b>4</b>
<b>BID INFORMATION SHEET</b>	<b>5</b>
<b>SECTION 1: INTRODUCTION</b>	<b>6</b>
1.1 INTRODUCTION	6
1.2 DETAILS OF POWER PROJECT	6
1.3 Information about Gokul Milk MSEDCL Power Supply	
1.4 Delivery Point :	7
<b>SECTION 2: BID INFORMATION AND INSTRUCTIONS TO BIDDERS</b>	<b>8</b>
2.1 PROJECT SIZING	8
2.2 PROJECT SCOPE:	8
2.3 ELIGIBILITY FOR PROJECT CAPACITY ALLOCATION	8
2.4 QUALIFICATION REQUIREMENTS	9
2.5 ELIGIBILITY CRITERIA	9
2.6 CONNECTIVITY WITH THE GRID	10
2.7 CLEARANCES/VARIOUS ACTIVITIES REQUIRED FROM THE CENTRAL/STATE GOVERNMENT AND OTHER LOCAL BODIES	10
2.8 Performance Bank Guarantee (PBG):	11
2.12 COMMISSIONING AND PENALTY FOR DELAY IN COMMISSIONING	12
2.13 COMMERCIAL OPERATION DATE (COD)	13
2.14 INSTRUCTIONS TO BIDDERS FOR STRUCTURING OF BID PROPOSALS IN RESPONSE TO RFS	13
2.15 CLARIFICATIONS/PRE-BID MEETING/ ENQUIRES/ AMENDMENT	14
2.16 RIGHT OF GOKUL MILK TO REJECT A BID	14
2.17 Technical evaluation criteria	14
2.17.1 The technical proposals of only those prequalified Bidders will be opened for technical evaluation	14
2.18 Financial evaluation criteria	15
2.19 Force Majeure Event :	15
<b>SECTION 3: TECHNICAL SPECIFICATIONS</b>	<b>16</b>
3.1 LIST OF DESIGN DOCUMENTS FOR SUBMISSION BY SUCCESSFUL BIDDER AFTER LOI / PO	16
3.2. System Components	21

3.2.1 SPV Module	21
3.2.2 Mounting Structure	23
3.2.3. INVERTER	24
3.2.4. TRANSFORMERS	28
3.2.5 HT SWITCHGEAR	30
3.2.6 CABLES	31
3.2.7. POWER EVACUATION	32
3.2.8. WEATHER MONITORING SYSTEM (WMS)	32
3.2.9. SCADA AND REMOTE MONITORING SYSTEM	34
3.2.10. EARTHING & LIGHTNING PROTECTION	35
3.2.10.1. EARTHING	35
3.2.10.2. LIGHTNING PROTECTION	36
3.2.10.3. FIRE DETECTION & PROTECTION SYSTEM	36
3.2.11. LIST OF APPROVED MAKES:	37
3.3. INFRASTRUCTURE	38
3.3.1 FENCING	38
3.3.2. CONTROL ROOM	38
3.3.3. APPROACH / PERIPHERAL / INTERNAL ROADS AND PATHWAYS	38
3.3.4. STORM WATER DRAINAGE SYSTEM	38
3.3.5. <u>SOLAR PV MODULE CLEANING SYSTEM</u>	
3.3.6. C.C TV SYSTEM	39
3.3.7. INDOOR AND STREET LIGHTING SYSTEM	39
3.4. PROJECT ORGANIZATION & SCHEDULE	39
3.4.1 PROJECT ORGANIZATION	39
3.4.2. PROJECT SCHEDULE	39
3.4.3. OPERATION AND MAINTENANCE	39
3.4.4. PAYMENT TERMS	40
<b>SECTION 4: DOCUMENTS FOR BID SUBMISSION</b>	<b>40</b>

## **DISCLAIMER**

1. Though adequate care has been taken while preparing the Request for Selection (RfS) document, the Bidders shall satisfy themselves that the document is complete in all respects. Intimation of any discrepancy shall be given to this office immediately. If no intimation is received from any Bidder on or before the date of Pre-Bid Meeting as specified in the Bid Information Sheet, it shall be considered that the RfS document is complete in all respects and has been received by the Bidder.
2. Gokul Milk reserves the right to modify, amend or supplement this RfS document including the draft PPA.
3. While this RfS has been prepared in good faith, neither Gokul Milk nor their employees or advisors make any representation or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this RfS, even if any loss or damage is caused by any act or omission on their part.

Place: Kolhapur, Maharashtra

Date:

**BID INFORMATION SHEET**

<b>Document Description</b>	RfS Document for Engineering, Procurement and Commissioning of 6.5 MWp Captive project in Open Access mode through competitive bidding process in Maharashtra
<b>RfS No.&amp; Date</b>	RfS No. Solar/2023/01 Dated : 25/08/2023
<b>Issue of tender documents</b>	<b>On <a href="http://www.gokulmilk.coop">www.gokulmilk.coop</a></b>
<b>Pre-bid Conference / Clarification Meeting Date &amp; Location</b>	Pre-bid meeting ( face-to-face meeting) will be held on 12.09.2023 for clarification at 10.30am. Only those bidder will be qualified to participate in technical & commercial bid, who will attend pre bid meeting. To remain present for pre bid meeting is mandetory.  Mail address : <a href="mailto:elect@gokulmilk.coop">elect@gokulmilk.coop</a> ,  engg@gokulmilk.coop  <b>Address for Pre-Bid Meeting:</b> Gokul Milk Project, Plot No. - B1, MIDC, Gokul Shirgaon, Kolhapur, Maharashtra- 416 234
<b>Last Date &amp; Time for</b>  Submission of Response to RfS and All documents submitted physically / Courier at Gokul Milk office, Kolhapur	Date: <b>25.09.2023 Time – up to 5:00 PM</b>
<b>Contact Persons</b>	1) Swami A.S. (Manager Engg.), Mobile – 9689496363 Mail – <a href="mailto:elect@gokulmilk.coop">elect@gokulmilk.coop</a>  2) Padwal P.A.. (Manager Engg.), Mobile – 9881402721 Mail – <a href="mailto:engg@gokulmilk.coop">engg@gokulmilk.coop</a>
<b>Consultant</b>	PHOVOEZOLAR ENERGY PVT.LTD. Tilakwadi, Belgavi (Karnataka) – 590006  Contact – Maahir Danewale (Mob. 7045660688 )

## **SECTION 1: INTRODUCTION**

### **1.1 INTRODUCTION**

**1.1.1** In India, Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd. is well known with its popular brand 'Gokul' is an Operation Flood Co-operative Dairy Project established on 16<sup>th</sup> March 1963.

**1.1.2** Gokul Milk desires to keep the environmental impact of their operations to a minimum. For years, Gokul Milk have consistently been working to reduce their ecological footprint by systematically saving energy and resources and reducing materials utilization in their products. This not only helps to protect the environment and mitigate climate change but also makes them more efficient and competitive. With this in mind, we are evaluating setting up a Captive Solar Power project for our Factories in Maharashtra.

### **1.2 DETAILS OF POWER PROJECT**

**1.2.1** The Proposed Solar PV Plant is ground mounted type & the power generated is fed to the MAHADISCOM grid at appropriate voltage level. The power generated is self-consumed under captive power plant policy by Gokul Milk, with appropriate wheeling & banking agreements with DISCOM.

#### **1.2.2 PROJECT STAKEHOLDERS**

Project Owner: Kolhapur Zilla Sahkari Dudh Utpadak Sangh Ltd. Kolhapur

Turnkey EPC partner: Third party EPC Company shall be selected through bidding process.

Project consultant: EZOLAR, Belagavi

#### **1.2.3 Scope of work (SOW ) OF EPC CONTRACTOR:**

The EPC contractor shall have the complete scope of work of Design Engineering, Procurement of components, Inspection, Installation & Commissioning of plant in general including the land procurement, ROW clearance and Liasoning with Government agencies for synchronization.

1. Provide project organization, execution schedule & provide periodic status report.
2. Design of plant & power evacuation scheme as per tender specifications.
3. Submission of design documents as per list & getting customer approval.
4. Procurement of Land for Solar Project on Ownership basis in the name of Kolhapur Zilla Sahakari Dudh Utp. Sangh Ltd. Kolhapur. Bidder should have agreement to sale with land owners (farmers) and after order confirmation bidder should carry sale deed in the name of Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd. Kolhapur. Bidder should consider land value, registration fee, stamp duty etc. in the commercial offer.
5. Procurement as per Tender & Inspection of material at site as per Customer approvals.
6. Submission of inspection reports & getting material clearance from the customer.



7. Supply of material to site, material receipt & storage at site.
8. Installation of the plant.
9. Installation of transmission line, including all required approvals & ROW agreements.
10. Provide work inspection reports periodically from the site.
11. Conduct pre-commissioning tests of all components of the plant & submit reports.
12. Correction of all inspection observations made by customer.
13. Commissioning of plant, including liaison with authorities & customer.
14. Conduct plant performance test & provide report to prove plant deliverable. Performance test to include Drone Thermography test of Solar Modules and Hand Held Thermography test of other Electrical Equipment including junction boxes, inverter, Transformer etc.
15. Submission of final commissioning report & getting approval from customer.
16. Provide as-built drawings as per document list.
17. Provide O&M manual including warranty certificates, PM check list & spares list.
18. Offer should be inclusive of insurance, including during transportation, construction, and third party liability insurance till commissioning.

### 1.3 Information about Gokul Milk MSEDCL Power supply.

Presently Gokul Milk is procuring the power from MSEDCL and Gokul Milk intends to substitute a certain portion of the electricity power supplied by MSEDCL to achieve the green objective of Gokul Milk.

### 1.4 Delivery Point :

Delivery point will be at following Gokul Milk locations:

Sl.No.	Gokul Milk locations in Maharashtra	Contract demand (KVA)	Supply Voltage (KV)	Consumer Number	Distribution Network
1	Plot No. B-1, MIDC, Gokul Shirgaon, Kolhapur Maharashtra – 416 234	3970	33	251019402064	MAHADISCOM

## SECTION 2: BID INFORMATION AND INSTRUCTIONS TO BIDDERS

### 2.1 PROJECT SIZING

**2.1.1** Finalised solar sizing is **6.5 Mwp**. Maximum DC to AC Overloading should be 40%.

**2.1.2** Prospective Bidders interested to participate in the bidding process are required to submit their proposals in response to this RfS document as mentioned in the Bid Information Sheet given at the beginning of the RfS.

### 2.2 PROJECT SCOPE:

**2.2.1** The successful bidder shall set up the Renewable Power Project(s) including the transmission/distribution network up to the Delivery Point., and in accordance with the provisions of this RfS document. All approvals, permits and clearances required for setting up of the Project (including but not limited to connectivity, NOC/Environmental Clearance, Forest Clearance and clearance from water department, if applicable for the

Project), those required from State Government, and local bodies shall be in the scope of the successful bidder. Including all required government fees in the name of Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd., Kolhapur and all original receipts should be submitted to KZSDUS Ltd.

**2.2.3 The Bidder shall identify 100% land required for the project at the time of submission of bid. The identified land should be part of a larger Solar Park only. It is clarified that the Bidder shall not be allowed to change the location of the project after the submission of the Bid.**

### **2.3 ELIGIBILITY FOR PROJECT CAPACITY ALLOCATION**

Following conditions shall be applicable to the Bidders for submission of bids against this RfS:

**2.3.1** A bidder including its Parent, Affiliate or Ultimate Parent or any Group Company can only submit a single bid.

**2.3.2** Multiple bids from the same company including its Parent/Ultimate Parent / Affiliates / Group Companies shall make all the bids submitted by the group invalid.

**2.3.3** The evaluation of bids shall be carried systematically.

### **2.4 QUALIFICATION REQUIREMENTS**

**2.4.1** Bidder as defined in Section 2 is eligible to participate under this RfS.

**2.4.2** The Bidding Entity should be incorporated in India under the Companies Act 1956 or Companies Act, 2013 as applicable.

### **2.5 ELIGIBILITY CRITERIA**

#### **2.5.1 Technical Qualification**

i. The Bidder(s) should have a prior experience in acquisition/development, operation and maintenance of Open Access renewable power projects of a cumulative capacity of at least 25 MW in last 3 years in order to be eligible to participate in the bidding process

ii) The bidder should have developed, operation & maintenance of at least two numbers of open access renewable power projects of min.15MW capacity in Maharashtra.

#### **2.5.2 Liquidity**

In order to ascertain that the Bidder has sufficient means to manage the fund requirements for the Project, the Bidder shall be required to demonstrate at least one of the following parameters:

i. A minimum annual turnover of INR 45 Crore as per the latest available audited financial statements. It is hereby clarified that "Other Income" as indicated in the annual accounts of the Bidder shall not be considered for arriving at the annual

turnover.

- ii. Internal resource generation capability, in the form of Profit Before Depreciation Interest and Taxes (PBDIT) for a minimum amount of INR 5 Crore of the quoted capacity, as per the latest available audited financial statements.
- iii. In-principle sanction letter from the lending institutions/banks of the Bidder, committing a Line of Credit for a minimum amount of INR 3 Crore, towards meeting the working capital requirement of the project quoted under this RfS. Such a letter can also be obtained by the Affiliate(s) of the Bidder.

**2.5.4** The Bidder may seek Liquidity Eligibility qualification based on financial capability of its Affiliate(s) for the purpose of meeting the qualification requirements above. In such cases, the Bidder shall be required to submit Board Resolutions from the respective Affiliate(s), undertaking to contribute the required equity funding and Performance Bank Guarantees in case the Bidder(s) fail to do so in accordance with the RfS.

**2.5.5** Foreign Companies are allowed to participate and foreign companies participating in the bidding process shall be registered as companies as per the rules of their country of origin. A foreign company can also participate on a standalone basis or as a member of a consortium at the RfS stage. In case of foreign company participating on a standalone basis and its selection as successful bidder, it has to form an Indian Company registered under the Companies Act, 2013 as its fully owned subsidiary Company (i.e. 100% subsidiary) before signing of PPA. It shall also comply with all the laws and provisions related to Foreign Direct Investment in India. In case the foreign company is participating as a member of the consortium.

**2.5.6** The bidder should submit valid GST Certificate.

## **2.6 CONNECTIVITY WITH THE GRID**

a.l) The project should be designed for delivery of energy at Delivery Point i.e. Gokul Milk interconnection at Plot No. B-1, MIDC, Gokul Shirgaon, Kolhapur Maharashtra 416234.

**2.6.2** The responsibility of getting the grid connectivity with CTU/STU shall entirely be of the successful bidder. The successful bidder shall submit documentary evidence for securing connectivity with the grid from CTU/STU within 12 (twelve) months from the date of award of Order, for the project.

**2.6.3** The transmission of power up to the point of Delivery Point/ Interconnection Point and energy accounting infrastructure shall be the responsibility of the successful bidder at his own cost.

**2.6.4** The arrangement of connectivity can be made by the successful bidder through a dedicated line. The dedicated line may be constructed by the successful bidder or through any other agency.

**2.6.6** The successful bidder shall comply with CERC/MERC regulations on Forecasting, Scheduling and Deviation Settlement, as applicable and are responsible for all liabilities related to LTA and Connectivity.

## **2.7 CLEARANCES/VARIOUS ACTIVITIES REQUIRED FROM THE CENTRAL/STATE GOVERNMENT AND OTHER LOCAL BODIES**

The Bidders are required to obtain necessary clearances and permits as required for setting up the Power Projects including but not limited to the following:

- 2.7.1** Registration Certificate from the respective state nodal agency for renewable energy projects
- 2.7.2** Grant of Connectivity from CTU/STU,
- 2.7.3** NOC / Environmental Clearance,
- 2.7.4** Forest Clearance,
- 2.7.5** Clearance from water department, if applicable for the Project.
- 2.7.6** Non – agricultural of land for Solar use.

## **2.8 Performance Bank Guarantee (PBG), EMD and Security Deposit requirements:**

Details are mentioned in the General Terms & Conditions.

## **2.9 CAPACITY UTILIZATION FACTOR (CUF):**

- 2.9.1** Criteria for generation: The bidder will declare the CUF of the project at the time of submission of response to RfS, Thereafter, the CUF for the project shall remain unchanged for the entire term of the project.
- 2.9.2** Shortfall in minimum generation: During the first 2 years, it is found that the developer has not been able to generate minimum energy corresponding to the lower limit of CUF declared by the developer, such shortfall in performance shall make developer liable to pay the compensation provided in the Purchase Order as payable to Gokul Milk. This will, however, be relaxed by Gokul Milk to the extent of grid non availability for evacuation, which is beyond the control of the developer. The amount of such penalty will be in accordance with the terms of the Purchase Order , This compensation shall be applied to the amount of shortfall in generation during the year. However, this compensation shall not be applicable in events of Force Majeure identified under the Purchase Order

## **2.11 PROJECT ARRANGEMENTS:**

- 2.11.1** Submit power evacuation/ connectivity agreement of successful bidder with CTU/STU.
- 2.11.2** Evidence of clear possession of required land along with the following documentary evidence.
  - i.** Ownership right or right to use from state nodal agency for entire duration of the project in the name of successful bidder and possession of 100% of the area required for the project.
  - ii.** Sworn affidavit from the authorized person of the successful bidder listing the details of the land and certifying total land required for the project under clear possession of the successful bidder.
  - iii.** Developer and/ or Transfer Permission issued by State Nodal Agency
  - iv.** Copy of key plan drawing showing survey number, plot number, point of installation of project with capacity.

- v. Bidder should have agreement to sale with the land owner.
- vi. Successful bidder should be responsible to make sale deed of land in name of Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd. Kolhapur.

## **2.12 COMMISSIONING AND PENALTY FOR DELAY IN COMMISSIONING**

**2.12.1** The Projects shall be commissioned within a period of 7 (Seven) months from the date of execution of the Purchase Order and issue of advance,

**2.12.2** Commissioning certificates shall be issued by RLDC/ SLDC/ DISCOM after successful commissioning of Project/Units.

**2.12.3** The Project shall be commissioned by the Scheduled Commercial Operation Date. (SOCD) In case of failure to achieve this milestone, Gokul Milk shall apply penalty as follows:

- i. 0.2% of the project Purchase order value on a per month basis.

## **2.13 COMMERCIAL OPERATION DATE (COD)**

Commercial Operation date with respect to the Project / Unit shall mean the date on which the Project/ Unit is commissioned (certified by RLDC/SLDC) and available for commercial operation.

## **2.14 INSTRUCTIONS TO BIDDERS FOR STRUCTURING OF BID PROPOSALS IN RESPONSE TO RfS**

**2.14.1** The bidder including its Parent, Affiliate or Ultimate Parent or any Group Company shall submit a single response to RfS.

**2.14.2** Submission of bid proposals by Bidders in response to RfS shall be in the manner described below:

- i. Board Resolutions, as per prescribed formats enclosed as Format duly certified by the Company Secretary or the Director of the relevant Bidder, as applicable to the Bidder and mentioned hereunder:
  - Board Resolution from the Bidding Company or the Lead Member of the Consortium, as the case may be, in favor of the person signing the response to RfS and in the event of selection of the Projects, to sign the Purchase Order with the Gokul Milk. Board Resolution from each of the Consortium Members in favor of the person signing Consortium Agreement.
  - Certificate of Incorporation of Bidding Company .
  - Certified copies of annual audited accounts for the latest financial year, as applicable shall be required to be submitted; OR in case the Bidder is a newly formed company, then the certificate issued by a Chartered Accountant with certified copy of Balance sheet, Profit & Loss account, Schedules and cash flow statement supported with bank statement (if available) shall be required to be submitted.

**2.14.3** Wherever information has been sought in specified formats, the Bidders shall fill in the

details as per the prescribed formats and shall refrain from any deviations and referring to any other document for providing any information required in the prescribed format.

- 2.14.4** If the Bidder conceals any material information or makes a wrong statement or misrepresents facts or makes a misleading statement in its response to RfS, in any manner whatsoever, Gokul Milk reserves the right to reject such response to RfS and/or cancel the Letter of Award, if issued, and the Bank Guarantee provided up to that stage shall be encashed. Bidder shall be solely responsible for disqualification based on their declaration in the submission of response to RfS.
- 2.14.5** All the information should be submitted in English language only. In case of foreign bidders having documents in other than English language, then the documents shall be translated in English language by certified translator and submitted.
- 2.14.6** Bidders shall mention the name of the contact person and complete address of the Bidder in the covering letter.
- 2.14.7** Only MERC and/ or Courts in Kolhapur, Maharashtra shall have exclusive jurisdiction in all matters pertaining to this RfS.

## **2.15 CLARIFICATIONS/PRE-BID MEETING/ ENQUIRES/ AMENDMENT**

- 2.15.1** Clarifications / Doubts, if any, on RfS document may be emailed and/or to Mr. Swami A.S.at [elect@gokulmilk.coop](mailto:elect@gokulmilk.coop) and Padwal P,A.at [engg@gokulmilk.coop](mailto:engg@gokulmilk.coop)
- 2.15.2** Gokul Milk will make effort to respond to the same in the Pre-Bid Meeting to be held as mentioned in the Bid Information Sheet. A compiled list of such questionnaire and Gokul Milk response will be sent to all the attendees in the prebid. No separate reply/ intimation will be given for the above, elsewhere.
- 2.15.3** A Pre-Bid Meeting shall be held as mentioned in the Bid Information sheet.
- 2.15.4**The bidder shall submit their queries on or before Pre-Bid meeting date and Gokul Milk will not entertain any queries after such a date.

## **2.16 RIGHT OF GOKUL MILK TO REJECT A BID**

Gokul Milk reserves the right to reject any or all of the responses to RfS or cancel the RfS or annul the bidding process for any project at any stage without assigning any reasons whatsoever and without thereby any liability.

## **2.17 Technical evaluation criteria**

- 2.17.1** The technical proposals of only those prequalified Bidders who satisfy criterias in Section 2.3, 2.4 and 2.5 will be opened for technical evaluation.
- 2.17.2** The technical proposal shall not include any financial information relating to financial proposal
- 2.17.3**The Bidder's technical proposal will be evaluated against the requirements mentioned Section 3 below

## **2.18 Financial evaluation criteria**

- Financial proposal of only those Bidders who have been technically qualified shall be opened for evaluation;
  - bidders shall submit their financial statement in the format specified in this document.
  - In the event of any difference between the figures and words, the amount indicated in words shall prevail.
- In evaluating the bids, both the technical and financial parameters stipulated will be evaluated by Gokul Milk team

Sl.No	Criteria	Basic unit rate (per MWp)	Basic Total Cost
1	Total price for 6.5 MWp Solar Plant (including land)		
2	Price for O&M for 5 years period		

- GST Extra as applicable.
- Bidder to submit year on year escalation (in %) over and above O&M fees after 5 years.  
Gokul Milk shall evaluate the Proposals of only those Bidders, who have satisfied the criteria and complied with the other requirements of this RFP. However, the evaluation is an internal process for Gokul Milk and will not be disclosed.

### 2.19 Force Majeure Event :

FM Event shall include but not limited to: -

1. the effect of any natural element or other act of God, including but not limited to any storm, flood, lightning, earthquake, cyclone, tsunami or inadequate solar insolation availability or other natural disaster, fire, accident, sabotage, breakage of facilities or equipment in relation to the Power Plant (not attributable to Generator's action or inaction), structural collapse or explosion at the Power Plant.
2. acts of terrorism or act of public enmity (including the acts of any independent unit or individual engaged in activities in furtherance of a program of irregular warfare).

## SECTION 3: TECHNICAL SPECIFICATIONS

### 3.1 LIST OF DESIGN DOCUMENTS FOR SUBMISSION BY SUCCESSFUL BIDDER AFTER LOI / P.O.:

LIST OF DRAWINGS:

Following is the minimum list of drawings:

No	Drawings	Remarks
A	Infra	
1	Plant Layout	
2	Overall Plant Grading and Leveling Plan	
3	Fencing layout, gate & details	
4	Access Road + Internal Pathways - layout & details	
5	Control Room layout & details	

6	Inverter room / canopy details	
7	Security room layout & details	
8	Module Cleaning System layout & details	
9	Storm water drain layout & details	
10	MMS foundation layout & details	
B	Solar Array	
1	Array layout	
2	Plant Single Line Diagram	
3	DC SLD	
4	AC SLD + Power evacuation scheme till plant switchyard	
5	DC Cables routing layout & details	
6	AC Cables routing layout & details	
7	Lightning Arrestor and Earthing Layout with details	
8	Inverter Room Cable Trench Layout	
9	Inverter Room Lighting & Earthing Layout	
10	Switch-yard layout, transformer foundation & details	
1 1	Street Light layout & details	
12	Auxiliary power supply Schematic & details	
13	MMS GA, foundation & details	
14	Communication + weather monitoring - layout & details	
15	Drawing & details of transmission line (switch-yard to GSS)	
16	Power interconnection schematic drawing & details at GSS	
17	Fire safety equipment layout & details	
18	Equipment & Cable identification tag list	
19	C.C.TV lay out & Details	

LIST OF DESIGN CALCULATIONS:

Following is the minimum list of design calculations:



A	ELECTRICAL SYSTEM	
1	String sizing w.r.t. the final Inverter - Module configuration	
1	DC Cables sizing and voltage drop calculation.	
2	AC Cables sizing and voltage drop calculation.	
3	Earthing calculation.	
4	Lightning Arrestor calculation.	
5	PV Syst. Report	
B	Control / Inverter Room Design & Calculation	
1	Inverter Room Lighting	
2	Inverter Room Earthing	
3	Switch-yard equipment selection / Calculations	
4	Auxiliary power consumption Calculation	
C	CIVIL / MECHANICAL	
1	Control / Inverter Room design Calculation	
2	Security room design Calculation	
3	Module Cleaning System Calculation	
4	Storm water Drain Calculation	
5	MMS (Module Mounting Structure ) design, analysis & Calculation	
6	MMS foundation design Calculation	
7	Fence design calculation	
8	Internal road design	
9	Transformer foundation design	
10	Earthing Pit Design	
11	Lightning Arrestor Foundation Design	
12	Street Lighting Foundation Design	
13	Foundation Design for Transmission Tower	
14	Transmission Tower Structure Design	

15	Control / Inverter room earthing calculation	
16	Battery and UPS design calculation	
17	C & R schemes, relay setting calculations, relay coordination schemes	
D	Power yield report	
1	Power generation & shading report (PV Syst)	
E	GTP, Data sheets & Check list	
1	Earth Wire GTP	
2	Module Technical detail	
3	Inverter Technical detail	
4	GTP of DC-Cable, AC-Cable & Communication cable	
5	GTP of Earth Pit, Earth Wire, Lightning Arrestor	
6	SLD & Technical data-sheet of AJB, DCDB. ACDB	
7	GTP of HT / LT Panel	
8	Battery and UPS data-sheets	
9	Alarms and Trip list	
10	Inverter duty/ power transformer GTP and GA drawing	
11	Technical Data-sheet for Tariff Meter (Incl. details of CT's PT's etc.)	
12	Technical Data-sheet Weather monitoring instrument.	
13	Technical Data-sheet for SCADA	
F	BOM of the project	
G	Project Execution schedule	
H	Other Documents	
	Quality plans & Check lists for all major equipment	
	Pre-commissioning test plan	
	Performance Test Plans	

	Commissioning Protocols	
	Permits and Clearances Required (Statutory)	

### 3.2. System Components

#### 3.2.1 SPV Module



Mono (PERC )Crystalline Module

The Contractor shall employ solar PV Module of Mono (PERC) Crystalline technology only. The Contractor shall provide detail Technical Data Sheets, Certifications of Standard Testing Conditions (STC: defined as Standard Testing Condition with air mass AM1.5, irradiance 1000W/m<sup>2</sup>, 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 cell configuration with rated power of **module ≥525 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 @ 1000 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 1000 Volts or higher IEC 62716, IEC 61701.

Minimum certified module efficiency shall be 16% for crystalline with minimum fill factor of 0.75. The temperature coefficient of power for the modules shall not be more than 0.50% / °C.

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 the junction box shall be made with UV resistant material to avoid degradation during module life and the Junction sealing shall comply with IP67 degree of protection.

Modules should have rugged design to withstand tough environmental conditions and should withstand a 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 3% of the rated capacity. YoY (Year Over Year ) the maximum allowable degradation is 0.7% 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% 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 not more than 0.7% for a period of 24 years, so that by the end of the 25th year, an actual output of at least 80.2% of the nameplate power output specified on the product will be achieved.

SPV modules 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 Successful bidder shall hand over Module warranty documents to Gokul Milk post commissioning of the project.

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 (Radio Frequency Identification) tag bearing the following details: The RFID must be placed outside the lamination of the PV module.

Name of manufacturer, name of manufacturer of solar cells symbol of bidder;

Country of Origin (separately for cells and modules)

Unique model number;

Unique Serial number;

Month and Year of manufacture (separately for cells and module).

Date and Year of obtaining IEC PV module qualification certificate.

Name of Test Lab issuing IEC certificate.

Other relevant information on traceability of solar cells and module as per ISO 9000.

Polarity of terminals or leads (colour coding is permissible).

Maximum system voltage for which the module is suitable.

Date & place of manufacture.

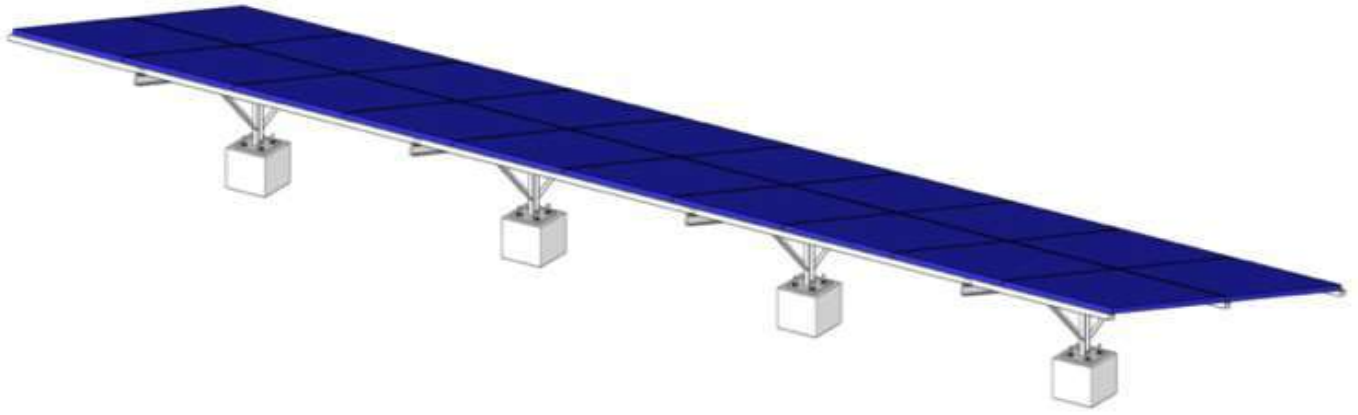
I-V Curve for the module at standard test condition (1000W/sqm, AM1.5, 25 °C).

Wattage,  $W_p$ ,  $P_{max}$ ,  $I_{mp}$ ,  $V_{mp}$ ,  $I_{sc}$  & FF for the module.

The module frame shall be made of Aluminium or corrosion resistant material, which shall be electrically compatible with the structural material used for mounting the modules. Both module frame & structure should have provision for earthing.

The sampling test shall be carried out on random basis on the PV MODULE at accredited labs by the Bidder/ supplier at his cost.

### **3.2.2 Mounting Structure**



The Contractor shall design, fabricate, supply and install module mounting structures with all required accessories.

Module inclination angle shall be decided based on the site coordinates considering the best generation angle for that location. Contractor shall ensure the tolerance of the Module inclination angle of the tables shall be within  $\pm 1^\circ$  from the finalized angle.

Contractor MMS design shall ensure that there is no shadow in the modules between 8.00am to 5.00pm throughout the year.

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 150km/hr for MMS.

The frames and leg assemblies of the array structures shall be made of hot dip Galvanized steel per ASTM A123 and minimum thickness of 70micros.

The design and the calculations for the MMS and the foundation system shall be submitted for prior approval of engineer in-charge.

Structure shall be designed and analyzed in accordance with finite element method using software (STAAD), with considering Dead load and wind load as per IS: 875 (Part 1&3). Analysis to be done as per appropriate load combinations in IS 800

All fasteners for Module mounting, Structural assembly shall be of Stainless Steel Grade- SS304.

The structure shall be designed to allow easy replacement of any module and shall be in line with the site requirements.

The support structure design & foundation shall be designed with reference to the existing soil conditions in order to withstand wind speed applicable. The bidder shall conduct pile / foundation

test & furnish test reports from the competent authority.

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.

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.

Steel shall be procured from reputed manufacturers & the test certificate for the steel materials shall be submitted for approval.

### **3.2.3. INVERTER**



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.

Only those Inverters which are commissioned for more than 50 MW capacity solar PV projects till date shall be considered for this project. Bidder has to provide sufficient information to the satisfaction of the engineer in-charge before placing the final order for Inverters.

The minimum European efficiency of the Inverter shall be 98% load as per IEC 61683 standard for measuring efficiency. The Bidder shall specify the conversion efficiency of different loads i.e. 25%, 50%, 75% and 100% in its offer. The Bidder should specify the overload capacity in the bid.

The Inverters shall be of outdoor string inverters with canopy and with protection to minimum of IP 65.

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.

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.

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

Maximum power point tracker (MPPT) shall be integrated in the inverter to maximize energy drawn from the Solar PV array. The MPPT unit shall conform to IEC 62093 for design qualification.

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.

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 is reached.

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.

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.

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

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.

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.

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

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).

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

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

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.

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.

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.

Desired Technical Specifications of Inverter.

Sinusoidal current modulation with excellent dynamic response.

Compact and weather proof housing (indoor/ outdoor)

Comprehensive network management functions (including the LVRT and capability to inject reactive power to the grid)

No load loss < 1% of rated power and maximum loss in sleep mode shall be less than 0.05%

Optional VAR control

Unit wise & integrated Data logging

Dedicated Prefabs / Ethernet for networking

Inverter must provide protection against:

Over current

Sync loss

Over temperature

DC bus over voltage

Cooling Fan failure (If provided)

Short circuit

Lightning

Earth fault

Surge voltage induced at output due to external source

Power regulation in the event of thermal overloading

Set point pre-selection for VAR control

Bus communication via -interface for integration

Remote control via telephone modem or mini web server

Integrated protection in the DC and three phase system

Insulation monitoring of the PV array with sequential fault location

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

DC power input

DC input voltage

DC Current

AC power output

AC voltage (all the 3 phases and line)

AC current (all the 3 phases and line)

Power Factor

Frequency

Display of sine wave with distortion, if any.

#### Detailed Specifications of INVERTER

S No	Particulars	Details
1.	Nominal AC Output Power	As per design
2.	Nominal AC Output Voltage	(300 - 800) V $\pm$ 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 - 800) V ±10% & 50 Hz +3% to - 5% Hz
16.	Voltage Tolerance	+ 10% and -10% or better than that
17.	DC Overloading	Suitable for 130% of DC overloading
18.	Communication to PLC	Ethernet

### 3.2.4. TRANSFORMERS



S No	Particulars	Description
1.	Continuous KVA ratings	As per design
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	12 kV
8.	Rated voltage on L.V. side	Output of solar inverter
9.	Vector Group	DYn11

10.	Connections H.V. Winding L.V. winding	Delta/Star Delta/Star
11.	On load taps changer 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	31mm/ kV
14.	Transformer connections	LV side – Bus Duct HV Side –Bushing with enclosure

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

S No	Particulars	Description
1.	Continuous kVA ratings	As per design (with 20% for future load)
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	12 kV
8.	Rated voltage on L.V. side	415V
9.	Vector Group	Dyn11
10.	Connections H.V. Winding 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	31mm/ kV

### 3.2.5 HT SWITCHGEAR



#### CODE AND STANDARDS

IEC: 62271, IS: 13118 and IS: 3427

#### Type of Switchgear

Free standing, Floor mounted, metal clad, fully compartmentalized draw-out type

#### Circuit Breaker

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

#### OPERATIONAL REQUIREMENT

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

Spring return to neutral type control switch (with NAC/NAT position)

Stay – put type selector switches. Voltmeter with selector switch shall be provided with each bus-section.

'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.

Thermostatically controlled space heater with switch, illumination and power plug point.

All meters/instruments shall be flush mounted on the front panel, at least 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.

### **3.2.6 CABLES**

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.

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 maximum 1.5% (including diode voltage drop).

All cables shall be supplied in the single largest length to restrict the straight-through joints to the minimum number.

All cables shall be armored except Solar Cables. Solar cable shall be laid through MMS / DWC Conduits.

OFC cable shall be laid in DWC conduits.

Ethernet cables shall be CAT-6.

All wires used for connecting the modules and array should conform to the NEC standards.

All high voltage cables connecting the inverters to the transformers should be XLPE insulated grade conforming to IS 7098-1 and cables shall also conform to IEC 60189 for test and measuring the methods.

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

### **3.2.7. POWER EVACUATION**

The Energy generated from the solar power plant shall be evacuated to suitable voltage level of MSETCL from the proposed project site. Contractor shall construct a dedicated transmission line for this project. Common evacuation facility along with any other party shall not be acceptable.

Contractor shall do the necessary survey for the finalizing the transmission line route and length.

All the necessary infrastructure in the MSETCL Substation for evacuating the generated power shall be provided as per MSETCL standards.

Contractor shall obtain necessary Evacuation approval and other related approval in the name of

KZSDUS Ltd. at his own cost.

The Transmission tower shall be designed for maximum pending moment arising due to wind load on tower, conductors, insulators, cross arms and conductor deviation loads with all conductor intact.

Conductor shall be selected based on the power evacuated and as per MSETCL standards.

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

### 3.2.8. WEATHER MONITORING SYSTEM (WMS)

As a part of the 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.

#### PYRANOMETER

Contractor shall provide minimum one (01) number of pyranometers for measuring incident global solar radiation. One of them shall be placed on horizontal surface and the other on adjustable inclined plane. The specification for pyranometers shall be as follows:

S No	Details	Values
1.	Spectral Response.	0.31 to 2.8 micron
2.	Sensitivity	Min 7 micro-volt/w/m <sup>2</sup>
3.	Time response (95%)	Max 15 s
4.	Non linearity	±0.5%
5.	Temperature Response	±2%
6.	Tilt error	< ±0.5%.
7.	Zero offset thermal radiation	±7 w/m <sup>2</sup>
8.	Zero offset temperature change	±2 w/m <sup>2</sup>
9.	Operating temperature range	0 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/m <sup>2</sup>
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.

#### 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.

#### ANEMOMETER

Contractor shall provide minimum one no. anemometer with Ultrasonic Type

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

The instrument shall have valid calibration certificate.

#### 3.2.9. SCADA AND REMOTE MONITORING SYSTEM

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.

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.

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.

Reliable sensors for solar insolation, temperature, and other weather and electrical parameters are to be supplied with the data logger unit.

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.

SCADA shall measure and continuously record electrical parameters of following equipment's 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
13. SCADA shall provide 15 minute daily, monthly and annual average of following parameters:
14. Exported Energy to grid
15. Energy, DC and AC voltage, power and pf of each Inverter
16. Solar Radiation Temperature (ambient and module surface)

### **3.2.10. EARTHING & LIGHTNING PROTECTION**

#### **3.2.10.1. EARTHING**

Soil resistivity test shall be carried to at least in five (5) location across the project site for designing the Earthing system.

Earth Grid resistivity shall be maintained less than 1 Ohm. And for every 100mtrs minimum one number of earth pit shall be provided. Separate Earthing grid shall be provided for AC & DC system and Lightning system. For instruments separate earth pits shall be provided.

For Switchyard necessary earth mat shall be provided as per IS 3043.

Earth strips shall be galvanized with minimum thickness of 80microns.

The photovoltaic modules, BOS and other components of power plant requires adequate earthing for protecting against any serious faults as guided by IEC 60364.

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.

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.

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.

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.

### **3.2.10.2. LIGHTNING PROTECTION**

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). Lightning 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.

The lightning conductor shall be earthed through flats and connected to the earth mats as per applicable Indian Standards with earth pits.

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.

### **3.2.10.3. FIRE DETECTION & PROTECTION SYSTEM**

The installation shall meet all applicable statutory requirements, safety regulations in terms of fire protection.

Liquefied CO<sub>2</sub> 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.

The minimum 2 no. of fire extinguishers (CO<sub>2</sub> 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.

Fire detection and alarm system shall be provided at Switch-gear room, inverter room and Control room.



3.2.11. LIST OF APPROVED MAKES:

S No.	COMPONENT	SUPPLIER
i.	PV Modules	Renewsys / Waaree / Vikram
ii.	Inverter	Sungrow, SMA, Solis
iii.	HV & LV Switchgears /Breakers	BHEL, Siemens, Schneider ABB, L&T, Crompton Greaves, Megawin
iv.	DC Cables	Top, Advance, Lapp, Siechem, Universal, Leoni, KEI
v.	Jointing Kits / MC4 Connectors	RPG, Raychem, Mseal
vi.	AC Cables	Unistar, Nicco, KEI, Poly Cab, KEC
vii.	SCADA Components	L&T, ABB, Siemens, GE Fanuk, Schneider, Rockwell, Honeywell
viii.	Transformer	BHEL, CGL, Voltamp, Bharat Bijlee, KEC, Alstom, EMCO, Tesla, Raychem, Danish
x.	Weather Monitoring System	Kipp, MetOne, ambient weather and Zonen, Suryalogix
xi.	Lightning Protection System	JEF Techno, PT, VNT
xii.	Power evacuation System, metering Equipments, including Transmission Line	As per KTPCL approved vendor list
xiii.	HT / LT cables	Universal, NICCO, KEI, RPG
xiv.	CCTV System	Bosch, Pelco, Sony, Toshniwal, Kokban
xv.	Lighting System	Bajaj, CGL, Philips
xvi.	UPS	Emerson, Hi-Rel, Delta, Power One, APC
xvii.	DC Charger	Amara Raja, HBL, Caldyne, Chhabi
xviii.	Pyranometer	
xx	Anemometer	

### **3.3. INFRASTRUCTURE**

#### **3.3.1 FENCING**

The contractor shall provide dedicated ( for Gokul owned land) Chain linked fence 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.

#### **3.3.2. CONTROL ROOM**

The common control room will be utilized for housing the Low Voltage Panels, High Tension Panels, Plant Monitoring system, Safety equipment's, Office room etc. In order to avoid shading effect the control room is proposed to be constructed on the North western side of the layout. The total area required for the control room will be approx. 30 to 50 sq. mtrs. The control room will be provided with Air conditioning unit in order to maintain the desired temperature of the equipment's like inverters for better performance. The office space will be provided inside the control room with basic amenities. The performance of the Power Plant can be monitored from the Office room. The control room will be equipped with all necessary safety equipment's as per the safety rules. The equipment's will be erected as per the Indian Electrical Standards. The cables will be routed through cables trenches or cable trays as required. Alarm system will be provided to alert the operator in case of emergency or plant break-down. The control room will also house the power evacuation system except the transformer. The proposed transformer will be installed in outdoor next to the control room.

#### **3.3.3. APPROACH / PERIPHERAL / INTERNAL ROADS AND PATHWAYS**

The Contractor shall provide internal road from main entrance to Guest house/MCR/Parking bay shall be asphalt roads of 6m wide plus shoulder of 750mm on either sides. All peripheral and internal roads shall be micro levelled and mechanically compacted type with width 4 mtr and 500mm shoulders.

#### **3.3.4. STORM WATER DRAINAGE SYSTEM**

Storm water drain system of 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 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.

#### **3.3.5. SOLAR PV MODULE CLEANING SYSTEM**

Cleaning frequency shall be about 15-20 days per cycle. For this, the Contractor shall construct a tank of 30,000 liters Water tank can be HDPE or RCC.

### **3.3.6 CCTV SYSTEM**

Bidder should provide a suitable CCTV system to cover the entire plant area and provide remote monitoring access of the CCTV to Gokul.

### **3.3.7 INDOOR AND STREET LIGHTING SYSTEM**

Bidder should provide a suitable lighting system to adequate illumination.

### **3.3.8 Office Room for Gokul**

The well furnished separate Office, Pantry, Toilet block of permanent RCC framed type structure is to be provided as follows,

1. The office room should have floor area of @ 120.00 Sft.
2. Attach pantry of floor area @ 100.00 Sft is to be provided with attach toilet having floor area of @ 35.00 Sft.
3. Side & partition walls are of min 150mm thk BBM, Concrete bricks
4. Branded Vetrified tiles are to be used for flooring, skirting and toilet block dado .
5. Proper ventilation should be provided. For windows granite stone slab is to be used for sill and jambs, Anodized aluminum sliding windows are to be provided with safety grills & Mosquito net.
6. All standard electric fitting and fixtures to be used, Ceiling fans, exhaust fan, LED lights are to be provided.
7. The terrace slab with proper waterproofing and MS Ladder facility for terrace is to be provided.
8. All external walls are double coat cement plastered with proper waterproofing & painting.
9. Office and Pantry internal walls are single coat cement plastered smooth wall care putty finished with proper colour work.
10. Water proof plywood & laminated doors shutter is to be provided with Granite door frame for office and pantry. WPC door shutter is to be provided with granite door frame for toilet.
11. In toilet block One wall hung commode, Hot/cold mixer, geaser, shower arrangement, wash basin, proper consealed piping, over head water tank of 1,000 lit capacity, etc. Is to be provided with proper plumbing and drainage facility.
12. For Office and pantry split AC is to be provided of proper capacity.
13. In Office one office table of size 5'0" x2'6", one office chair, 3 visitor chairs are to be provided.
14. In pantry one three seater sofa cum bed is to be provided with tea poy.

The drawing and all details must be pre approved from Gokul.

## **3.4. PROJECT ORGANIZATION & SCHEDULE**

### **3.4.1 PROJECT ORGANIZATION**

The contractor should submit overall organization chart for managing the project. The Project Manager is the single point of contact with customer for all communications. The contact details of all members of the team must be shared.

### **3.4.2. PROJECT SCHEDULE**

The contractor should submit a detailed project schedule with Gantt chart / Bar Chart. There should be provision for indicating plan & actual status of each listed activity. Contractor should submit the status report weekly during project execution & action plan for any delayed activity.

### **3.4.3 OPERATION AND MAINTENANCE**

The contractor is responsible for Operation and Maintenance (O&M) of the plant for the next 5 years post commissioning of the project.

O&M includes:

1. Quarterly Preventive Maintenance of the entire plant.
2. Cleaning of all modules twice a Month.
3. Having onsite Engineers for day to day operations.
4. Having onsite security for 24\*7 security
5. During signing of O&M contract, the successful bidder will submit a Guaranteed generation table for each month in concurrence with Pyranometer and weather monitoring data.

### **3.4.4 PAYMENT TERMS :**

As per given in Terms & Conditions.

For O&M :

1. Payment of O&M amount will be made on a Quarterly basis.

### **SECTION 4 : DOCUMENTS FOR BID SUBMISSION:**

The following documents are required to be submitted as part of the RfS. These formats are designed to demonstrate the bidder's compliance with the Qualification Requirements set forth in sections below and other submission requirements specified in the RfS.

- 4.1 Covering Letter : Should be submitted on Company letter Head and should provide company profile, Land and Substation details for the proposed project.

4.2 Technical Bid : This Documents should contain technical details about the project which should be in adherence to the RfS.

4.3 Company Financial statements : Should submit duly attested Financial Statements for the latest 3 years from certified CA.

4.4 FINANCIAL PROPOSAL : Should Consist of price for project Turnkey EPC,price for 5 years O & M

4.5 Reference of Past Performance : Should accompany technical Bid. Details of past performance will help in building confidence.

Documents in 4.1,4.2,4.3 and 4.5 to be submitted in one envelope and should mention **'TECHNICAL BID for Solar PV project (open access)'** on the envelope cover.

Documents in 4.4 should be submitted in a separate envelope and should mention **'FINANCIAL PROPOSAL for Solar PV project (open access)'** on the envelope cover.

Both the above envelopes should be submitted in a larger envelope mentioning “ RfS document for 6.5 Mwp Captive Solar Project” on the envelope cover.

The Bidder may use additional sheets to submit the information for their detailed response.

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## FORMAT

### Technical offer

The Managing Director,  
Kolhapur Zilla Sah.Dudh Utpadak Sangh Ltd.  
B-1, M.I.D.C., Gokul Shirgaon,  
Kolhapur - 416 234

### **Sub - Technical offer for Supply , Installation, Testing and commissioning of 6.5 MWp Solar plant under open access captive scheme**

Dear Sir,

With reference to the Tender Notice published in Daily----- on Dt----- I/ we submit the Technical offer with respect to above subject for Gokul milk project ( with required laisioning work ) as per tender. We also agree upon Terms conditions, Technical specifications & scope of work

#### **3) Our Solar Plant Location -**

#### **4) Solar Plant Land Area -**

Seal & Signature of Bidder

Encl -

1. RTGS details of EMD
2. Company Profile
3. Details of such type of work completed by contractor (Minimum 25 MW solar plant in last 3 years)
4. Other documents mentioned in section 4.

FORMAT

COMPANY PROFILE

Name of the Tenderer	-	
Address	-	
Tel. Nos.	-	
web site	-	
E - mail	-	
GST Registration No.	-	
Name of Authorized Signatory	-	
Designation of the authorized Signatory	-	

Seal & Signature of Bidder

Format

Commercial offer

To,  
The Managing Director  
Kolhapur Zilla Sahakari Dudh Utpadak Sangh Ltd.  
B-1, M.I.D.C., Gokul Shirgaon,  
Tal. Karveer, Dist. Kolhapur

**Sub - Commercial offer for Supply , Installation, Testing, Commissioning AND O&M of 6.5 MWp  
Solar plant under open access captive scheme for Gokul Milk Project.**

Dear Sir,

In continuation to your Tender Notice in Daily -----Dt.----- , I/we submit our Tender offer. We have gone through Terms & conditions of the Tender and scope of work . We agree upon the terms & conditions.

Our **GRAND TOTAL AMOUNT (I) + (ii)** for above work is Rs.\_\_\_\_\_

(In words Rs \_\_\_\_\_)

(Amount including GST .)

Note - Detailed price break up of Total bid price is enclosed herewith.

Date :

Seal & Signature of Bidder



KOLHAPUR ZILLA SAHAKARI DUDH UTPADAK SANGH LTD. KOLHAPUR  
Supply, Installation, Testing, Commissioning & O&M of 6.5 MWp Solar Plant under open access captive  
scheme for Gokul Milk Plant, B-1, MIDC, Gokul Shirgaon.(Kolhapur )

**COMMERCIAL OFFER**  
**Price breakup**

Sr.No	Description	Qty.	Amount (Rs.)
1.	Supply , Installation, Testing and commis- sioning of 6.5 MWp Captive Solar Plant under open access scheme as per specifi- cations given in Tender.	1 Lot	
	AMOUNT		
	GST		
	TOTAL AMOUNT (i)		
2.	Operation and Maintenance cost for 5 years O&M as per tender specifications	1 Job	
	AMOUNT		
	GST		
	TOTAL AMOUNT (ii)		
	<b>GRAND TOTAL AMOUNT (I) + (ii)</b>		

GRAND TOTAL (In Words Including GST) \_\_\_\_\_

Sign & Seal of bidder