OREDA LIMITED

(Under the Department of Energy Government of Odisha)
(CIN No: U35105OD2024SGC045786)
(ISO 9001:2008 / ISO 14001:2004)
S/59, MANCHESWAR INDUSTRIAL ESTATE
BHUBANESWAR-751010, ODISHA
Website: www.oredaodisha.com E-mail: ceoreda@oredaorissa.com

e-Tender Call Notice

Notice No: 55 / OREDA Limited **Date:** 08/01/2025

Request for Empanelment (RfE) is invited through e-tender portal from eligible bidders for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 1-7.5 HP capacities in the State of Odisha including complete system warranty and its repair and maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE, GoI.

1	Date of publication of NIT on E-procurement website and OREDA Limited website	08.01.2025
2	Due date of pre bid query submission as per format of NIT	15.01.2025, Time: 5.00 PM
3	Date and time of pre-bid meeting through virtual mode https://meet.google.com/ziw-xxrz-dbb	17.01.2025, Time: 11.30 AM
4	Due date and time for submission of online copies of Technical Bid and price bid.	10.02.2025, Time: 5:00 PM
5	Due date and time for submission of hard copies of Technical Bid for select Bid Forms only **Bidders must submit the COST OF BID, BID SECURITY, AND POWER OF ATTORNEY ONLY in hard copy along with JV agreement/Consortium copy (if applicable), as specified in the tender documents. Submitting any additional documents in hard copy,**	13.02.2025, Time: 5:00 PM
6	Tentative date and time for the opening of Technical Bid for both online copies and hard copies, except price bid.	15.02.2025, Time: 12.00 PM
7	Due date and time for the opening of online price bid applicable only for the bidders whose Technical bids shall be responsive	To be intimated later

Details can be seen from the website www.oredaorissa.com. Further corrigendum, if any, will be uploaded in these websites only.

07.01.2025

Chief Executive Officer

Memo No. 56 /OREDA Limited Date: 08/01/2025

Copy to FA – cum – Special Secretary to Government, DoE, GoO for favour of information.

7.01.2025

Chief Executive Officer

Memo No. 57 /OREDA Limited Date: 08/01/2025

Copy forwarded to the Director (Admin) / All Divisional Heads / Publicity Wing / Notice Board / Website of OREDA Limited i.e. www.oredaodisha.com for information and necessary action. The advertisement may please be published in two Odia dallies and in two English dailies in all the editions.

7.01.2025

Chief Executive Officer

Request for Selection (RfS) of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 1-7.5 HP capacities in the State of Odisha including complete system warranty and its repair and maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE, GoI.

E-procurement Website: https://www.tenderwizard.com/OREDA

RfS No: OREDA/Tech/55/2024-25 dated: 08.01.2025

Contact Details

OREDA Limited

Address: S-3/59, Mancheswar Industrial Estate, Bhubaneswar - 751010, Odisha.

Phone: (0674) 2588260, 2586398, 2580554, Fax: 2586368

Email: ceoreda@oredaorissa.com. Website: http://www.oredaorissa.com

DISCLAIMER

1) Though adequate care has been taken while preparing the RfS document, the bidder(s) shall satisfy themselves that the document is complete in all respect. Intimation regarding any discrepancy shall be given by the prospective bidders to the office of OREDA Ltd.immediately . If no intimation is received from any bidder within 15 **(Fifteen) days from the date of issuance of RfS documents,** it shall be considered that the document is complete in all respect and has been received/ acknowledged by the bidder(s).

2) Odisha Renewable Energy Development Agency (OREDA) reserves the right to modify, amend or supplement this document.

3) This RfS document has been prepared in good faith, and on best endeavor basis. Neither OREDA nor their employees or advisors make any representation or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this document, even if any loss or damage is caused by any act or omission on their part.

4) In case of any discrepancy in the documents uploaded on the websites of OREDA and **www.tenderwizard.com/OREDA** portal, the documents uploaded on the **www.tenderwizard.com/OREDA** website will prevail.

OREDA Limited, hereinafter referred to as "OREDA"

Place: Bhubaneswar

-Sd-

Chief Executive Officer

Date: 08.01.2025

BID INFORMATION SHEET

The brief details of the RfS are as under:

<table>
<tr><th>Sr. No</th><th>Particulars</th><th>Description</th></tr>
<tr><td>a)</td><td>Name of work/ brief scope of work/ job</td><td>Selection of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 1- 7.5 HP capacities in the State of Odisha including complete system warranty and its repair and maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE, GoI</td></tr>
<tr><td>b)</td><td>Rfs no. & date</td><td>RfS No: OREDA/Tech/55/2024-25 dated: 08.01.2025</td></tr>
<tr><td>c)</td><td>Type of bidding system</td><td><table><tr><td>Single bid system</td><td></td></tr><tr><td>Two bid system</td><td>Yes</td></tr></table></td></tr>
<tr><td>d)</td><td>Types of RfS/ Tenders</td><td><table><tr><td>E-tender</td><td>Yes</td></tr><tr><td>Manual</td><td></td></tr></table></td></tr>
<tr><td>e)</td><td>Completion/ Contract period</td><td>2 years from publication of Empanelment list</td></tr>
<tr><td>f)</td><td>No of Pumps</td><td>10,000 (Numbers may increase or decrease up to +/- 20% ,subject to feasibility and other conditions.</td></tr>
<tr><td>g)</td><td>Bid processing fee</td><td><table><tr><td>Applicable</td><td>Yes</td></tr><tr><td>Not Applicable</td><td></td></tr></table>
Amount: INR 12,390/- (Indian Rupees Twelve Thousand Three Hundred and Ninety Rupees Only) including GST, to be submitted either through NEFT/RTGS transfer in the account of OREDA, or in the form of DD/Pay Order along with the response to RfS in favor of “Chief Executive Officer, OREDA Limited”, payable at Bhubaneswar.</td></tr>
<tr><td>h)</td><td>Earnest Money Deposit (EMD)</td><td><table><tr><td>Applicable</td><td>Yes</td></tr><tr><td>Not Applicable</td><td></td></tr></table>
Amount: As per clause 4 of section 3 of this RfS to be submitted in the form of Bank Guarantee/Payment on Order Instrument, along with the Response to RfS.</td></tr>
</table>

<table>
<tr><td>i)</td><td>Performance bank guarantee</td><td><table><tr><td>Applicable</td><td>Yes</td></tr><tr><td>Not Applicable</td><td></td></tr></table>Amount: As per clause 6 of section 3 of this RfS to be submitted in the form of Bank Guarantee/Payment on Order Instrument, along with the Response to RfS.</td></tr>
<tr><td>j)</td><td>Date, time & venue of pre-bid meeting</td><td>OREDA limited
S3/59, Mancheswar Industrial Estate,
Bhubaneswar, Odisha - 751017
Scheduled as per NIT on www.tenderwizard.com/OREDA and/or OREDA website. https://www.oredaodisha.com</td></tr>
<tr><td>k)</td><td>Offline & online bid-submission deadline</td><td>As per NIT on www.tenderwizard.com/OREDA portal</td></tr>
<tr><td>k)</td><td>Techno-Commercial bid opening</td><td>As per NIT on www.tenderwizard.com/OREDA portal</td></tr>
<tr><td>l)</td><td>E- Reverse Auction (e-RA)</td><td>Not Applicable</td></tr>
<tr><td>m)</td><td>Contact details of E-procurement portal portal</td><td>M/s Satamanyu Routray
Honganasu, #137/3, Bangalore – Mysore Road,Opp.
KMS Coach Builders,
Kengeri, Bangalore – 560 060</td></tr>
<tr><td>n)</td><td>Name, Designation, Address and other details for submission of response to RfS</td><td>Chief Executive Officer
OREDA Limited
S3/59, Mancheswar Industrial Estate,
Bhubaneswar, Odisha - 751017
Email: ceoreda@oredaorissa.com</td></tr>
<tr><td>o)</td><td>Details of persons to be contacted in case of any assistance required</td><td>Mr. Soumyaranjan Aich
Director (Tech) OREDA
Ph: 9438564707
Email: sraichoreda@gmail.com

Smt Asima Arunima
Asst. Director (Tech) OREDA
Ph: 70089 44462
Email- asima.oreda@gmail.com

Mr Bramhanada Tarai
Asst. Director (Tech) OREDA
Ph 9111868247
Email- btarai.oreda@gmail.com</td></tr>
</table>

Note:

- Bids must be submitted strictly in accordance with Section-2 and 3 of the RfS, depending upon Type of Tender as mentioned at Clause no. (D) of Bid Information Sheet.
- Bidders are required to quote strictly as per terms and conditions of the RfS document and not to stipulate any deviations/ exceptions.
- Any bidder, who meets the Qualifying Requirement and wishes to quote against this RfS, may download the complete RfS document along with its amendment(s) and clarifications if any, from Tender Wizard Portal (https://www.tenderwizard.in) and/or OREDA Limited website (https://www.oredaodisha.com) and submit their Bid complete in all respect as per terms & conditions of RfS Document on or before the due date of bid submission.
- Clarification(s)/ Corrigendum(s) if any shall also be available on the above referred websites.

Bidders are requested to remain updated for any notices/ amendments/ clarifications etc. to the RfS document through the websites https://www.tenderwizard.in/OREDA and www.oredaodisha.com. No separate notifications will be issued for such notices/ amendments/ clarifications etc. in the print media or individually. Intimation regarding notification on the above shall be updated on www.oredaodisha.com and the details only will be available from https://www.tenderwizard.in)

SECTION: 1. INTRODUCTION & INVITATION FOR BIDS

1. Background & Introduction

OREDA Limited, hereinafter referred to as "OREDA" is a Government Agency under the administrative control of Department of Energy, Govt of Odisha. One of the main objectives of OREDA Limited is to develop, promote and commercialization of solar energy technologies in the State.

While Large Scale Solar power generation projects are being installed in the State to achieve the ambitious targets for Renewable Power generation, it also has been planned to simultaneously develop the decentralized solar energy.

Towards developing decentralized renewable power, it is planned to replace Agriculture Diesel pumps with Solar Water pumps and Solarize Grid-connected Agriculture pumps. This is also providing additional source of income to the farmers sometime. To provide energy and water security to farmers and enhance their income, de-dieselize the agriculture sector and to reduce environmental pollution, the Government of India has approved PM-KUSUM scheme.

With such initiatives, under PM KUSUM Component B, as per the MNRE, GOI OM dated 25.07.2023, States are allowed to have their own tender under PM KUSUM Component B in line with centralized SECI tender and OREDA is opting for conducting bidding tender under the component-B of PM-KUSUM, Sanction-IV.

OREDA shall be the bidding agency for selection of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 1-7.5 HP capacities in the State of Odisha including complete system warranty and insurance along with its repair and maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE, GoI. Details regarding the selection process are contained in Section-5 of the RfS. OREDA's role is for price discovery through transparent competitive bidding mechanism along with award of work under this scheme.

The Bidders will be free to avail fiscal incentives like Accelerated Depreciation, Concessional Customs and Excise Duties, Tax Holidays etc. as available for such Projects. The same will not have any bearing on comparison of bids for selection. As equal opportunity is being provided to all Bidders at the time of tendering itself, it is up to the Bidders to avail various tax and other benefits. No claim shall arise on OREDA for any liability if Bidders are not able to avail fiscal incentives and this will not have any bearing on the SPWPS. OREDA does not however, give a representation on the availability of fiscal incentive and submission of bid by the Bidder shall be independent of such availability or non-availability as the case may be of the fiscal incentives.

Individual farmers will be supported to install standalone solar Agriculture pumps of capacity up to 7.5 HP for replacement of existing diesel Agriculture pumps / irrigation systems in off-grid areas, where grid supply is not available. Installation of new pumps shall also be permitted under this scheme. Pumps of capacity higher than 7.5 HP may be allowed, however, the CFA by MNRE, GOI is limited to the CFA applicable for pump of 7.5 HP. Water User Associations (Pani Panchayats) and community-based irrigation system may also be covered under this component. However, priority would be given to small and marginal farmers. In order to minimize the water usage for irrigation purpose, preference will be given to the farmers using Micro irrigation systems or covered under Micro irrigation schemes or who opt for micro irrigation system. The capacity of pump would be selected based on data provided by Odisha Lift Irrigation Corporation (OLIC) or any other beneficiary entity to OREDA such as water table in the area, land covered, and quantity of water required for irrigation. For solar pumps to be set up and used by Water User Associations (Pani Panchayats)/ Farmer Producer Organizations/Primary Agricultural Credit

Societies, the CFA will be allowed for solar pump capacity of higher than 7.5 HP considering up to 5 HP capacity for everyone in the group.

Solar PV capacity in kW for the pump capacity in HP will be allowed as per MNRE, GoI specifications under the scheme. **It will be mandatory to use indigenously manufactured solar panels with indigenous solar cells and modules. Further, the motor-pump-set, controller and balance of system should also be manufactured indigenously.** The vendor has to declare the list of imported components used in the manufacturing of solar water pumping system.

CFA by MNRE, GoI of 30 % of the benchmark cost or the discovered tender cost, whichever is lower, of the stand-alone solar Agriculture pump will be provided. The balance will be covered from the share of Government of Odisha and the Farmer's share.

2. Invitation for Bids

A Single Stage, Two-Envelope Bidding Procedure will be adopted and will proceed as detailed in the RfS Documents. Bidding will be conducted through the competitive bidding procedures as per the provisions of Sections 2 and 3 of the RfS.

Interested bidders have to necessarily register themselves on the portal https://www.tenderwizard.in ("KEONICS portal") to participate in the bidding under this invitation for bids. It shall be the sole responsibility of the interested bidders to get themselves registered at the aforesaid portal to complete the registration formalities. Contact details of the Portal is mentioned in the Bid Information Sheet. All required documents and formalities for registering on tender Wizard are mentioned in the subsequent RfS documents.

For proper uploading of the bids on the tender wizard portal, it shall be the sole responsibility of the bidders to apprise themselves adequately regarding all the relevant procedures and provisios as detailed in the portal, for which contact details are also mentioned on the Bid Information Sheet. OREDA in no case shall be responsible for any issues related to timely or properly uploading/ submission of the bid in accordance withthe relevant provisions of the Bidding Document.

Bidders should submit their bid proposal complete in all aspect on or before last date and time of Bid Submission as mentioned on Tender Wizard Portal (https://www.tenderwizard.in), OREDA website http://www.oredaodisha.com and as indicated in the Bid Information Sheet.

Bidder shall submit its proposal along with non-refundable Bid Processing Fees and Earnest Money Deposit (EMD) (if applicable) complete in all respect as per the Bid Information Sheet. Techno-Commercial bids will be opened as per the Bid InformationSheet in online presence of authorized representatives of bidders who wish to be present online. Bid proposals received without the Bid Processing Fees and/or Earnest Money Deposit (EMD) (as applicable) will be rejected. **In the event of any date indicated being declared a holiday, the next working day shall become operative for the respective purpose mentioned herein.**

RfS documents which include Eligibility Criteria, Technical Specifications, various Conditions of Contract, and Formats etc. can be downloaded from the **www.tenderwizard.com/OREDA** Portal or from OREDA's website. It is mandatory to download official copy of the RfS Document from Electronic Tender System (**www.tenderwizard.com/OREDA**) Portal to participate in the Tender.

Any amendment(s)/corrigendum(s)/clarification(s) with respect to this RfS shall be uploaded on **www.tenderwizard.com/OREDA** portal website and OREDA website. The Bidder should regularly check for any Amendment(s)/Corrigendum(s)/ Clarification(s) on the above-mentioned **www.tenderwizard.com/OREDA** portal and OREDA website. The same may also be uploaded on OREDA website also. However, in case of any discrepancy, the information available on **www.tenderwizard.com/OREDA** portal website shall prevail.

OREDA reserves the right to cancel/withdraw/defer this invitation for bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision.

INTERPRETATIONS

- Words comprising the singular shall include the plural & vice versa.
- An applicable law shall be construed as reference to such applicable law including its amendments or re-enactments from time to time.
- A time of day shall save as otherwise provided in any agreement or document be construed as a reference to Indian Standard Time.
- Different parts of this contract are to be taken as mutually explanatory and supplementary to each other and if there is any differentiation between or among the parts of this contract, they shall be interpreted in a harmonious manner so as to give effect to each part.
- The table of contents and any headings or sub headings in the contract has been inserted for case of reference only & shall not affect the interpretation of this agreement.

SECTION 2. SPECIAL CONDITIONS OF CONTRACT

Scope of Work

Under this RfS, the selected vendors shall be required to Design, Manufacture, Supply,Transport, Installation, Testing and Commissioning of stand-alone off Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 1- 7.5 HP capacity in the State ofOdisha including complete system warranty, Insurance and its repair and maintenancefor 5 Years under Component- 'B' of PM-KUSUM scheme of MNRE, GoI. As per MNRE specifications and applicable BIS standards, bidder shall follow all provisions of the Scheme Guidelines as amended from time to time.

1. Supply and Manufacture

a) The Selected vendor shall be responsible for design, supply, installation and commissioning of SPWPS along with 5 years of repair and maintenance. To ensure timely maintenance of SPWPS, apart from training a local person and making available necessary spare parts & tools in each district, the vendor shall have one authorized service centre in each operational district and a helpline in local language (Odia). Helpline number shall be indicated on the pump/ controller at suitable location easily visible to the user.

b) Each pump should be marked with Toll Free No. of successful bidder (Toll Free No. shall be affix on controllers and shall be readable for 5 years) operating in English/Hindi/Odia and specific pump number and same must have been registered on OREDA's CRC portal at the time of installation at site

c) During the time of PDI of each component, test reports of equipment's, warranty certificates, calibration certificates and any other certificates as specified in the guidelines and specification issued by MNRE should be provided by the bidder.

2. Installation and Commissioning

a) Installation and commissioning of SPWPS shall be done by the vendor as per the details provided by OREDA. The vendors shall co-ordinate with OREDA for repair and maintenance of SPWPS for 5 years.

b) Selected vendors have to submit consent of beneficiaries and feasibility of site after allocation of LOA in their favor to OREDA for which OREDA will issue 'Notice to Proceed' and for this, vendor shall complete the installation and commissioning of SPWPS within 90 days from date of issuance of the NTP.

c) Selected Vendor and OREDA representative should conduct site survey and submit Progress report on fortnight basis to OREDA Head Quarter office.

d) Action plan should be submitted to OREDA including complete details of team, resources, and service centers in each district within 30 days of acceptance of LoA from OREDA, failing of which, the vendor will be liable for levy of penalty.

e) Vendors will have to submit installation reports as per given format on weekly basis and Monthly basis to MNRE and OREDA.

f) Vendor will have to submit the completion reports of each district to OREDA within one week from 100% completion of work as per allocation of each district.

g) Selected Vendor shall submit monthly and quarterly maintenance reports to OREDA in online mode.

h) Vendor shall comply with all applicable regulatory and statutory norms. Vendor must obtain approval/ NOC from appropriate Govt body for implementing the project in each selected village.

i) Vendor must submit handing over certificates in the format prescribed by MNRE.

j) Each SPWPS is to be provided with the required details as mentioned in the specification and guidelines of the PM-KUSUM scheme.

k) Vendor should submit the prescribed certificate and photographs of each SPWPS installed which must show complete installation setup along with beneficiary pump number etc.

l) The selected vendors shall take all necessary permits, approvals and licenses, insurance etc., provide training and such other items and services required to complete the scope of work mentioned above.

m) Time Schedule includes the time required for mobilization as well as testing, rectifications if any, retesting and completion in all respects to the entire satisfaction of OREDA representative.

3. Technical Requirement and Testing

a) SPWPS installed under this programme should meet technical specification and construction standards as specified by BIS and MNRE from time to time as given in Annexure-A.

b) **Only indigenously manufactured solar panels enlisted under ALMM list-I of MNRE with indigenous solar cells and modules. Further, the motor-pump-set, controller and balance of system should also be manufactured indigenously. The Motor pump set and controller should be enlisted under empanelled OEM of OREDA.**

c) In case of any ambiguity in interpretation of any of the provisions of PM-KUSUM Guideline, the decision of the MNRE shall be final.

4. Operation & Maintenance (O&M), Training, Awareness and Sensitization

a) Selected Vendor should keep necessary spare parts (minimum 2% of allotted quantity of each component of the complete system at the service center) at each district and should ensure proper maintenance of SPWPS to 5 years from date of installation of each SPWPS. Vendor should comply to the schedule maintainance and corrective maintainance ticket on CRC portal as generated.Vendor should also ensure to provide local training to local persons regarding proper maintenance of SPWPS. Vendor should submit bi-weekly installation report to OREDA as per the prescribed format provided during the installation phase.

b) Any complaint registered on CRC /service calls received should be attended at the earliest and the system should be repaired/restored/replaced within 7 days from date of complaint received/informed to the vendor. Incase the vendor doesnt comply to the corrective maintainace and scheduled maintainance OREDA reserves the right to encash the CPG, deduct the CMC charges and/or blacklist the vendor for the period 3 years. CRC details are enclosed in Annexure –D.

c) MNRE officials, OREDA or any designated agency may inspect the systems during the installation or operational phase. In case the installed systems are not as per the standards, found non-functional on account of poor quality of installation or maintenance or not in-compliance with the guidelines and specification and

tender terms and conditions, OREDA reserves the right to encash the CPG, deduct CMC amount and/or blacklist the vendor for the period 3 years.

d) If any selected vendor, after getting empaneled doesn't go forward with the installation of pumps, apart from encashment of EMD, the said vendor shall also be blacklisted for 3 years period from the date of issuance of such notice of blacklisting by OREDA.

e) Vendor must submit an O&M manual in both English and Odia (local language) should be provided with each SPWPS to the beneficiary. The following minimum details must be provided in the manual: -

i. Basic principles of PV system
ii. A small write-up (with a block diagram) on SPWPS- its components, PV module, electronics and expected performance
iii. A simple single line diagram (SLD) depicting the electrical circuits and control mechanism
iv. Type, model number, voltage and capacity of the motor used in the system
v. The make model number and country of origin of each component
vi. Significance of indicators
vii. Clear instruction on regular maintenance and troubleshooting of the SPWPS
viii. Preventive maintenance schedule
ix. Detailed information about warranty coverage
x. Dos and Don'ts
xi. Name and address of the contact person for repair and maintenance in case of non-functionality.
xii. Tollfree contact details of CRC.
xiii. Description of frequent faults of PV module and pump and its remedies
xiv. Minimum 10 hard copies in (booklet form kept at each service center also to beprovided to OREDA as and when required.

f) The O&M cost for 5 years should be inbuilt with system cost.

g) Vendors will mandatorily provide CMC for a period of 5 years from the date of commissioning of the systems including insurance coverage for the installed systems against natural calamities and theft. CMC will include inspection by Vendor at least once in a quarter and submission of quarterly inspection report of the installed pumps as per prescribed format. Selected Vendor shall provide a copy of valid insurance certificate of SPWPS to the beneficiary and same shall be renewed every year.

h) Vendors have to provide the Remote Monitoring System (RMS) with all the SPWPS installed under the scheme. Further, vendor has to maintain the RMS in working condition for the period of 5years and RMS systems shall push the accurate data of the parameters as specified in the specification and guidelines attached as annexure –A, failing which the installation of the system will not be accepted by OREDA. The ***RMS system should be synchronized with SEDM portal and National Portal within 30 days of Commissioning of Pump.***

i) Vendor shall ensure that the local training, awareness and sensitization campaigns on usage of the SPWPS are conducted.

5. Selection of Beneficiary

The implementation of Scheme is demand based. However, the following shall be ensured before inclusion of a beneficiary under the Scheme:

a) Beneficiary should not have an electricity connection at the farm.

b) Installation of the new pumps not allowed in the notified areas issued by the Central Ground Water Board.

c) Priority to be given to small and marginal farmers.

Pump Capacity (HP)	Pump Type	Pump Position	Controller Type
1	AC	Submersible	Normal (Without USPC)
	AC	Surface	Normal (Without USPC)
	DC	Submersible	Normal (Without USPC)
	DC	Surface	Normal (Without USPC)
2	AC	Submersible	Normal (Without USPC)
	AC	Surface	Normal (Without USPC)
	DC	Submersible	Normal (Without USPC)
	DC	Surface	Normal (Without USPC)
3	AC	Submersible	Normal (Without USPC)
	AC	Surface	Normal (Without USPC)
	DC	Submersible	Normal (Without USPC)
	DC	Surface	Normal (Without USPC)
5	AC	Submersible	Normal (Without USPC)
	AC	Surface	Normal (Without USPC)
	DC	Submersible	Normal (Without USPC)
	DC	Surface	Normal (Without USPC)
7.5	AC	Submersible	Normal (Without USPC)
	AC	Surface	Normal (Without USPC)
	DC	Submersible	Normal (Without USPC)
	DC	Surface	Normal (Without USPC)

d) Preference be given to the farmers using Micro irrigation systems or covered under Micro irrigation schemes or who opt for micro irrigation system.

e) The beneficiary should not have availed any other subsidized scheme under Odisha govt. for similar purpose.

6. Total capacity and types of Pumps allowed

The indicative cumulative quantities envisaged under this tender for Standalone Solar Pumps under PM-KUSUM is around 10,000 SPWPS. The following types of pump manufacturers are planned for empanelment under the RfS:

7. Maximum Eligibility for Contracted Capacity Allocation for a Bidder

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

a) A Bidder, including its Parent, Affiliate or Ultimate Parent or any Group Company shall submit a single bid.

b) If there are no vendors available in any corresponding package, who have agreed to match the L1 prize and circumstances necessitates additional award of work, additional allocation may be done by OREDA as per MNRE approvals.

c) The evaluation of bids shall be carried out as described in Section-5 of the RfS. The methodology for Allocation of SPWPS is elaborated in Section-5 of the RfS.

8. SPWPS Locations

This scheme proposes to install Solar Photovoltaic Water Pumping Stations across the State of Odisha without confining to any particular district. as per attached annexure-C to the RfS.

9. Performance Monitoring

Selected Vendor must ensure working of minimum of 95 % of total installed SPWPS at any point of time. Remote monitoring system (RMS) shall be installed integrated with the SPWPS controllers rather than having as a separate unit through an integral arrangement and it should be capable of providing accurate live status/parameters on Odisha State portal maintained by OREDA and on central portal maintained by MNRE. Detailed requirements of Remote Monitoring System along with minimum performance requirements are brought out as per Annexure-A .

10. Commissioning of Projects

Selected vendors must submit consent of beneficiaries in their favours and feasibility of site to OREDA for which OREDA will give Notice to Proceed (NTP) and for this selected vendor shall complete the installation and commissioning of allocated SPWPS within 90 days from issuance of Notice to Proceed (NTP).

Commissioning of the SPWPS shall be carried out by the vendor in line with the detailed procedure as per clause 2 of section 2 of this RfS. OREDA through its Assistant Director (Technical) of respective districts will witness and validate the installation/commissioning on site(s). Commissioning certificates shall be issued by OREDA after successful commissioning of allotted SPWPS for any particular district. MNRE authorized representative may also be allowed for the inspection/ commissioning if required.

SECTION 3. STANDARD CONDITIONS OF CONTRACT

1. Obtaining RfS Documents

Interested bidders must download the official copy of RfS & other documents after login into the **www.tenderwizard.com/OREDA** portal by using the Login ID & Password provided by KEONICS during registration (Refer Annexure – B of the RfS). The bidder shall be eligible to submit/upload the bid document only after logging into the **www.tenderwizard.com/OREDA** portal and downloading the official copy of RfS.

2. Bid Processing Fees

Prospective Bidders interested to participate in the bidding process are required to submit their bid proposals in response to this RfS document along with a non-refundable processing fee as mentioned in the Bid Information Sheet. A Bidder will be eligible to participate in the bidding process only on submission of entire financial amounts as per the Bid Information Sheet. In case the Bidder chooses to submit the Bid Processing Fees through NEFT/RTGS (electronic transfer), the Bidder shall submit the transaction receipt instead of the corresponding DDs, as part of the offline bid submission.

The bank details of OREDA is: account holder "Orissa Renewable Energy Development Agency" in the bank and branch "Axis Bank Ltd., Mancheswar Branch, Bhubaneswar" having the account no. 918010103435005 IFSC code UTIB0001973.

In case a Bidder chooses to deduct TDS while making the payments against Bid Processing Fee, such TDS details shall be submitted by the Bidder along with the transaction details, as part of online bid submission.

Bids submitted without Bid Processing Fee and/or Bank Guarantee against Earnest Money Deposit (EMD) (as applicable) (including partial submission of any one of the respective amounts), may be liable for rejection by OREDA.

All MSMEs (Micro, Small and Medium Enterprises) notified as per clause 1.10.3 of GFR 2017 and as registered under NSIC/DIC/Udyog Aadhaar only are exempted from submission of Bid Processing Fee and EMD. For claiming this exemption, at the time of bid submission, MSMEs must provide valid proof of their being registered as MSME. However, upon empanelment under this RfS, selected MSMEs must submit Performance Bank Guarantee as per clause 12 of section III of RfS.

3. Scope of Work and Other Conditions of the Contract

Refer Clause 3 of the RfS.

4. Bank Guarantee/ Payment on Order Instrument (POI) against Earnest Money Deposit (EMD)

a) Bidder shall submit Earnest Money Deposit (EMD) in the form of Bank Guarantee for an amount of Rs **Thirty Lakh** /- according to Format 7.3A/ Format 7.3B and valid for 24 months from the last date of bid submission, shall be submitted by the Bidder along with their bid, failing which the bid shall be summarily rejected. The

Bank Guarantees towards EMD must be issued in the name of the Bidding Company/ Lead Member of Bidding Consortium. In the event of encashment of EMD, the encashed amount shall include all applicable taxes.

b) The Bidder shall furnish the Bank Guarantees towards EMD from any of the Scheduled Commercial Banks as listed on the website of Reserve Bank of India (RBI) and amended as on the date of issuance of bank guarantee. Bank Guarantee issued by foreign branch of a Scheduled Commercial Bank is to be endorsed by the Indian branch of the same bank or State Bank of India (SBI).

c) The EMD shall be valid as per the timelines stipulated above. However, shortfall in the EMD validity, if any, up to a period of seven (7) days shall be acceptable. Further, an additional shortfall only in the following cases shall be acceptable: If the Bidder has submitted the EMD with validity as per original bid submission date or as per any revised submission date and if the deadline for submission of bids has been extended further, the Bid Guarantee shall be acceptable provided, the EMD is valid for more than two months from the actual date of bid submission and the Bidder submits the EMD extension for the requisite period within seven days from the date of actual bid submission, if required.

d) OREDA has agreed to accept the EMD in the form of an unconditional and irrevocable Bank Guarantee instead of the cash deposit with the clear position intimated to the bidder that the EMD Bank Guarantee shall be encashable for being appropriated by OREDA in terms of the guarantee as in the case of appropriation of the cash deposit lying with OREDA.

e) The EMD amount/ BG submitted against EMD will be returned to the venders, who are not selected under the tender within one month of publishing of Empanelment list.

f) The EMD amount/ BG submitted against EMD will be returned to the venders, who are selected under the tender within one month of submission of PBG amounting more than EMD amount.

g) EMD will be submitted in favour of : **Chief Executive Officer, OREDA Limited**

Account No- 924020075365443

IFSC- UTIB0000024

Axis Bank Ltd, Satyanagar, Bhubaneswar

5. Forfeiture of EMD

The BG towards EMD shall be encashed by OREDA in the following cases:

a) If the Bidder withdraws or varies the bid after due date and time of bid submission and during the validity of bid.

b) In case, OREDA issues LoA to the Selected Vendor and if the Selected Vendor does not submit the Performance Bank Guarantee within the stipulated time period (i.e. 15 days from issuance of LoA);

c) If after empanelment of vendors or after issuance of LoA by OREDA, it is found that the documents furnished by the Bidder as part of response to RfS are misleading or misrepresented in any way.

6. Performance Bank Guarantee (PBG)

Bidders selected by OREDA under Category-A based on this RfS shall submit to OREDA, a Performance Guarantee for a value @ 5% of the amount equivalent to the total allocation including taxes .Category -B bidders shall submit a Performance Bank guarantee for a value @ 1.25% of the amount equivalent to the total allocation including taxes It may be noted that Successful Bidders shall submit the Performance Guarantee according to the Format 7.3 C with a validity period up to (& including) the date as on 60 months from placement of award by OREDA. In case the PBG is not for 60 months, Validity of PBG shall be extended by the vendor for every year

for next three years. Further, OREDA reserves the right to encash the existing PBG, in case the vendors doesn't renew/extend the existing PBG at-least 30 days in advance.

PBG(s) shall be submitted by selected vendors to OREDA within 15 days from issuance of letter of award/empanelment.

PBG(s) shall be submitted by selected vendors to OREDA within 15 days from issuance of letter of award/empanelment.

The PBGs will be issued in favor of Chief Executive Officer, OREDA Limited.

The Successful Bidder/Selected Vendor shall furnish the PBG from any of the Scheduled Commercial Banks as listed on the website of Reserve Bank of India (RBI) and amended as on the date of issuance of bank guarantee. Bank Guarantee issued by foreign branch of a Scheduled Commercial Bank is to be endorsed by the Indian branch of the same bank or State Bank of India (SBI).

The Bank Guarantees must be executed on non-judicial stamp paper of appropriate value as per Stamp Act relevant to the place of execution.

All expenditure towards execution of Bank Guarantees such as stamp duty etc. shall be borne by the Bidders.

In case of Bank Guarantees issued by foreign branch of a Scheduled Commercial Bank, the same is to be endorsed by the Indian branch of the same bank or SBI.

h) PBG will bw in favor of : **Chief Executive Officer, OREDA Limited**

Account No- 924020075365443

IFSC- UTIB0000024

Axis Bank Ltd, Satyanagar, Bhubaneswar

7. Notice to Proceed/ Completion Time

Selected vendors should ensure the completion of work as per Letter of Award (LoA)/ Notice To Proceed (NTP), tender terms and conditions, specifications, and guidelines of the scheme.

In order to achieve the target, suitable numbers of team must be deployed on the field by the selected vendor.

Note withstanding the transfer of ownership of the plant and equipment the responsibility of care and custody thereof together with the risk of loss or damage there too shall remain with the Vendor hereof until completion of facilities or the part thereof in which such plant and equipment are incorporated.

8. Payment Terms

Stage-1: State share (70%-80%) for total nos. of SPWPS installed at site based on:

a) Submission of detailed work plan (Project Execution Plan) with timeline for the lot supplied duly approved by OREDA's representative.

b) Submission of evidence in hard copy regarding completion of installation of SPWPS in good condition at site duly verified and acknowledged by Engineer-In Charge/SIA and Beneficiary.

c) All the relevant warranty and quality (Performance Test Reports) of the lot to be submitted.

d) Signing of contract agreement between OREDA and Vendor.

e) Submission of Original Supply Tax invoices/bills duly verified by OREDA.

f) Submission of software generated installation reports as per prescribed format by OREDA which shall include following but not limited to consumer details, site survey details, asset inspection and mapping details, Remote monitoring system parameters etc.

g) Proof of distribution of O&M Manual to beneficiary printed in both English and Odia.

h) Submission of handing over certificates of SPWPS in the format as suggested by MNRE.

i) Performance report for one week after commissioning based on the accurate data of the parameters received from RMS or data logger in case of internet unavailability.

j) An Undertaking with respect to withstand ability of SPWPS to the wind speed of 150 km/hr in all weather conditions.

Stage-II: MNRE, GoI share (20%-30%) after Synchronization:

a) Payment shall be made to vendor within 30 days of receipt of MNRE share. This will be subjected to submission of following documents.

b) RMS integration and Synchronization of all pumps on SEDM portal and National portal.

c) Submission of 90 days generation data on SEDM portal by monitoring RMS integration.

Stage-III: CMC amount (5%):

CMC amount consisting 5% of discovered price will be held up for 5 years. At the end of each year vendors can claim CMC amount@1% subjected to submission of quarterly maintenance report in prescribed format.

9. Minimum Paid Up Share Capital to be Held by Project Promoter

The Bidder shall provide complete information in their bid in reference to this RfS about its promoters and upon issuance of LoA, the Successful Bidder/Selected Vendor shall indicate its shareholding in the company indicating the controlling.

10. Instructions to Bidders for Structuring of Bid Proposals in Response to RfS

The bidder including its Parent, Affiliate or Ultimate Parent or any Group Company shall submit single response to RfS. Detailed Instructions to be followed by the bidders for online submission of response to RfS are stated at Annexure – B. Submission of bid proposals by Bidders in response to RfS shall be in the manner described below:

a) Covering Letter as per Format 7.1.

b) In case of a Bidding Consortium, a Power of Attorney in favour of the Lead Member issued by the other Members of the Consortium shall be provided in original as per format attached hereto as Format 7.2A/7.2B.

c) Bank Guarantee/ Payment on Order Instrument (POI) against Earnest Money Deposit (EMD) as per Format 7.3 A/7.3 B.

d) Board Resolutions, as per prescribed formats enclosed as per Format 7.4 duly certified by the Company Secretary or the Director of the relevant Bidder, as applicable to the Bidder and mentioned hereunder:

i. Board Resolution from the Bidding Company or the Lead Member of the Consortium, as the case may be, in favour of the person signing the response to RfS and in the event of selection of the Projects. Board Resolution from each of the Consortium Members in favour of the person signing Consortium Agreement.
ii. Board Resolution from the Bidding Company committing 100% (One Hundred Percent) of the equity requirement for the Project/ Board Resolutions from each of the Consortium Members together in aggregate committing to 100% (One Hundred Percent) of equity requirement for the Project (in case of Bidding Consortium); and
iii. Board Resolutions from each of the Consortium Members and Lead member contributing such additional amount over and above the percentage limit (specified for the Lead Member and other member in the Consortium Agreement) to the extent becoming necessary towards the total equity share in the Project Company, obligatory on the part of the Consortium pursuant to the terms and conditions in the Consortium Agreement.

e) In case of a Consortium, the Consortium Agreement between the Members in the Consortium as per Format 7.5 along with Board resolution from each Member of the Consortium for participating in Consortium.

f) Format for Financial Requirements as per Format 7.6 along with the certificate from practicing Chartered Accountant/ Statutory Auditors showing details of computation of the financial credentials of the Bidder.

g) Undertaking regarding no willful default and no major litigation pending as per Format 7.7.

h) A disclosure statement as per Format 7.8/ 7.8A regarding participation of any related companies in the bidding process.

i) Covering letter for the financial bid as per Format 7.10.

j) Declaration regarding banning, liquidation, court receivership etc. as per Format 7.11.

k) Declaration for the local content as per Format 7.12.

l) Declaration for using same make of equipments as per the test certificate as per Format 7.13.

m) Declaration for submitting the test certificate as per MNRE technical specifications for solar water pump sets issued in 2023 as per Format 7.14.

n) Certificate regarding compliance of MeitY notification vide file no. 1(10)/2017-CLES dt. 02.07.18 as per Format 7.15.

o) Attachments

i. Memorandum of Association, Article of Association of the Bidder needs to be attached along with the bid. The bidder should also highlight the relevant provision which highlights the objects relating to Power/ Energy/ Renewable Energy/ Solar Water Pumping Station/Solar Power plant development/Manufacturer of pump- sets, solar panels and controllers.
   - In case, there is no mention of the above provisions in the MoA/ AoA of the Bidder, the same has to be amended and submitted, if the bidder is selected as Selected Vendor.

ii. Certificate of Incorporation of Bidding Company/ all member companies of Bidding Consortium.
iii. A certificate of shareholding of the bidding company, its Parent and Ultimate Parent (if any) duly certified by a practicing Chartered Accountant/Company Secretary as on a date within 30 days prior to the last date of bid submission. OREDA reserves the right to seek additional information relating to shareholding in promoter companies, their parents/ ultimate parents and other group companies to satisfy themselves that RfS conditions have been complied with and the bidder will ensure submission of the same within the required time-lines.

iv. Certified copies of annual audited accounts for the last three financial year, i.e., FY 2022-23/2021-22/2020-21, and provisional audited accounts, along with certified copies of Balance Sheet, Profit & Loss Account, Schedules and Cash Flow Statement supported with bank statements as on the date at least 7 days prior to the due date of bid submission (if applicable), shall be required to be submitted.

v. Details of all types of securities/instruments which are pending conversion into equity whether optionally or mandatorily.

11. Important Notes and Instructions to Bidders

a) 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.

b) The Bidders shall be shortlisted based on the declarations made by them in relevant schedules of RfS.

c) If the Bidder/Member in a Bidding Consortium 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, OREDA reserves the right to reject such response to RfS and/or cancel the Letter of Award, if issued, and the Bank Guarantee/POI 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.

d) Response submitted by the Bidder shall become the property of the OREDA and OREDA shall have no obligation to return the same to the Bidder.

e) All documents of the response to RfS (including RfS and subsequent Amendments/ Clarifications/Addenda) submitted online must be digitally signed by the person authorized by the Board as per Format 7.4.

f) The response to RfS shall be submitted as mentioned in Clause 16 of the RfS. No change or supplemental information to a response to RfS will be accepted after the scheduled date and time of submission of response to RfS. However, OREDA Limited reserves the right to seek additional information from the Bidders, if found necessary, during the course of evaluation of the response to RfS.

g) The Bidder shall make sure that the correct, valid and operative Pass-Phrase to decrypt the relevant Bid-part is submitted into the 'Time Locked Electronic Key Box (EKB)' after the deadline of Bid submission, and before the commencement of the Online Tender Opening Event (TOE) of technical bid.

h) All the information should be submitted in English language only. In case of bidders or their foreign affiliate having documents in other than English language, then the documents shall be translated in English language by certified translator and submitted.

i) Bidders shall mention the name of the contact person and complete address and contact details including email address which shall be active for the period of 07 years in their covering letter.

j) Response to RfS that are incomplete, which do not substantially meet the requirements prescribed in this RfS, will be liable for rejection by OREDA.

k) Response to RfS not submitted in the specified formats will be liable for rejection by OREDA.

l) Bidders delaying in submission of additional information or clarifications sought will be liable for rejection.

m) Non-submission and/ or submission of incomplete data/ information required under the provisions of RfS shall not be construed as waiver on the part of OREDA of the obligation of the Bidder to furnish the said data/information unless the waiver is in writing.

n) Only Courts of Odisha shall have exclusive jurisdiction in all matters pertaining to this RfS.

o) All the financial transactions to be made with OREDA including delay charges, and any additional charges (if required), shall attract 18% GST on each transaction, irrespective of the same being mentioned in the RfS.

12. Non-Responsive Bid

The response to RfS submitted by the bidder along with the documents submitted online to OREDA shall be scrutinized to establish "Responsiveness of the bid". Each bidder's response to RfS shall be checked for compliance with the submission requirements set forth in this RfS.

Any of the following conditions shall cause the Bid to be "non-responsive":

i. Non-submission of the requisite Bid Processing Fee as mentioned in the Bid Information Sheet.
ii. Response to RfS not received by the due date and time of bid submission.
iii. Non-submission of correct, valid and operative Pass-Phrases for both Technical and Financial Bid (Price Bid) Parts after the deadline of Bid Submission, and before the commencement of the Online Tender Opening Event (TOE) of Techno-Commercial Bid.
iv. Any indication of price in any part of response to the RfS, other than in the financial bid.
v. Data filled in the Electronic Form of Financial Bid (Second Envelope), not in line with the instructions mentioned in the same electronic form.
vi. In case it is found that the Bidding Company including Ultimate Parent Company/ Parent Company/Affiliate/Group Companies have submitted more than one response to this RfS, then all these bids submitted shall be treated as non-responsive and rejected.

In any of the above cases, the bid shall not be considered for bid opening and evaluation process.

13. Method of Submission of Response to RfS by the Bidder

Documents to be Submitted Offline (in Original)

The bidder has to submit original of following documents **offline.**

The Bidder shall submit the Bid either under Category A or Category B as per the terms of the Bidding Document.

Category A

i. DD/Pay order or NEFT/RTGS details towards Bid Processing Fee as mentioned in Bid Information Sheet.

ii. Bank Guarantee towards EMD as mentioned in the Bid Information Sheet (as per Format 7.3A). One EMD shall be submitted for the cumulative capacity quoted by the Bidder.

iii. Power of Attorney as per Format 7.2 A/7.2 B along with Board

Resolution as per Format 7.4.

Category B

i MSME certificate/ Udyog Certificate

ii. Power of Attorney as per Format 7.2 A/7.2 B along with Board

Resolution as per Format 7.4.

No documents will be accepted in person, on or before the date of bid submission. Bank Guarantee against EMD needs to be submitted in both online and offline modes. The bidders will be required to submit the bank guarantee against EMD and DDs/Pay Orders (if applicable) against the bid processing fee, either in person or through post, at the office of OREDA until the date as on 2 working days after the closing date of bid submission. The 2-day duration will be counted from the date of bid submission.

For e.g., if the bid submission deadline is 18:00 hrs. on 22.09.2023, the above deadline will expire at 18:00 hrs. on 24.09.2023. In case the above deadline being a holiday, the next working day in OREDA will be the deadline for submission of Bank Guarantees.

Note: In all cases, the Bank Guarantee against EMD along with DDs/Pay Orders (if applicable), shall be issued on or before the bid submission deadline. These instruments issued after the expiry of the deadline will be summarily rejected.

The bidding envelope shall contain the following sticker:

RFS Document for Selection of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 1-7.5 HP capacities in the State of Odisha including complete system warranty and its repair and maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE, GoI.	
Cumulative Capacity of the projects applied for	_____Nos
No. of Projects Bid for	10,000 Nos
RfS Reference No.	OREDA/TECH/-----/ 2024-25dated ------
Submitted by	(Enter Full name and address of the Bidder)
Organization ID (OID) on ETS Portal	(Enter the OID through which the Bid has been submitted online on ETS portal)
Authorized Signatory	(Signature of the Authorized Signatory) (Name of the Authorized Signatory) (Stamp of the Bidder)
Bid Submitted to	**Chief Executive Officer** **OREDA Limited** **S3/59, Mancheswar Industrial Estate, Bhubaneswar, Odisha – 751 017** **Tel No. 0674 – 2588 260** **Email – ceoreda@oredaorissa.com**

Documents to be Submitted Online

Detailed instructions to be followed by the Bidders for online submission of response to RfS as stated as Annexure-B of the RfS. The bidders shall strictly follow the instructions mentioned in the electronic form in respective technical bid and financial bid while filling the forms.

If the Bidder has submitted bid online and fails to submit the DDs/Pay order against bid processing fee offline within 2 working days from last date of bid submission, then the same shall be treated as incomplete bid and Bid Processing fee submitted shall be encashed.

All documents of the response to RfS submitted online must be digitally signed and uploaded on the website, *https://www.tenderwizard.in* which should contain the following:

a) Technical Bid (First Envelope)

The Bidder shall upload single technical bid containing scanned copies of the following documents duly signed and stamped on each page by the authorized signatory as mentioned below.

i. Formats - 7.1, 7.2/7.2A (if applicable), 7.3 A/7.3 B, 7.4, 7.5 (if applicable), 7.6, 7.7, 7.8/7.8A, 7.10,7.11, 7.12, 7.13, 7.14, 7.15 as elaborated in section-7 of the RfS.
ii. All attachments elaborated in section-7 of the RfS,: Attachments, with proper file names.
iii. All supporting documents regarding meeting the eligibility criteria.
iv. Scanned Copies of NEFT/RTGS details towards Bid Processing Fee as mentioned in Bid Information Sheet.

The Bidder will have to fill the Electronic Form provided at the www.tenderwizard.com/OREDA portal as part of the Technical Bid.

b) <u>Financial Bid (Second Envelope) applicable for Category-A bidders only.</u>

a) Bidders shall submit the single Financial Bid containing the scanned copy of following document(s):

i. Covering letter as per **Format 7.1** of the RfS

ii. Duly signed and stamped strictly as per price bid **Format 7.16** of the RfS.

b) Bidding Parameter:

i. <u>A single fixed price per line item as a bidding parameter:</u> Under this RfS, the bidding parameter shall be the Price quoted by the Bidder i.e., a fixed price per line item (exclusive of GST) in INR.

ii. The above fixed price shall include all costs related to the Scope of Work as per the RfS and Obligations of the Successful Bidder/Selected Vendor. The Bidder shall quote for the entire facilities on a "single responsibility" basis such that the fixed price covers all the obligations in respect of Design, Supply, Erection, Testing and Commissioning including Warranty, Operation & Maintenance (05 years), inclusive of all taxes.

iii. The price shall remain firm and fixed and shall be binding on the Selected Vendor irrespective of actual cost of execution of the Project. No escalation on the price will be granted for any reason whatsoever. The Selected Vendor shall not be entitled to claim any additional charges, even though it may be necessary to extend the completion period for any reasons whatsoever.

iv. The fixed price for each line item shall be exclusive of all duties and taxes, insurance etc. The prices quoted by the firm shall be complete in all respect.

v. Only a single price bid for each line item (i.e., type of pump) for the cumulative Project capacity quoted by the bidders, shall have to be filledonline in the Electronic Form provided at the ***www.tenderwizard.com/OREDA*** portal. The instructions mentioned in the Financial Bid Electronic Form have to be strictly followed without any deviation, else the bid shall be considered as non-responsive.

vi. <u>Important Note:</u>

(a) The Bidding envelope shall be properly sealed with the signature of the Authorized Signatory running across the sealing of the envelope.

(b) In case the Bidder submits the online documents on **www.tenderwizard.com/OREDA** portal within the bid submission deadline and fails to submit the pass phrases in the portal within 2 working days after bid submission deadline, the online bid of the Bidder shall not be opened and shall be 'archived' on the **www.tenderwizard.com/OREDA** portal. Similarly, bids submitted offline but without any online submission on **www.tenderwizard.com/OREDA** portal shall not be opened.

For e.g., if the bid submission deadline is 18:00 hrs. on 05.10.2023, the above deadline will expire at 18:00 hrs. on 07.10.2023. In case of the above deadline being a holiday, the next working day in OREDA will be the deadline for online submission of Pass-phrases in the **www.tenderwizard.com/OREDA** portal.

14. Validity of the Response to RfS

The Bidder shall submit the response to RfS which shall remain valid up to the date as on 24 months from the last date of bid submission ("Bid Validity"). OREDA reserves the right to reject any response to RfS which does not meet the aforementioned validity requirement.

15. Bid Preparation Cost

The Bidder shall be responsible for all the costs associated with the preparation of the response to RfS and participation in discussions and attending pre-bid meeting(s) etc. OREDA shall not be responsible in any way for such costs, regardless of the conduct or outcome of the bid process.

16. Clarifications/ Pre-Bid Meeting/ Enquiries/ Amendments

Clarifications/ Doubts, if any, on RfS document may be emailed and/ or through ISN- ETS portal. The format for submission of clarifications is available on the portal.

OREDA 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 OREDA's response will be uploaded in the **www.tenderwizard.com/OREDA** portal. If necessary, amendments, clarifications, elaborations shall be issued by OREDA which will be notified on OREDA/ **www.tenderwizard.com/OREDA** web site. No separate reply/ intimation will be given for the above, elsewhere.

A Pre-Bid Meeting shall be held as mentioned in the Bid Information Sheet.

Enquiries/ Clarifications up to award of contract may be sought by the Bidder from following point of contacts in OREDA.

Name of the Authorized Person	**Contact Details:**

Mr. Soumyaranjan Aich Director(Technical)	Phone (Off): 9438564707 Email: sraichoreda@gmail.com
Smt. Asima Arunima Asst. Director (Tech)	Phone (Off): 70089 44462 Email: asima.oreda@gmail.com
Mr. Bramhanand Tarai Asst. Director (Tech)	Phone (Off): 9111868247 Email: btarai.oreda@gmail.com

17. Right of OREDA to Reject a Bid

OREDA 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. In the event of the tender being cancelled at any stage, the processing fee (excluding GST, if amount credited) without any interests, and EMD submitted by the Bidders shall be returned to the respective Bidders (if applicable).

18. Post Award Compliances

Timely completion of all the milestones will be the sole responsibility of Vendor. OREDA shall not be liable for issuing any intimations/reminders to Vendor for timely completion of milestones and/or submission of compliance documents.

Any checklist shared with Vendor by Client Organization for compliance of above- mentioned milestones to be considered for the purpose of facilitation only. Any additional documents required as per the conditions of RfS must be timely submitted by the Vendor.

19. Adjudicator

Adjudicator under the contract shall be appointed by the Appointing Authority of OREDA. If the bidder does not accept the Adjudicator proposed by OREDA, it should so state in its bid form and make a counter proposal of an adjudicator. If on the day the contract agreement is signed, OREDA and contractor have not agreed on the appointment of adjudicator, the adjudicator shall be appointed, at the request of either party, by the MNRE.

20. Arbitration

Arbitration shall be carried out as per Arbitration Act 1996 and its subsequent amendment. The Contract shall be governed by and interpreted in accordance with the laws in force in India. The Courts of Odisha shall have exclusive jurisdiction in all matters arising under the contract.

21. Force Majeure

Definition

"Force Majeure Event" means any act or event that prevents the affected Party from performing its obligation in accordance with the Agreement, if such act or event is beyond the reasonable control of the affected Party and such Party had been unable to overcome such act or event with the exercise of due diligence (including the expenditure of reasonable sums). Subject to the foregoing conditions, "Force Majeure Event" shall include without limitation the following acts or events: (i) natural phenomena, such as storms, hurricanes, floods, lightning, volcanic eruptions and earthquakes; (ii) explosions or fires arising from lighting or other causes unrelated to the acts or omissions of the Party seeking to be excused from performance; (iii) acts of war or public disorders, civil disturbances, riots, insurrection, sabotage, epidemic, terrorist acts, or rebellion. A Force Majeure Event shall not be based on the

economic hardship of either Party. In case of any damage because of force majeure event, the System shall be repaired/commissioned in line with the penal provisions of Scheme guideline/RfS.

Excused Performance

Except as otherwise specifically provided in the Agreement, neither Party shall be considered in breach of the Agreement or liable for any delay or failure to comply with the Agreement (other than the failure to pay the amounts due hereunder), if and to the extent that such delay or failure is attributable to the occurrence of a Force Majeure Event; provided that the Party claiming relief under this Clause 27 shall immediately (i) notify the other Party in writing of the existence of the Force Majeure Event, (ii) exercise all reasonable efforts necessary to minimize delay caused by such Force Majeure Event, (iii) notify the other Party in writing of the cessation or termination of said Force Majeure Event and (iv) resume performance of its obligations hereunder as soon as practicable thereafter; provided, however, that OREDA shall not be excused from making any payments and paying any unpaid amounts due in respect of Vendor to OREDA prior to the Force Majeure Event performance interruption.

Termination as a Consequence of Force Majeure Event

If a Force Majeure Event shall have occurred that has affected the Vendor's performance of its obligations hereunder and that has continued for a continuous period of one hundred eighty (180) days, then OREDA shall be entitled to terminate the Agreement upon ninety (90) days' prior written notice to the Vendor. If at the end of such ninety (90) day period such Force Majeure Event shall still continue, the Agreement shall automatically terminate. Upon such termination for a Force Majeure Event, neither Party shall have any liability to the other (other than any such liabilities that have accrued prior to such termination).

22. Vendor's Indemnity

The Vendor agrees that it shall indemnify and hold harmless OREDA and its members, officers, employees, casual labourers, persons permitted to run any business or service and to any lawful visitors from and against any and all Losses incurred by OREDA Indemnified Parties to the extent arising from or out of the following any claim for or arising out of any injury to or death of any Person or loss or damage to property of any Person to the extent arising out of the Vendor's negligence or willful misconduct. The Vendor shall not, however, be required to reimburse or indemnify any OREDA Indemnified Party for any Loss to the extent such Loss is due to the negligence or willful misconduct of any OREDA Indemnified Party.

23. Insurance

The Goods supplied under the Contract shall be fully insured in Indian Rupees against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery. For delivery of goods at site, the insurance shall be obtained by the Contractor/selected Vendor, for an amount not less than the Contract Price of the goods from "warehouse to warehouse" (final destinations) on "All Risks" basis including War risks and strikes. The Comprehensive insurance of Solar Photo Voltaic Water Pumping System shall be provided for natural calamities, theft & burglary etc. during 5 years warranty period.

24. Transportation, Demurrage, Wharfage, etc.

Contractor/Selected Vendor is required under the Contract to transport the Goods to place of destination defined as Site. Transport to such place of destination in India including insurance, as shall be specified in the Contract, shall be arranged by the Contractor/Selected Vendor, and the related cost shall be included in the Contract Price.

Subsequent to an order being placed against bidder's quotation, received in response to this 'enquiry', if it is found that the materials supplied are not of the right quality or not in accordance with our specifications (required by us) or received in damaged or broken conditions, not satisfactory owing to any reason of which we shall be the sole

judge, SIA shall be entitled to reject the materials, cancel the contract and buy our requirement from the open market / other sources and recover the loss, if any, from the supplier reserving to ourselves the right to forfeit the security deposit, furnished by the supplier against the contract. The supplier will make his own arrangements to remove the rejected material within a fortnight of instruction to do so. Thereafter material will lie entirely at the supplier's risk and responsibility and storage charges, along with any other charges applicable, will be recoverable from the supplier.

OREDA reserve the right to accept or reject any quotation in full or in part without assigning any reason thereof. We also reserve the right to split and place order on more than one supplier.

25. Liquidated damages

In case of any delay in the execution of the order or delay in maintenance beyond the stipulated time schedule decided including any extension permitted in writing, OREDA reserves the right to recover from the bidder a sum equivalent to 0.5 % of the value of the delayed SPWPS installation or on the unexecuted portion of the work for each week of the delay and part thereof subject to a maximum of 10 % of the total value of the contract.

Alternatively, OREDA reserves the right to purchase of the material and completion of the works including maintenance from elsewhere at the sole risk and cost of the successful bidder/ contractor and recover all such extra cost incurred by OREDA in procuring the material from resources available including encashment of the bank guarantee or any other sources etc. Further, if any extra cost is incurred by OREDA due to delay in work completion by the party beyond the completion time as per PO/LOA, the same shall be recovered from the party's Invoice/BG/PBG etc.

Alternatively, OREDA may cancel the order completely or partly without prejudice to his right under the alternatives mentioned above.

26. Statutory Compliance/ Certification regarding Cyber Security Products

A certificate as per format 7.15 is to be submitted by the bidders that the items offered meet the definition of domestically manufactured/produced Cyber Security Products as per MeitY notification vide File no. 1(10)/2017-CLES dt. 02.07.18. The above certificate shall be on Company's letterhead and signed by Statutory Auditor or Cost Auditor of the Company.

'Cyber Security Products means a product or appliance or software manufactured/ produced for the purpose of protecting, information, equipment, devices computer, computer resource, communication device, and information stored therein from unauthorized access, use, disclosure, disruption, modification or destruction'.

27. Warranty and Maintenance

The complete Solar Photovoltaic Water Pumping System and display board / Name Plate shall be warranted and maintained for 05 years from the date of installation.

The maintenance service provided shall ensure proper functioning of the system as a whole. All preventive/routine maintenance and breakdown/corrective maintenance required for ensuring maximum uptime shall have to be provided by the Contractor.

Successful bidder, on whom letter of award is placed, is to ensure all safety guidelines, rules and regulations, labour laws etc. Successful bidder indemnifies OREDA for any accident, injury met by its labour, employee or any other person working for him. Any compensation sought by its labour, employee or any other person working for him shall be paid by successful bidder as per settlement solely.

Local representative of bidder should meet governing authorities of each block and should submit the minutes of meeting to OREDA on quarterly basis.

28. Declaration of Local Content

Bidder shall submit a certificate stating the percentage of local content as per the format

7.12 of RfS Document. The certificate shall be from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content. It is mandatory to mention UDIN No in the certificate.

NOTE: False declarations will be in breach of the code of integrity under Rule 175(1)(i)(h) of the General Financial rules for which a bidder or its successors can be debarred for up to 2 years as per Rule 151(iii) of the General Financial rules along with such other actions as may be permissible under law. Only those bidders who comply with the minimum local content requirement as mentioned above shall be eligible to bid.

29. Price basis

Price basis of the price quoted shall be on F.O.R (Freight on Road) destination basis for site. Price mentioned in the quotation must be firm. Hence prices in Letter of Award shall be firm and not subject to escalation till the execution of the complete order and its subsequent amendments accepted by the bidder even though the completion / execution of the order may take longer time than the delivery period specified and accepted in the Letter of Award.

30. Roles and Responsibilities of OREDA as an Implementation Agency

OREDA will be responsible for the following activities:

i. Selection of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of 1-7.5 HP capacities in the State of Odisha including complete system warranty and its repair and maintenance for 5 Years under Component-B of PM- KUSUM scheme of MNRE, GoI.
ii. Demand aggregation for solar Agriculture pumps through beneficiary's department, Govt of Odisha.
iii. Prepare proposal and submit to MNRE for sanction
iv. Oversee installation of systems.
v. Inspection of installed systems and online submission of completion reports to MNRE along with availability of the accurate data of the parameters of the SPWPS on the central portal of the MNRE.
vi. Submission of utilization certificates and audited statement of expenditure through EAT module and disbursement of MNRE CFA.
vii. Online submission of monthly and quarterly progress reports.
viii. Ensure project completion within the given timelines and compliance of MNRE Guidelines and Standards.
ix. Online and offline maintenance for records.
x. Real time monitoring through dedicated web-portal which is to be maintained by OREDA.
xi. Performance monitoring of installed system through third party
xii. Ensure compliance of CMC and training of locals by the vendors.
xiii. Carrying out publicity of the scheme so as to increase awareness, for which purpose advice of MNRE may also be adopted apart from its own publicity.
xiv. Any other activity to ensure successful implementation of the programme.

SECTION 4. QUALIFICATION REQUIRMENTS FOR BIDDERS

Short listing of Bidders will be based on the following Criteria:

1. ***General Eligibility Criteria***

Bidders participating in the RfS will be required to meet the following eligibility criteria (as applicable).

The empanelment of bidder will include two (2) categories of the Bidders .

Category A:

Any Bidder registered pan India who meets the Qualification Requirement as per Section 4 (QR) can participate under Category A.

Category B:

The Bidders who are local MSME and registered under the MSME Development Act, 2006 in Odisha as per Section D, Division 35, Group 351 having NIC 5-digit code of 35105 (Electric power generation using solar energy) and meets "Specific Qualification Requirement" as per clause-4 of section-4, but does not meet the "Technical

Qualification Requirement" as per Clause-2 of section-4 and "Financial Qualification Requirement" as per clause-3 of section-4. In case any such Bidder has participated under Category A, then such a Bidder cannot participate under Category B.

In case of Consortium or Joint Venture the Lead member should be MSME for availing exemption.

Note: A Bidder can either participate under Category A or under Category B. Further, Category A and Category B bidder shall not be related by any way which may result into conflict of interest. In case a Bidder participates for both Category A and Category B or Category A and Category B bidders are related entities as per our definition of affiliate, then such Bids shall be summarily rejected owing to conflict of interest and either or both bidders may be blacklisted in the future from further participating in any bid with OREDA.

The empanelment order may include empaneled Bidders from Category A and Category B bidders.

Note: OREDA reserves all the right to empanel bidders under the Category A and Category B.

The Bidder shall be a Proprietorship, Company or a Limited Liability Partnership as defined.

Bidding Consortium with one of the Companies as the Lead Member. Consortium shortlisted and selected based on this RfS has to necessarily form a Project Company and get it registered under the Companies Act, 2013, keeping the original shareholding of the Bidding Consortium unchanged. In case applications for multiple Projects have been made by a Consortium, separate Project Companies can be formed for each Project. For the avoidance of doubt, it is hereby clarified that the shareholding pattern of the Project Company shall be the identical to the shareholding pattern of the Consortium as indicated in the Consortium Agreement (Format 7.5).

A foreign company cannot participate on a standalone basis or as a member of consortium under this RfS.

In line with the O.M. issued by the Department of Expenditure, Ministry of Finance, vide No. 6/18/2019-PPD dated 23.07.2020 and subsequent amendments and clarifications thereto, the Bidder shall meet the following criteria for its bid to be considered for evaluation under the RfS:

a) Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority (as defined in the OM as referred above).

b) "Bidder" in this reference, means any person or firm or company, including any member of a consortium, 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 this tender.

c) "Bidder from a country which shares a land border with India" for the purpose of this clause, means:

   i. An entity incorporated, established or registered in such a country; or

   ii. A subsidiary of an entity incorporated, established or registered in such a country; or

   iii. An entity substantially controlled through entities incorporated, established or registered in such a country; or

   iv. An entity whose beneficial owner is situated in such a country; or

   v. An Indian (or other) agent of such an entity; or

   vi. A natural person who is a citizen of such a country; or

vii. A consortium where any member of the consortium falls under any of the above.

d) In support of the above, the Bidder shall be required to submit necessary Undertaking, as per Format 7.8/7.8A of the RfS.

e) Other provisions of the referred OM dated 23.07.2020, except Sl. 11 of the OM, will also be applicable for this tender. Any interpretation of the above clauses will be made in line with the referred OM, including subsequent amendments and clarifications thereto.

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

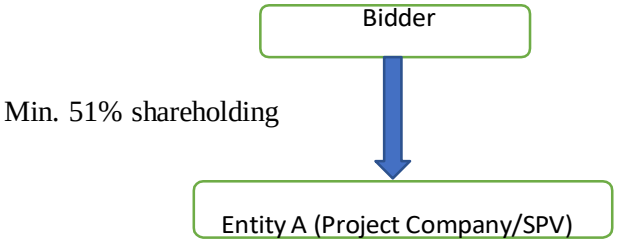
A Bidder which has been selected as Selected Vendor based on this RfS can also execute the Project through a Special Purpose Vehicle (SPV) i.e., a Project Company especially incorporated/acquired as a subsidiary Company of the Selected Vendor for setting up of the Project, with at least 51% shareholding in the SPV which has to be registered under the Indian Companies Act, 2013. Multiple SPVs may also be utilized for executing more than one Project.

Any consortium, if selected as Selected Vendor for the purpose of supply of power to OREDA, shall incorporate a Project company with equity participation by the Members in line with consortium agreement (to be submitted along with the response to RfS) i.e., the Project Company incorporated shall have the same shareholding pattern as that indicated in the Consortium Agreement given at the time of submission of response to RfS.

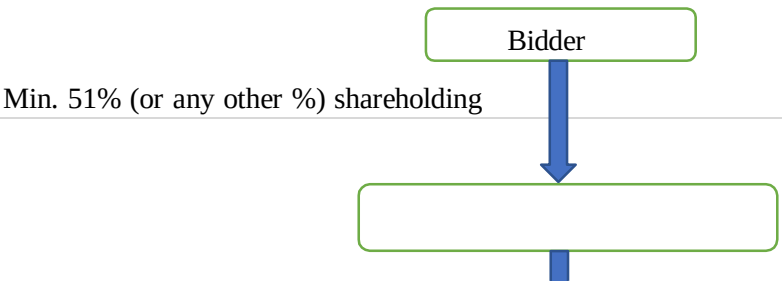
The Bidder or any of its Affiliates should not be a willful defaulter to any lender, and that there is no major litigation pending or threatened against the Bidder or any of its Affiliates which are of a nature that could cast a doubt on the ability or the suitability of the Bidder to undertake the Project. The Bidder shall submit an undertaking to this effect as per format 7.7 of this RfS.

For avoidance of doubt, it is clarified that the fully owned subsidiary Company as mentioned in Clauses 38.3 and 38.6 above should be an immediate subsidiary of the bidder, without any intermediaries involved. The following illustrations are provided to clarify the same:

Scenario 1:



Scenario 2:



Entity A (Intermediary)

Min. 51% shareholding

Entity B (Project Company/SP

As per provisions of the RfS, only Scenario 1 will be permissible under this RfS.

Companies coming under Joint Venture(JV) has no need to from any SPV.

2. Technical Eligibility Criteria

a. Under this RfS, it is proposed to promote only commercially established and operational technologies to minimize the technology risk and to achieve timely commissioning of the Projects. The Bidder is required to undertake to furnish evidence of meeting the above criteria in line with provisions of the RfS. The undertaking shall be submitted as per enclosed Format 7.8.

The bidder should be, either of the following:

a) EPC of 'similar works'

'Similar Works' means - Design, Supply, Erection, Testing and Commissioning of standalone (off-grid) Solar PV based water pump sets (1HP -7.5 HP) in the State of Odisha.

a) Manufacturer of Solar PV Module in Joint venture with EPC of 'similar works'

b) Manufacturer of Solar Pump and Controller using indigenous technology in Joint venture with EPC of 'similar works'

Experience required for the bidders in Last 5 Financial years . (2019-20 till Date of floating of Tender)

The total experience to be considered for the below purpose will be the cumulative experience of the Bidding Company ,Joint Venture or Consortium, together with the total experience of those Affiliates of the Bidder(s) that undertake to contribute the required equity funding and PBG in case the Bidder(s) fail to do so in accordance with the RfS.

1. EPC of 'similar works'

EPC experience in Installation of minimum **500 nos.** of different capacities of (1HP -7.5 HP) Solar pumps to be counted in past 5 financial years **in the state of Odisha .**

Or

EPC experience in Installation of **1000** nos of of different capacities (1HP -7.5 HP) of Solar pumps all over India in past 5 financial years .

Or

2. Module Manufacturers

Supply of **5 MW** of Solar panels all over India and having EPC experience in Installation of minimum **200 nos.** of different capacities of (1HP -7.5 HP) Solar pumps in Odisha.

Or

3. Pump and Controller manufacturer

Supply of **5000** Solar Pumps all over India and having EPC experience in Installation of minimum **200 nos.** of different capacities of (1HP -7.5 HP) Solar pumps in Odisha.

Detailed technical parameters of the Pumps to be met by Vendors is at Annexure-A. The Bidders shall strictly comply with the technical parameters detailed in the Annexure-A. **Further, the provisions as contained in the O.M. dated 10.03.2021 issued by MNRE on the subject "Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirement of Compulsory Registration) Order, 2019-Implementation- Reg." and its subsequent amendments and clarifications** issued until the bid submission deadline, shall be applicable for this RfS. The modules used in the Project under this RfS should have been included in the List-I under the above Order, valid as on the date of invoicing of such modules.

3. ***Financial Eligibility Criteria***

Net-Worth

i. The Net Worth of the category-A Bidder should as per the table below, as on the last date of previous Financial Year, i.e., FY 2023-24.

ii. The net worth to be considered for the above purpose will be the cumulative net-worth of the Bidding Company, Joint Venture or Consortium, together with the Net Worth of those Affiliates of the Bidder(s) that undertake to contribute the required equity funding and PBG in case the Bidder(s) fail to do so in accordance with the RfS.

iii. Net Worth to be considered for this clause shall be the total Net Worth as calculated in accordance with the Companies Act, 2013 and any further amendments thereto.

AND

Minimum Average Annual Turnover

The Bidder shall demonstrate a Minimum Average Annual Turnover (MAAT) as per the table below, during any three financial years in last 5 financial year.

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.

AND

Liquidity

The Bidder shall demonstrate Working Capital or Line of Credit for the last Financial Year, 2023-24, as per the table below.

Sl. No.	State/UT	MAAT/ Average Annual Turn Over Requirement (in lakhs INR) in any three years in last five years.	Profitability	Net Worth
1	Odisha	7 Cr	Profitable in at least two of the last three Financial Years	Not less than paid up capital in last FY 2023-24

The Bidder may seek qualification on the basis of financial capability of its Affiliate(s) for the purpose of meeting the qualification requirements as per Clauses 4.2 and 4.3 above. In case of the Bidder being a Bidding Consortium or Joint venture, any Member may seek qualification on the basis of financial capability of its Affiliate. In this case, a Bidder can use the credential of only a single affiliate to meet all the financial eligibility criteria. In such cases, the Bidder shall be required to submit Board Resolutions from the respective Affiliate, 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. In case of non-availability of the Board Resolution as required above, a letter from the CEO/ Managing Director of the respective Affiliate, undertaking the above, shall be required to be submitted and the requisite Board Resolution from the Affiliate shall be required to be submitted.

For the purposes of meeting financial requirements, only latest unconsolidated audited annual accounts shall be used. However, audited consolidated annual accounts of the Bidder may be used for the purpose of financial requirements provided the Bidder has at least twenty six percent (26%) equity in each Company whose accounts are merged in the audited consolidated account.

A Company/Consortium would be required to submit annual audited accounts for the last FY, 2023-24, or as on the day at least 7 days prior to the bid submission deadline, along with net worth, annual turnover, working capital certificate (if applicable) from a practicing Chartered Accountant/Statutory Auditor to demonstrate fulfillment of the criteria.

Note: In case of bidder seeking eligibility using credential of foreign Parent/Ultimate Parent/Affiliate entity, in the event the Bidder is unable to furnish the audited annual accounts for the previous financial year as per the prevalent norm in the respective country, the Bidder shall submit the annual audited accounts of the last financial year for which the audited accounts are available. This, however, would be acceptable, subject to the condition that the last date of response to this RfS falls on or within the deadline for completion of audit of annual accounts of companies, as stipulated by the laws/rules of the respective country, and the Bidder shall submit the corresponding documentary evidence against the same. In case the annual accounts or provisional accounts as on the day at least 7 days prior to the bid submission deadline, are submitted in a language other than English, a certified English translation from an approved translator shall be required to be submitted by the Bidder.

For meeting the above financial eligibility criteria, if the data is provided by the Bidder in a foreign currency, equivalent Indian Rupees of Net Worth and other financial parameters will be calculated by the Bidder using Reserve Bank of India's reference rates prevailing on the date of closing of the accounts for the respective financial year. In case of any currency for which RBI reference rate is not available, Bidders shall convert such currency into USD as per the exchange rates certified by their banker prevailing on the relevant date and used for such conversion. After such conversion, Bidder shall follow the procedure/ submit document as elaborated in Clause 40.6 above.

Note: Wherever applicable, audited accounts for the last FY, 2023-24 will be required to be submitted for meeting the qualification requirements.

4 .Category-B bidders

Only financial eligibility criteria is needed as follows. The Net worth should be more than paid up capital in last FY 2023-24.

5.Estimated Cost.

The cost discovered vide Tender no -2863 /OREDA dated-13.09.2023 will be considered as estimated cost of Solar pumps under each category for this tender. **APC will be required for price quoted less than the Estimated cost**. OPWD codes regarding estimated cost will be followed. The estimated price is as below.

Pump Capacity (HP)	Pump Type	Pump Position	Controller Type	L1 Price (without GST)
1	AC	Submersible	Normal (Without USPC)	144600
1	AC	Surface	Normal (Without USPC)	133600
1	DC	Submersible	Normal (Without USPC)	145440
1	DC	Surface	Normal (Without USPC)	134680
2	AC	Submersible	Normal (Without USPC)	182780
2	AC	Surface	Normal (Without USPC)	172025
2	DC	Submersible	Normal (Without USPC)	181115
2	DC	Surface	Normal (Without USPC)	172025
3	AC	Submersible	Normal (Without USPC)	243000
3	AC	Surface	Normal (Without USPC)	236000
3	DC	Submersible	Normal (Without USPC)	244750
3	DC	Surface	Normal (Without USPC)	235000
5	AC	Submersible	Normal (Without USPC)	345350
5	AC	Surface	Normal (Without USPC)	335130
5	DC	Submersible	Normal (Without USPC)	346150
5	DC	Surface	Normal (Without USPC)	336260
7.5	DC	Surface	Normal (Without USPC)	468000
7.5	DC	Submersible	Normal (Without USPC)	469500
7.5	AC	Surface	Normal (Without USPC)	465600
7.5	AC	Submersible	Normal (Without USPC)	468290

SECTION 5. BID EVALUATION AND SELECTION OF PROJECTS

4. *Bid Evaluation*

Bid evaluation will be carried out considering the information furnished by Bidders as per provisions of this RfS. The detailed evaluation procedure and selection of bidders are described in subsequent clauses in this Section.

5. *Techno-Commercial Evaluation of Bidders (Step 1)*

Bid opening (online) will be done only after the deadline for submission of bid in the **www.tenderwizard.com/OREDA** portal.

For e.g., if the bid submission deadline is 18:00 hrs. on 09.08.2023, the online bid opening will be conducted on 12.08.2023. In case of the above deadline being a holiday, the bids will be opened on the next working day.

Documents (as mentioned in the previous clause) received after the bid submission deadline as specified by OREDA, shall be rejected and returned unopened, if super-scribed properly with address, to the bidder.

Subject to Clause 18 of the RfS, OREDA will examine all the documents submitted by the Bidders and ascertain meeting of eligibility conditions prescribed in the RfS. During the examination of the bids, OREDA may seek clarifications/additional documents to the documents submitted etc. from the Bidders if required to satisfy themselves for meeting the eligibility conditions by the Bidders. Bidders shall be required to respond to any clarifications/additional documents sought within 07 (seven) days from the date of such intimation from OREDA. All correspondence in this regard shall be made through email/ portal only. It shall be the responsibility of the Bidder to ensure that the email id of the authorized signatory of the Bidder is functional. The Bidder may provide an additional email id of the authorized signatory in the covering letter. No reminders in this case shall be sent. It shall be the sole responsibility of the Bidders to remove all the discrepancies and furnish additional documents as requested. OREDA shall not be responsible for rejection of any bid on account of the above.

The response to RfS submitted by the Bidder shall be scrutinized to establish Techno- Commercial eligibility as per the RfS.

6. *Financial Bid Evaluation (Step 2)*

Financial bid should only be submitted online. If submitted off-line, the bidded will be disqualified. Format for submission of financial bid different for category-A and Category-B.

In this step evaluations of Techno-Commercially Qualified Bids shall be done based on the "Fixed Price", quoted by the Bidder for each line item (i.e., for each type of pump) as per price bid format Annexure-C to the RfS (i.e., for each type of pump) in the Electronic Form of Financial Bid.

Second Envelope (containing Fixed Price) of only those bidders shall be opened whose technical bids are found to be qualified as per the RfS.

For each line item (i.e., for each type of pump) the Bidder including its Parent, Affiliate or Ultimate Parent or any Group Company will have to submit a single bid (single application) quoting a Fixed Price in Indian Rupee for all the line items applied for.

The Price has to be quoted in Indian Rupee up to two places of decimal only. If it is quoted with more than two digits after decimal, digits after first two decimal places shall be ignored. (For e.g., if the quoted price is INR 47,800.455, then it shall be considered as INR 47,800.45).

In this step, evaluation will be carried out for the each line item (i.e., for each type of pump) within the maximum capacities as mentioned in Annexure-C to the RfS, based on the price quoted by Bidders.

The following types of pumps are for Odisha as per table below:

Pump Capacity	Pump Type	Pump Position	Pump Cooling Category	Controller Type
1	AC	Submersible	Waterfilled	Normal (Without USPC)
	AC	Surface	Waterfilled	Normal (Without USPC)
	DC	Submersible	Waterfilled	Normal (Without USPC)
	DC	Surface	Waterfilled	Normal (Without USPC)
2	AC	Submersible	Waterfilled	Normal (Without USPC)
	AC	Surface	Waterfilled	Normal (Without USPC)
	DC	Submersible	Waterfilled	Normal (Without USPC)
	DC	Surface	Waterfilled	Normal (Without USPC)
3	AC	Submersible	Waterfilled	Normal (Without USPC)
	AC	Surface	Waterfilled	Normal (Without USPC)
	DC	Submersible	Waterfilled	Normal (Without USPC)
	DC	Surface	Waterfilled	Normal (Without USPC)
5	AC	Submersible	Waterfilled	Normal (Without USPC)
	AC	Surface	Waterfilled	Normal (Without USPC)
	DC	Submersible	Waterfilled	Normal (Without USPC)
	DC	Surface	Waterfilled	Normal (Without USPC)
7.5	AC	Submersible	Waterfilled	Normal (Without USPC)
	AC	Surface	Waterfilled	Normal (Without USPC)
	DC	Submersible	Waterfilled	Normal (Without USPC)
	DC	Surface	Waterfilled	Normal (Without USPC)

On completion of Techno-Commercial bid evaluation, only Bidder(s) is/are eligible for the next stage, opening of the financial bid of the Bidder(s) will be at the discretion of OREDA. Thereafter, OREDA will take appropriate action as deemed fit.

For each line item (i.e., for each type of pump) based on the fixed Price quoted by the bidders, OREDA shall arrange the bids in the ascending order i.e., L1, L2, L3, etc. (L1 being the lowest quote).

If the fixed price (exclusive of GST (in INR) on F.O.R Destination Basis) quoted is same for two or more Bidders, then all the Bidders with same price shall be considered of equal rank/standing in the order.

7. *L-1 Matching and Selection of Selected Vendors*

For each line item (i.e., for each type of pump) the Bidder quoting the lowest price (L1 price) will be identified and shall be declared as the Selected Vendor. In case of multiple Bidders quoting the L1 price, all such Bidders ("L1 Bidders") will be declared as Selected Vendors.

For each line item (i.e., for each type of pump), option to match L1 price will be initially extended to all bidders falling under L1+25% and in case number of bidders in this range is less than five the same will be further extended to other bidders in the ascending orders of price bid quoted by them till at-least five bidders agreed for L1 matching or all bidders have been given option to match L1 price, whichever is earlier.

For each line item, the Bidders other than the L1 Bidder(s) will be given a period of 7 days to match the L1 price. In case a Bidder wishes to match the L1 price, such matching shall be communicated to OREDA only through email. The 7-day period shall commence from the date on which the L1 price is intimated to all the eligible Bidders (through email), and will culminate at 11:59:59 PM of the 7th day after such intimation by OREDA. For example, in case OREDA intimates the L1 price on 05.10.2023, the above deadline for L1 matching shall expire at 11:59:59 PM on 12.10.2023. Any communication after the expiry of the above deadline will not be entertained, and decision taken by OREDA in this regard shall be final and binding on all parties.

Note: In all cases, matching of Prices will be on individual line items within the price bid table on total landed cost (excluding GST) for complete scope of work.

OREDA reserves the right for the variation of allocated quantity for the State.

Further, in case a Vendor is not able to supply quantity allocated to them as per scheduled timelines, OREDA reserves the right to shift the part/full quantity to another Vendor, who has matched the price.

8. *Empanelment of vendors*

Category-A

10 numbers Category-A vendors will be empaneled under this tender. Ranking will be done based on quoted price under each category of pumps. it will be arranged as L1,L2…..L10 in ascending order subjected ti L1 price matching. In case more than 10 bidders are qualified, L1 to L10 will be empaneled under category-A and rest will automatically be eligible to participate in drawl of Lot under Category-B, subjected to willingness to participate under category-B and L1 price matching.

. In case any bidder is disqualified from empanelment within the tenure of validity of tender I,e 24 years, the next in line bidder may take the place subjected to requirement.

Category-B

20 numbers Category-B vendors will be empaneled under this tender. The vendors will be selected by drawal of Lot till 20 places among category -B bidders ,who will agree to match L1 pricing. . In case any bidder is disqualified from empanelment within the tenure of validity of tender I,e 24 years, the next in line bidder may take the place subjected to requirement.

- ***Any qualified bidder can take part in drawl of lot either under Category-A or Category-B but not in both.***

9. ***Validity of discovered prices***

In order to allow sufficient time to implement SPWPS based on the prices discovered under this tender, all prices discovered under this tender will remain valid for **24 months** from the date of opening the price bids, which will be announced by OREDA. Within this **24-month** period, empaneled vendors have no right of refusal to complete the allocated work.

10. ***Allocation of work***

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

Ranking will be done based on quoted price under each category of pumps. it will be arranged as L1,L2…..L10 in ascending order subjected ti L1 price matching.In case more than 10 bidders aare qualified, L1 to L10 will be empaneled under category-A and rest will automatically be eligible to participate in drawl of Lot under Category-B, subjected to willingness to participate under category-B and L1 price matching.

• Up to 80% of the overall works will be allocated to Category A Bidders cumulatively.

• Minimum 20% of the overall works shall be allocated to Category B Bidders, as per the drawl of lots subject to fulfilment of following conditions:

- Category B Bidders accept the L1 price discovered through Category A Bidder. Failure to accept the L1 price shall disqualify Category B bidders.
- In the event, none of the Category B Bidders accepts the L1 price 100% of the offered quantity shall be awarded to Category A Bidder.
- Drawl of lots shall be carried out until and unless the 20% quantity is not exhausted.
- Award of the quantity to Category B Bidder shall be on the basis of its quoted quantity or quantity of works under 20% limit, whichever is less.

A Bidder, including its Parent, Affiliate or Ultimate Parent or any Group Company shall submit a single bid.

If there are no vendors available, in Category A, in any corresponding package, who have agreed to match the L1 price and circumstances necessitates additional award of work, additional allocation may be done by OREDA as per MNRE approvals.

The evaluation of bids shall be carried out as described in Section-5 of the RfS. The methodology for Allocation of SPWPS is elaborated in

Section-5 of the RfS.

11. ***Recommendation and Issuance of LoAs***

At the end of selection process, OREDA will intimate MNRE the prices discovered and empanelment of Vendors. Letters of Award (LoAs) and the LoAs will be issued to the Selected Vendors identified, by OREDA.

In case of a Consortium/Joint Venture being selected as the Selected Vendor, the LoA shall be issued to the Lead Member of the Consortium/Joint venture.

Each Selected Vendor shall acknowledge the LoA and return duplicate copy with signature of the authorized signatory of the Selected Vendor to OREDA within 15 (Fifteen) days of issue of LoA, failing which it will be deemed to have been accepted by the Bidder.

If the Selected Vendor, to whom the LoA has been issued does not fulfil any of the conditions specified in Bid document, then OREDA reserves the right to annul/cancel the award of the LoA of such Selected Vendor also imposing the penalty such as encashment of BG or/and Blacklisting.

In all cases, OREDA's decision regarding selection of Bidder based on price or annulment of tender process shall be final and binding on all participating bidders.

12. *Issue of Notice o Proceed(NTP)/ Work Order*

Notice to Proceed (NTP)/Work order will be issued to the bidders after receiving acceptance to LOA and corresponding PBG as per clause-14.

13. *PDI/PDA*

Pre Dispatch Inspection must be done before installation. The selected bidder shall intimate the Assistant Director (Tech.), RE Cell of concerned district for PDI after procurement of materials to the local warehouse. PDI must be carried out within 7 days of intimation. The same PDI Report will be communicated to OREDA Ltd. head quarters and shall be uploaded on SEDM portal.

14. *Time line of project*

The timeline to complete installation of all the Solar pumps under a NTP/Work order will be 90 days from issue of beneficiary list.

15. *Inspection and Audit by the Government/MNRE*

All materials / equipment manufactured by the bidder/consortium of bidders against the Letter of Award shall be subject to inspection, check and/or test by OREDA/MNRE or his authorized representative at all stages and place, before, during and after the manufacture. All these tests shall be carried out in the as per technical specifications and bidder shall submit the relevant test reports at the time of bid submission to OREDA. If upon delivery the material/equipment does not meet the specification, the materials/equipment shall be rejected and returned to the bidder for repairs/modification etc. or for replacement and OREDA may also impose the penalty or/and blacklist the vendor. In such cases all expenses including the to-and-fro freight, repacking charges, any other costs etc. shall be to the account of the Vendor.

16. *Debarment from Participating in OREDA's Future Tenders*

OREDA reserves the right to carry out the performance review of each Bidder from the time of submission of Bid. In case it is observed that a bidder has not fulfilled its obligations in meeting the various timelines envisaged, in addition to the other provisions of the RfS, such Bidders may be debarred from participating in OREDA's any future tender for a period as decided by the competent authority of OREDA.

SECTION 6. DEFINITIONS OF TERMS

17. ***Following terms used in the documents will carry the meaning and interpretations as described below:***

"ACT" or "ELECTRICITY ACT, 2003" shall mean the Electricity Act, 2003 and include any modifications, amendments and substitution from time to time.

"AFFILIATE" shall mean a company that, directly or indirectly,

i. controls, or

ii. is controlled by, or

iii. is under common control with, a company developing a Project or a Member in a Consortium developing the Project and control means ownership, directly or indirectly, of more than 50% (fifty percent) of the voting shares of such company or right to appoint majority Directors.

"B.I.S." shall mean specifications of Bureau of Indian Standards (BIS).

"BID" or **"PROPOSAL"** shall mean the documents submitted by the Bidder towards meeting the techno-commercial and financial qualifying requirements, along with the price bid submitted by the Bidder and submissions during the e-Reverse Auctions, if applicable, as part of its response to the RfS issued by OREDA Limited.

"BIDDER" shall mean Bidding Company or a Bidding Consortium submitting the Bid. Any reference to the Bidder includes Bidding Company/ Bidding Consortium, Member of a Bidding Consortium including its successors, executors and permitted assigns and Lead Member of the Bidding Consortium jointly and severally, as the context may require.

"BIDDING CONSORTIUM" or **"CONSORTIUM"** shall refer to a group of Companies that collectively submit the response in accordance with the provisions of this RfS under a Consortium Agreement.

"CEA" shall mean Central Electricity Authority.

"CHARTERED ACCOUNTANT" shall mean a person practicing in India or a firm whereof all the partners practicing in India as a Chartered Accountant(s) within the meaning of the Chartered Accountants Act, 1949.

For Bidders incorporated in countries other than India, "Chartered Accountant" shall mean a person or a firm practicing in the respective country and designated/ registered under the corresponding Statutes/ laws of the respective country.

"COMPANY" shall mean a body corporate incorporated in India under the Companies Act, 2013 or any law in India prior thereto relating to Companies, as applicable.

"CONTRACT YEAR" shall mean the period beginning from the Effective Date of the Contract Agreement and ending on the immediately succeeding 31st March and thereafter each period of 12 months beginning on 1st April and ending on 31st March provided that:

i. in the financial year in which the Scheduled Commissioning Date would occur, the Contract Year shall end on the date immediately before the Scheduled Commissioning Date and a new Contract Year shall commence once again from the Scheduled Commissioning Date and end on the immediately succeeding 31st March, and thereafter each period of 12 (Twelve) Months commencing on 1st April and ending on 31st March, and

ii. Provided further that the last Contract Year of this Agreement shall end on the last day of the Term of this Agreement.

"CONTROL" shall mean the ownership, directly or indirectly, of more than 50% (fifty percent) of the voting shares of such Company or right to appoint majority Directors.

"CONTROLLING SHAREHOLDING" shall mean more than 50% of the voting rights and paid up share capital in the Company/ Consortium.

"DAY" shall mean calendar day.

"EQUITY" shall mean Net Worth as defined in Companies Act, 2013.

"GROUP COMPANY" of a Company means

i. a Company which, directly or indirectly, holds 10% (Ten Percent) or more of the share capital of the Company or;

ii. a Company in which the Company, directly or indirectly, holds 10% (Ten Percent) or more of the share capital of such Company or;

iii. a Company in which the Company, directly or indirectly, has the power to direct or cause to be directed the management and policies of such Company whether through the ownership of securities or agreement or any other arrangement or otherwise or;

iv. a Company which, directly or indirectly, has the power to direct or cause to be directed the management and policies of the Company whether through the ownership of securities or agreement or any other arrangement or otherwise or;

v. a Company which is under common control with the Company, and control means ownership by one Company of at least 10% (Ten Percent) of the share capital of the other Company or power to direct or cause to be directed the management and policies of such Company whether through the ownership of securities or agreement or any other arrangement or otherwise;

Provided that a financial institution, scheduled bank, foreign institutional investor, Non- Banking Financial Company, and any mutual fund, pension funds and sovereign funds shall not be deemed to be Group Company, and its shareholding and the power to direct or cause to be directed the management and policies of a Company shall not be considered for the purposes of this definition unless it is the Project Company or a Member of the Consortium developing the Project.

"IEC" shall mean specifications of International Electro-Technical Commission.

"JOINT CONTROL" shall mean a situation where a company has multiple promoters (but none of the shareholders has more than 50% of voting rights and paid-up share capital).

"LEAD MEMBER OF THE BIDDING CONSORTIUM" or **"LEAD MEMBER"**: There shall be only one Lead Member, having the shareholding of not less 51% in the Bidding Consortium.

"LETTER OF AWARD" or **"LoA"** shall mean the letter issued by State Implementing Agency (SIA) to the selected vendor for award of the cumulative SPWPS capacity.

"LIMITED LIABILITY PARTNERSHIP" or **"LLP"** shall mean a Company governed by Limited Liability Partnership Act 2008 or as amended.

"MEMBER IN A BIDDING CONSORTIUM" or **"MEMBER"** shall mean each Company in a Bidding Consortium. In case of a Technology Partner being a member in the Consortium, it has to be a Company.

"MONTH" shall mean calendar month.

"NET-WORTH" shall mean the Net-Worth as defined section 2 of the Companies Act, 2013.

"O&M/ AMC" shall mean Operation & Maintenance/ Annual Maintenance Contract of the supplied equipments.

"OREDA" shall mean **OREDA Limited.**

"PAID-UP SHARE CAPITAL" shall mean the paid-up share capital as defined in Section 2 of the Companies Act, 2013.

"PARENT" shall mean a Company, which holds more than 50% voting rights and paid up share capital, either directly or indirectly in the Project Company or a Member in a Consortium developing the Project.

"PROJECT" shall mean Solar Photovoltaic Water Pumping Systems (SPWPS).

"PROJECT INSTALLATION" The Project (SPWPS) will be considered as installed if all equipment as per rated project capacity has been installed.

"RfS" or **"RfS DOCUMENT"** or **"BIDDING DOCUMENT(S)"** or **"TENDER DOCUMENTS"** shall mean the "Request for Selection" document issued by OREDA Limited including standard Power Purchase Agreement along with subsequent clarifications and amendments thereof, vide RfS No. SECI/C&P/MI/00/0010/2022-23 Dated 31.12.2022.

"SECI" shall mean Solar Energy Corporation of India Limited.

"TOE" shall mean Tender Opening Event.

"ULTIMATE PARENT" shall mean a Company, which owns more than 50% (Fifty Percent) voting rights and paid-up share capital, either directly or indirectly in the Parent and Affiliates.

"VENDOR" or **"SUCCESSFUL BIDDER"** or **"SELECTED VENDOR"** shall mean the Bidding Company or a Bidding Consortium participating in the bid and having been selected and allocated a Project capacity by OREDA Limited (through a competitive bidding process) {in case of the Selected Vendor/Bidding Consortium itself executing the Project}, or the SPV formed by the selected vendor/consortium for the purpose of setting up of the Project{in case of Project execution through SPV}.

"WEEK" shall mean calendar week.

SECTION 7. SAMPLE FORMS & FORMATS FOR BID

SUBMISSION

The following formats 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 Section 4 and other submission requirements specified in the RfS.

Format 7.1

COVERING LETTER

(The Covering Letter should be submitted on the Letter Head of the Bidding Company/ Lead Member of Consortium)

Ref. No._____ Date:

_____

From: *(Insert name and address of Bidding Company/ Lead Member of Consortium*)

_____

_____

Tel.#:

Fax#:

E-mail address#

To

OREDA Limited

S3/59, Mancheswar Industrial Estate,

Bhubaneswar, Odisha - 751 017

Sub: Response to RfS No. …….. dated..... for (Insert title of the RfS)

Dear Sir/ Madam,

We, the undersigned *[Insert name of the 'Bidder']* having read, examined and understood

in detail the RfS including Qualification Requirements in particular, hereby submit our response to RfS.

We confirm that in response to the aforesaid RfS, neither we nor any of our Ultimate Parent Company/ Parent Company/ Affiliate/ Group Company has submitted response toRfS other than this response to RfS, directly or indirectly, in response to the aforesaid RfS(as mentioned in Format 7.8 under Disclosure) **OR** We confirm that in the response to the aforesaid RfS, we have a Group Company who owns more than 10% but less than 26% in the bidding company as well as other companies who may participate in this RfS, and accordingly, we have submitted requisite undertaking as per Format 7.8A in this regard {strike out which ever not applicable}.

We are submitting our bid for the allocation of work under Category A/ Category B We are submitting our response to the RfS as:

Type of Bidder	**Applicability (Yes/No)**
Pump/ Pump set Manufacturer	
Solar PV Module Manufacturer	
Solar Pump Controller Manufacturer	
Joint Venture/ RSPS	

In case of Joint Venture:

Lead Bidder	**Non-Lead Bidder**
EPC/ Pump Manufacturer/ Solar PV Module Manufacturer/ Solar Pump Controller Manufacturer	EPC/ Pump Manufacturer/ Solar PV Module Manufacturer/ Solar Pump Controller Manufacturer

1. We give our unconditional acceptance to the RfS, dated *[Insert date in dd/mm/yyyy]*, issued by OREDA Limited. In token of our acceptance to the RfS along with the amendments and clarifications issued by OREDA Limited, the same have been digitally signed by us and enclosed with the response to RfS. Further, we confirm that the SPWPS shall be installed within the deadline as per panel provisions of scheme guidelines and RFS.
2. Earnest Money Deposit (EMD): - We have enclosed EMD of INR(Insert Amount), in the form of Bank

Guarantee no.....[Insert bank guarantee/Payment on Order Instrument

number] dated ……. [Insert date of bank guarantee as per Format 7.3A/7.3B from [Insert name of bank providing bank guarantee] and valid up to…

…..... in terms of Clause 3.6 of this RfS. (Strike off whichever is not applicable)

3. We hereby declare that in the event our bid gets selected, and we are not able to submit Bank Guarantee of the requisite value(s) towards PBG, within due time as mentioned in Clauses 3.4 & 12 of this Rfs, OREDA Limited shall have the right to encase the EMD/PBG submitted by us and return the balance amount (if any) for the value of EMD pertaining to unsuccessful capacity.

4. We have submitted our response to RfS strictly as per Section 7 (Sample Forms and Formats) of this RfS, without any deviations, conditions and without mentioning any assumptions or notes in the said Formats.

5. Acceptance: -

We hereby unconditionally and irrevocably agree and accept that the decision made by OREDA in respect of any matter regarding or arising out of the RfS shall be binding on us. We hereby expressly waive and withdraw any deviations and all claims in respect of this process.

We also unconditionally and irrevocably agree and accept that the decision made by OREDA in respect of award of SPWPS in line with the provisions of the RfS, shall be binding on us.

6. Familiarity with Relevant Indian Laws & Regulations: -

We confirm that we have studied the provisions of the relevant Indian Laws and Regulations as required to enable us to submit this response to RfS, in the event of ourselection as Selected Vendor.

7. In case of our selection as the Selected Vendor under the scheme and the Project (SPWPS) being executed by a Special Purpose Vehicle (SPV) incorporated by us which shall be our subsidiary, we shall infuse necessary equity to the requirements of RfS.

8. We are submitting our response to the RfS with formats duly signed as desired by youin the RfS online for your consideration.

9. It is confirmed that our response to the RfS is consistent with all the requirements of submission as stated in the RfS, including all clarifications and amendments and subsequent communications from OREDA.

10. The information submitted in our response to the RfS is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our response to the RfS.

11. We confirm that all the terms and conditions of our Bid are valid up to _ (*Insert date in dd/mm/yyyy*) for acceptance [i.e., a period upto the date as on 24 months from the last date of submission of response to RfS].

12. Contact Person

Details of the representative to be contacted by OREDA are furnished as under:

Name : ……

Designation : ……

Company : ……

Address : ……

Phone Nos. : ……

Mobile Nos. : ……

Fax Nos. : ……

E-mail address: ……

13. We have neither made any statement nor provided any information in this Bid, which to the best of our knowledge is materially inaccurate or misleading. Further, all the confirmations, declarations and representations made in our Bid are true and accurate. In case this is found to be incorrect after our selection as Selected Vendor, we agree that the same would be treated as our event of default.

Dated the____day of_, 20….

Thanking you, We remain, Yours faithfully,

Name, Designation, Seal and Signature of Authorized Person in whose name Power of Attorney/ Board Resolution/ Declaration.

Format 7.2A

FORMAT FOR POWER OF ATTORNEY

(Applicable for all the bidders)

(*To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value***)**

KNOW ALL MEN BY THESE PRESENTS THAT We, [name of the executant(s)], do hereby constitute, appoint, and authorize.[name of the Authorized Signatory] as the Authorized Signatory presently residing at [residential address of Authorized Signatory] and having PAN [insert PAN no. of Authorized Signatory] who is presently employed with us and holding the designation of [designation of the Authorized Signatory] as our true and lawful representative, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid with reference to the NIT no. [insert NIT no.] dated [DD MMM YYYY] issued by OREDA Limited. The Authorized Signatory shall represent us and shall be responsible for the signing of the Bid, submission of the Bid and executing all other documents related to this Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which OREDA may require us to submit. The Authorized Signatory is further authorized to make representations to OREDA and provide information/ responses to OREDA, representing us in all matters before OREDA, and generally dealing with OREDA in all matters in connection with our Bid and during the performance of the Work Order.

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

All the terms used herein but not defined shall have the meaning ascribed to such terms underBidding Document

Signature of the executant Name:

Designation:

Address:

Company:

Accepted by

Signature of the Authorized SignatoryName:

Designation:

Address:

Company:

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

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

WITNESS

Signature:

Name:

Address: .....

Signature:

Name:

Address

Notes:

1. The mode of execution of the power of attorney shall be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the sameshall be under the common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shallbe duly authorized by a Board Resolution.

2. The person authorized under this Power of Attorney shall be a person holding the responsible post and designation in the company.

3. The Board Resolution forms a part of the Power of Attorney.

Format 7.2B

FORMAT FOR POWER OF ATTORNEY

(Applicable Only in case of Consortiums/Joint Venture)

(To be provided by each of the other members of the Consortium in favor of the Lead Member)

(*To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value***)**

KNOW ALL MEN BY THESE PRESENTS THAT M/s..... having its registered office at ……., …., and M/s …… having its registered office at ....., (Insert names and registered offices of all Members of the Consortium) the Members of Consortium have formed a Bidding Consortium named …… (Insert name of the Consortium iffinalized) (hereinafter called the 'Consortium') vide Consortium Agreement dated .....and having agreed to appoint M/s……..…as the Lead Member of the said Consortium do hereby constitute, nominate and appoint M/s……..a company incorporated under the laws of ……and having its Registered/ Head Office at ……..…….as our duly constituted lawful Attorney (hereinafter calledas Lead Member) to exercise all or any of the powers for and on behalf of the Consortiumin regard to submission of the response to RfS No……..

We also authorize the said Lead Member to undertake the following acts:

i) To submit on behalf of Consortium Members response to RfS.
ii) To do any other act or submit any information and document related to the aboveresponse to RfS Bid.

It is expressly understood that in the event of the Consortium being selected as SelectedVendor, this Power of Attorney shall remain valid, binding and irrevocable until 05 yearsfrominstallation.

We as the Member of the Consortium agree and undertake to ratify and confirm all whatsoeverthe said Attorney/ Lead Member has done on behalf of the Consortium Members pursuant to this Power of Attorney and the same shall bind us and deemed to have been done by us.

IN WITNESS WHEREOF M/s....., as the Member of the Consortium have executed these presents on this…… day of under the CommonSeal of our company.

For and on behalf of Consortium Member

M/s……

- ---------- (Signature of person authorized by theboard)

(Name

Designation

Place:

Date)

Accepted

(Signature, Name, Designation and Address

of the person authorized by the board of the Lead member)

Attested

(Signature of the executant)

(Signature & stamp of Notary of the place of execution)Place:

---Date: ---

Lead Member in the Consortium shall have the controlling shareholding in the Companyasdefined in Section-6, Definition of Terms of the RfS.

Date:)
Accepted

(Signature, Name, Designation and Address

of the person authorized by the board of the Lead Member)

Attested

(Signature of the executant)

(Signature & stamp of Notary of the place of execution)

Place:
Date:

Lead Member in the Consortium shall have the controlling shareholding in the Companyas defined in Section-6, Definition of Terms of the RfS.

Format 7.3A

FORMAT FOR BANK GUARANTEE TOWARDS EARNEST MONEY DEPOSIT (EMD)

(*To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value*)

Reference: ……..

listNo.: .....…

Date: .....……...

In consideration of the_____[*Insert name of the Bidder*] (hereinafter referred to as 'Bidder') submitting the response to RfS inter alia for _____[*Insert title of the RfS*] for Odisha declared in Format 7.1, in responseto the RfS No._____dated_____issued by OREDA (hereinafter referred to as OREDA) and OREDA considering such response to the RfS of ……[*Insert the name of the Bidder*] as per the terms of the RfS, the _____[*Insert name & address of bank*] hereby agrees unequivocally, irrevocably and unconditionally to pay to CE, OREDA at [*Insert Name of the Place from the address of OREDA*] forthwith without demur on demand in writing from OREDA or any Officer authorized by it in this behalf, any amount upto and not exceeding Rupees___[*Insert amount*], only, on behalf of M/s _____[*Insert name of the Bidder*].

This guarantee shall be valid and binding on this Bank up to and including _____[*insert date of validity in accordance with Clause 3.4 of this RfS*] and shall not be terminable by noticeor any change in the constitution of the Bank or the term of contract or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension oftime or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to INR_____(Indian Rupees _____ only). Our Guarantee shall remain in force until _____[*insert date of validity in accordance with Clause 3.4 of this RfS*]. OREDA shallbe entitled to invoke this Guarantee till_____[*insert date of validity in accordance with Clause 3.4 of this RfS*].

The Guarantor Bank hereby agrees and acknowledges that the OREDA shall have a right to invokethis BANK GUARANTEE in part or in full, as it may deem fit.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand by OREDA, made in any format, raised at the above-mentioned address of theGuarantor Bank, in order to make the said payment to OREDA.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by_____[*Insert name of the Bidder*] and/ or any other person. The Guarantor Bank shall not require OREDA to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against OREDA in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts Odisha shall have exclusive jurisdiction.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly OREDA shall not be obliged before enforcing this BANK GUARANTEE to take anyaction in any court or arbitral proceedings against the Bidder, to make any claim against or anydemand on the Bidder or to give any notice to the Bidder or to enforce any security held by OREDA or to exercise, levy or enforce any distress, diligence or other process against the Bidder. This BANK GUARANTEE shall be effective only when the Bank Guarantee issuance messageis transmitted by the issuing Bank through SFMS and a confirmation in this regard is received by OREDA. Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to INR (Indian Rupees Only) and it shall remain in force until_____[*Date to be inserted on the basis of Clause 3.4 of thisRfS*].

We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee onlyif OREDA serves upon us a written claim or demand.

Signature: _____

Name: _____

Power of Attorney No.: _

For_____[*Insert Name and Address of*

the Bank] _____Contact Details of the Bank:

E-mail ID of the Bank:

Banker's Stamp and Full Address.

Dated this_____day of_____, 20___

Format 7.3 b

FORMAT FOR PERFORMANCE BANK GUARANTEE (PBG)

(To be submitted Separately for each Project)

(*To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value*)

Reference: …….

Bank Guarantee No.: .....…

Date: .....……..

In consideration of the_____[*Insert name of the Bidder*] (hereinafter referred to as 'selected Vendor') submitting the response to RfS inter alia for … .....[*Insert title of the* RfS] for Odisha declared in Format 7.1, in response to the RfS dated…… issued by OREDA (hereinafter referred to as O R E D A) and O R E D A considering such response to the RfS of.....[*Insert name of the Bidder*] (which expression shall unless repugnant to the context or meaning thereof include its executers, administrators, successors and assignees) issuing Letterof Award No._to_____(*Insert Name of selected Vendor*)as per terms of RfS, M/s_____{a Special Purpose Vehicle (SPV) formed for this purpose}, if applicable].

As per the terms of the RfS, the_____[*Insert name & address of Bank*] hereby agrees unequivocally, irrevocably and unconditionally to pay to OREDA at_____[*Insert Name of the Place from the address of OREDA*] forthwith on demand in writing from OREDA, any amount up to and not exceeding Indian Rupees _____ [Total Value] only, on behalf of M/s _____[*Insert name of the selected Vendor*].

This guarantee shall be valid and binding on this Bank up to and including .....and shall not be terminable by notice or any change in the constitution of the Bank or the term of contractor by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to INR_____(Indian Rupees _____Only).

Our Guarantee shall remain in force until……. O R E D A shall be entitled to invoke this Guarantee till …….

The Guarantor Bank hereby agrees and acknowledges that OREDA shall have a right to invoke this BANK GUARANTEE in part or in full, as it may deem fit.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand by SIA, made in any format, raised at the above-mentioned address of theGuarantor Bank, to make the said payment to OREDA.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by_____[*Insert name of the*

selected Vendor] and/ or any other person. The Guarantor Bank shall not require OREDA to justifythe invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourseagainst SIA in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts at _____shall have exclusive jurisdiction.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly SIA shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the selected Vendor, to make any claim against or any demand on the selected Vendor or to give any notice to the selected Vendor or to enforce any security held by OREDA or to exercise, levy or enforce any distress, diligence or other process against the selected Vendor.

The Guarantor Bank acknowledges that this BANK GUARANTEE is not personal to SIA andmay be assigned, in whole or in part, (whether absolutely or by way of security) by SIA to anyentity to whom OREDA is entitled to assign its rights and obligations.

Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to INR (Indian Rupees.....Only) and itshall remain in force until We are liable to pay the guaranteed amount or any part

thereof under this Bank Guarantee only if OREDA serves upon us a written claim or demand.

Signature: _____

Name: _____

Power of Attorney No.: _____

For

_____*[Insert Name and Address of the Bank*] ___

Contact Details of the Bank:

E-mail ID of the Bank:

Banker's Stamp and Full Address.

Dated this_____day of_____, 20____

Witness:

1. …….

Signature

Name and Address

2. …….

Signature

Name and Address

Notes:

1. The Stamp Paper should be in the name of the Executing Bank and of appropriate value.
2. The Performance Bank Guarantee shall be executed by any of the Scheduled Commercial Banks as listed on the website of Reserve Bank of India (RBI) and amended as on the date of issuance of Bank Guarantee. Bank Guarantee issued by foreign branch of a Scheduled Commercial Bank is to be endorsed by the Indian branch of the same bank or State Bank of India (SBI).

Format 7.4

FORMAT FOR BOARD RESOLUTIONS

The Board, after discussion, at the duly convened Meeting on..... [*Insert date*], with the consent of all the Directors present and in compliance of the provisions of the Companies Act,1956 or Companies Act 2013, as applicable, passed the following Resolution:

1. RESOLVED THAT Mr./ Ms..... , be and is hereby authorized to do on our behalf, all such acts, deeds and things necessary in connection with or incidental to our responseto RfS vide RfS No._____for_____(insert title of the RfS), including signing and submission of all documents and providing information/ response to RfS to OREDA Limited representing us in all matters before OREDA, and generally dealing with OREDA in all matters in connection with our bid for the said Project. (***Tobe provided by the Bidding Company or the Lead Member of the Consortium***)

2. FURTHER RESOLVED THAT pursuant to the provisions of the Companies Act, 1956 or Companies Act, 2013, as applicable and compliance thereof and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to invest total equity in the Project. (***To be provided by the Bidding Company***)

[*Note: In the event the Bidder is a Bidding Consortium, in place of the above resolution at Sl. No. 2, the following resolutions are to be provided*]

FURTHER RESOLVED THAT pursuant to the provisions of the Companies Act, 1956 or Companies Act, 2013, as applicable and compliance thereof and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to invest (-----%) equity [*Insert the % equity commitment as specified in Consortium Agreement*] in the Project. (**To be provided by each Member of the Bidding Consortium including Lead Member such that total equity is 100%**)

FURTHER RESOLVED THAT approval of the Board be and is hereby accorded to participate in consortium with M/s ---------- [*Insert the name of other Members in the Consortium*] and Mr/ Ms……., be and is hereby authorized to execute the Consortium Agreement. (***To be provided by each Member of the Bidding Consortium including Lead Member*)**

And

FURTHER RESOLVED THAT approval of the Board be and is hereby accorded to contribute such additional amount over and above the percentage limit (specified for the Lead Member in the Consortium Agreement) to the extent becoming necessary towards the total equity share in the Project Company, obligatory on the part of the Consortium pursuant to theterms and conditions contained in the Consortium Agreement dated..... executed by the Consortium as per the provisions of the RfS. [***To be passed by the Lead Member of the Bidding Consortium***]

3. *NOT USED*

Certified True Copy

(Signature, Name and Stamp of Company Secretary)

Notes:

1) This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary/ Director.
2) The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
3) This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act, 1956 or Companies Act, 2013 as applicable may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing Company and the authorizations granted therein are true and valid.

Format 7.5

FORMAT FOR CONSORTIUM AGREEMENT

(*To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value*)

THIS Consortium Agreement ("Agreement") executed on this___Day of_Two Thousand between M/s_____[*Insert name of Lead Member*] a Company incorporated under the laws of_____and having its Registered Office at_____(hereinafter called the "**Member-1**", which expression shall include its successors, executors and permitted assigns) and M/s _____a Company incorporated under the laws of _____and having its Registered Office at _____ (hereinafter called the "**Member-2**", which expression shall include its successors, executors and permitted assigns), M/s _____a Company incorporated under the laws of_____and having its Registered Office at _____ (hereinafter called the "**Member-n**", which expression shall include its successors, executors and permitted assigns), [*The Bidding Consortium should list the details of all the Consortium Members*] for the purpose of submitting response to RfS and execution of Power Purchase Agreement (in case of award), against RfS No.____dated_____issued by OREDA, a Govt agency.

WHEREAS, each Member individually shall be referred to as the "Member" and all of the Members shall be collectively referred to as the "Members" in this Agreement.

WHEREAS OREDA desires to install SPWPS under RfS for_____(insert title of the RfS);

WHEREAS, OREDA had invited response to RfS vide its Request for Selection (RfS) dated _____

WHEREAS the RfS stipulates that in case response to RfS is being submitted by a Bidding Consortium, the Members of the Consortium will have to submit a legally enforceableConsortium Agreement in a format specified by OREDA wherein the Consortium Members haveto commit equity investment of a specific percentage for the SPWPS.

NOW THEREFORE, THIS AGREEMENT WITNESSTH AS UNDER:

In consideration of the above premises and agreements all the Members in this Bidding Consortium do hereby mutually agree as follows:

1. We, the Members of the Consortium and Members to the Agreement do hereby unequivocally agree that Member-1 (M/s_____), shall act as the Lead Member as defined in the RfS for self and agent for and on behalf of Member-2, , Member-n and to submit the response to the RfS.

2. The Lead Member is hereby authorized by the Members of the Consortium and Members to the Agreement to bind the Consortium and receive instructions for and on their behalf.

3. Notwithstanding anything contrary contained in this Agreement, the Lead Member shall always be liable for the equity investment obligations of all the Consortium Members i.e. for both its own liability as well as the liability of other Members.

4. The Lead Member shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the Consortium in discharging all of their respective equity obligations. Each Member further undertakes to be individually liable for the performance of its part of the obligations without in any way limiting the scope of collective liability envisaged in this Agreement.

5. Subject to the terms of this Agreement, the share of each Member of the Consortium in the issued equity share capital of the Vendor is/shall be in the following proportion:

Name	**Percentage**
Member 1	---
Member 2	---
Member n	---
Total	100%

6. In case of any breach of any equity investment commitment by any of the Consortium Members, the Lead Member shall be liable for the consequences thereof.

7. Except as specified in the Agreement, it is agreed that sharing of responsibilities as aforesaid and equity investment obligations thereto shall not in any way be a limitation of responsibility of the Lead Member under these presents.

8. It is further specifically agreed that the financial liability for equity contribution of the Lead Member shall not be limited in any way so as to restrict or limit its liabilities. The Lead Member shall be liable irrespective of its scope of work or financial commitments.

9. This Agreement shall be construed and interpreted in accordance with the Laws of India and courts at New Delhi alone shall have the exclusive jurisdiction in all matters relating thereto and arising thereunder.

10. It is hereby further agreed that in case of being selected as the Selected Vendor, the Members do hereby agree that they shall furnish the Performance Guarantee in favour of OREDA in terms of the RfS.

11. It is further expressly agreed that the Agreement shall be irrevocable and shall form an integral part of the Contract Agreement and shall remain valid until the expiration or

early termination of the Contract Agreement in terms thereof, unless expressly agreed to the contrary by OREDA.

12. The Lead Member is authorized and shall be fully responsible for the accuracy and veracity of the representations and information submitted by the Members respectively from time to time in the response to RfS.

13. It is hereby expressly understood between the Members that no Member at any given point of time, may assign or delegate its rights, duties or obligations under the Contract Agreement except with prior written consent of OREDA.

14. This Agreement

    a) has been duly executed and delivered on behalf of each Member hereto and constitutes the legal, valid, binding and enforceable obligation of each such Member;
    b) sets forth the entire understanding of the Members hereto with respect to the subject matter hereof; and
    c) may not be amended or modified except in writing signed by each of the Members and with prior written consent of OREDA.

15. All the terms used in capitals in this Agreement but not defined herein shall have the meaning as per the RfS.

IN WITNESS WHEREOF, the Members have, through their authorized representatives,executed these present on the Day, Month and Year first mentioned above.

For M/s.....[Member 1]

(Signature, Name & Designation of the person authorized vide Board Resolution Dated _____)

Witnesses:

1) Signature----------	2) Signature ----------
Name:	Name:
Address:	Address:

For M/s.....[Member 2]

(Signature, Name & Designation of the person authorized vide Board Resolution Dated _____)

Witnesses:

1) Signature ----------	2) Signature ----------
Name:	Name:
Address:	Address:

For M/s.....[Member n]

(Signature, Name & Designation of the person authorized vide Board Resolution Dated _____)

Witnesses:

1) Signature ----------	(2) Signature ----------
Name:	Name:
Address:	Address:

_____

Signature and stamp of Notary of the place of execution

Format 7.6

FORMAT FOR FINANCIAL REQUIREMENT

(This should be submitted on the Letter Head of the Bidding Company/ Lead Member of Consortium)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidding Company/ Lead Member of Consortium*)

_____

Tel.#:

Fax#:

E-mail address#

To

OREDA Limited

S3/59, Mancheswar Industrial Estate,

Bhubaneswar, Odisha - 751 017

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

We certify that the Bidding Company/Member in a Bidding Consortium is meeting the financial eligibility requirements as per the provisions of the RfS. Accordingly, the Bidder, with the support of its Affiliates, (strike out if not applicable) is fulfilling the minimum Net Worth criteria, by demonstrating a Net Worth of Rs…….. Cr. (..... in words) as on the last date of Financial Year 2023-24.

This Net Worth has been calculated in accordance with instructions provided in Clause 4.3 ofthe RfS.

Exhibit (i): Applicable in case of Bidding Company

For the above calculations, we have considered the Net Worth by Bidding Company and/ or itsAffiliate(s) as per following details:

Name of Bidding Company	Name of Affiliate(s) whose net worth is to be considered	Relationship with Bidding Company*	Net Worth (in Rs. Crore)
Company 1			
Total			

**The column for "Relationship with Bidding Company" is to be filled only in case the financial capability of Affiliate has been used for meeting Qualification Requirements. Further, documentary evidence to establish the relationship, duly certified by a practicing company secretary/ chartered accountant is required to be attached with the format.*

Exhibit (ii): Applicable in case of Bidding Consortium

(To be filled by each Member in a Bidding Consortium separately)
Name of Member: [*Insert name of the Member*]

Net Worth Requirement to be met by Member in Proportion to the Equity Commitment: INR

---------- Crore (Equity Commitment (%) * Rs. [ ] Crore)

For the above calculations, we have considered Net Worth by Member in Bidding Consortiumand/ or its Affiliate(s) per following details:

Name of Consortium Member Company	Name of Affiliate(s) whose net worth is to be considered	Relationship with Bidding Company* (If any)	Net Worth (in Rs. Crore)	Equity Commitment (in %age) in Bidding Consortium	Committed Net Worth (in Rs. Crore)
Company 1					

Total					

** The column for "Relationship with Bidding Company" is to be filled only in case the financial capability of Affiliate has been used for meeting Qualification Requirements. Further, documentary evidence to establish the relationship, duly certified by a practicing company secretary/chartered accountant is required to be attached with the format*

Further, we certify that the Bidding Company/ Member in the Bidding Consortium, with the support of its Affiliates, (strike out if not applicable) is fulfilling the Minimum Average AnnualTurnover Criteria, by demonstrating a MAAT of INR_____(_____in words) for the last three Financial Years, namely____,____and_____.

Exhibit (i): Applicable in case of Bidding Company

For the above calculations, we have considered the MAAT by Bidding Company and/ or itsAffiliate(s) as per following details:

Name of Bidding Company	Name of Affiliate(s) whose MAAT is to be considered	Relationship with Bidding Company*	MAAT (in Rs. Crore) FY	MAAT (in Rs. Crore) FY	MAAT (in Rs. Crore) FY
Company 1					

**The column for "Relationship with Bidding Company" is to be filled only in case the financial capability of Affiliate has been used for meeting Qualification Requirements. Further, documentary evidence to establish the relationship, duly certified by a practicing company secretary/chartered accountant is required to be attached with the format.*

Exhibit (ii): Applicable in case of Bidding Consortium

(To be filled by each Member in a Bidding Consortium separately)
Name of Member: [*Insert name of the Member*]

MAAT requirement to be met by Member in Proportion to the Equity Commitment: INR -----

--------Crore (Equity Commitment (%) * Rs. [ ] Crore)

For the above calculations, we have considered MAAT by Member in Bidding Consortiumand/ or its Affiliate(s) as per following details:

Name of Consortium Member Company	Name of Affiliate(s) whose MAAT is to be considered	Relationship with Bidding Company* (If Any)	MAAT (in Rs. Crore) FY	MAAT (in Rs. Crore) FY	MAAT (in Rs. Crore) FY	Equity Commitment (in %age) in Bidding Consortium	Proportionate MAAT (in Rs. Crore)
Company 1							

Total							

** The column for "Relationship with Bidding Company" is to be filled only in case the financial capability of Affiliate has been used for meeting Qualification Requirements. Further, documentary*

evidence to establish the relationship, duly certified by a practicing company secretary/chartered accountant is required to be attached with the format

Further, we certify that the Bidding Company/ Member in the Bidding Consortium, with the support of its Affiliates, (strike out if not applicable) is fulfilling the minimum Liquidity Criteria by demonstrating a Working Capital of INR_____(in words) as on the end of Financial Year 2023-24. (Strike out if not applicable)

Exhibit (i): Applicable in case of Bidding Company

For the above calculations, we have considered Working Capital by Bidding Company and/ orits Affiliate(s) as per following details:

Name of Bidding Company	**Name of Affiliate(s) whose Working Capital is to be considered**	**Relationship with Bidding Company***	**Working Capital (in Rs. Crore)**
Company 1			
Total			

**The column for "Relationship with Bidding Company" is to be filled only in case the financial capability of Affiliate has been used for meeting Qualification Requirements. Further, documentary evidence to establish the relationship, duly certified by a practicing company secretary/chartered accountant is required to be attached with the format.*

Exhibit (ii): Applicable in case of Bidding Consortium

(To be filled by each Member in a Bidding Consortium separately)
Name of Member: [*Insert name of the Member*]

Working Capital requirement to be met by Member in Proportion to the Equity Commitment:INR ---------- Crore (Equity Commitment (%) * Rs. [ ] Crore)

For the above calculations, we have considered Working Capital by Member in BiddingConsortium and/ or its Affiliate(s) as per following details:

Name of Consortium Member Company	**Name of Affiliate(s) whose Working Capital is to be considered**	**Relationship with Bidding Company* (If Any)**	**Working Capital (in Rs. Crore)**	**Equity Commitment (in %age) in Bidding Consortium**	**Proportionate Working Capital (in Rs. Crore)**

Company 1					

Total					

** The column for "Relationship with Bidding Company" is to be filled only in case the financial capability of Affiliate has been used for meeting Qualification Requirements. Further, documentary evidence to establish the relationship, duly certified by a practicing company secretary/chartered accountant is required to be attached with the format*

(Signature & Name of the Authorized Signatory)

(Signature and Stamp of CA)

Membership No.

Regn. No. of the CA's Firm:

Date:

Note: (i) Along with the above format, in a separate sheet on the letterhead of the Chartered Accountant's Firm, provide details of computation of Net Worth and Annual Turnoverduly certified by the Chartered Accountant.

(ii) Certified copies of Balance sheet, Profit & Loss Account, Schedules and Cash Flow Statements are to be enclosed in complete form along with all the Notes to Accounts.

Format 7.6A

FORMAT FOR FINANCIAL REQUIREMENT (APPLICABLE FOR CATEGORY B BIDDERS)

(This should be submitted on the Letter Head of the Bidding Company/ Lead Member of Consortium)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidding Company/ Lead Member ofConsortium*)

_____

Tel.#:

Fax#:

E-mail address#

To
OREDA Limited

S3/59, Mancheswar Industrial Estate,
Bhubaneswar, Odisha - 751 017

Sub:

Response to RfS No._____dated_____for_____

Dear Sir/ Madam,

This is to certify that we (Name of the bidder) are participating in the bid under category

B, and we have a positive net worth as per clause 4.3 of the tender

(Signature & Name of the Authorized Signatory)

(Signature and Stamp of CA)
Membership No.

Regn. No. of the CA's Firm

FORMAT 7.7

UNDERTAKING

(To be submitted on the letterhead of the Bidder)

We, hereby provide this undertaking to OREDA, in respect to our response to RfS vide RfS No._____dated_____, that M/s _____(insert name of the Bidder), or any of its Affiliates is not a willful defaulter to any lender, and that there is no major litigation pending or threatened against M/s _____(insert name of the Bidder) or any of its Affiliates which are of a naturethat could cast a doubt on the ability or the suitability of the Bidder to undertake the Project.

(Name and Signature of the Authorized Signatory)

Format 7.8

FORMAT FOR DISCLOSURE

(To be submitted on the Letter Head of the Bidding Company/ Each Member of Consortium)

DISCLOSURE

Ref.No._____ Date: _____

From:_____*(Insert name and address of Bidding Company/ Lead Member of Consortium*)

_____

_____

Tel.#: Fax#:

E-mail address#

To

OREDA Limited

S3/59, Mancheswar Industrial Estate,

Bhubaneswar, Odisha - 751 017

Sub: Response to RfS No._____dated___for _____

Dear Sir/ Madam,

We hereby declare and confirm that only we are participating in the RfS Selection process forthe RfS No._____dated__and that our Parent, Affiliate or Ultimate Parent or any GroupCompany with which we have direct or indirect relationship are not separately participating in this selection process.

We further declare that the above statement is true & correct. We undertake that if at any stageit is found to be incorrect, in addition to actions applicable under the RfS including but not limited to cancellation of our response to this RfS and LoA, we, i.e. M/s

_____(enter name of the bidding company/member in a consortium), including ourParent, Ultimate Parent, and our Affiliates shall be suspended/debarred from participating in any of the upcoming tenders issued by OREDA for a period of 2 years from the date of default as notified by OREDA.

We also understand that the above is in addition to the penal consequences that may follow from the relevant laws for the time being in force.

We further declare that we have read the provisions of Clause 30.4 of the RfS, and are complying with the requirements as per the referred OM dated 23.07.2020 except Sl.11 of theOM, including subsequent amendments and clarifications thereto. Accordingly, we are also enclosing necessary certificates (Annexure to this format) in support of the above complianceunder the RfS. We understand that in case of us being selected under this RfS, any of the abovecertificates is found false, OREDA shall take appropriate action as deemed necessary.

We further declare that we are fully aware of the binding provisions of the ALMM Order andthe Lists(s) thereunder, while quoting the price in RfS for (Enter the name of the RfS).

We further understand that the List-I (Solar PV Modules) of ALMM Order, Annexure-I of theOM, issued by MNRE on 10th March, 2021 will be updated by MNRE from time to time. Wealso understand that the Modules to be procured for this project, shall be from the List-I of theALMM Order applicable on the date of invoicing of such modules.

We also further understand and accept that we shall be liable for penal action, including but not limited to blacklisting and invocation of Performance Bank Guarantee, if we are found notcomplying with the provisions of ALMM Order, including those mentioned above.

Dated the_____ day of_____, 20….

Thanking you,

We remain, Yours

faithfully,

Name, Designation, Seal and Signature of Authorized Person in whose name Power ofAttorney/ Board Resolution/ Declaration.

Format 7.8 A

FORMAT FOR DISCLOSURE

(To be submitted on the Letter Head of the Bidding Company/ Each Member of Consortium)

(To be submitted by all such bidders in which a common Company/companies directly/indirectly own(s) more than 10% but less than 26% shareholding)

DISCLOSURE

Ref.No._____ Date:

_____

From:_____(Insert name and address of Bidding Company/ Lead Member of Consortium)

_____

_____

Tel.#: Fax#:

E-mail address#

To

OREDA Limited

S3/59, Mancheswar Industrial Estate,

Bhubaneswar, Odisha - 751 017

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

We hereby declare and confirm that in terms of the definitions of the RfS, M/s _____(enter name of the common shareholder) is our Group Company, and has a direct/indirect shareholding of less than 26% in the bidding company. M/s_____(enter name of the common shareholder) also holds directly/indirectly less than 26% shareholding inother Companies which may participate in this RfS, i.e., RfS No._____.

We undertake that M/s_____(enter name of the above common shareholder) is nota party to the decision-making process for submission of response to this RfS by M/s _____(enter name of the bidding company/member in the consortium). We further undertake that while undertaking any action as part of our response to RfS, we are not complicit with other such bidders participating in this RfS, in which M/s _____ (enter name of the common shareholder) has less than 26% direct/indirect shareholding, if any.

We further declare that the above statement is true & correct. We undertake that if at any stageit is found to be incorrect, in addition to actions applicable under the RfS including but not limited to cancellation of our response to this RfS and LoA, we, i.e. M/s

_____(enter name of the bidding company/member in a consortium), including ourParent, Ultimate Parent, and our Affiliates shall be suspended/debarred from participating in

any of the upcoming tenders issued by OREDA for a period of 2 years from the date of default as notified by OREDA.

We also understand that the above is in addition to the penal consequences that may follow from the relevant laws for the time being in force.

We further declare that we have read the provisions of Clause 38 of the RfS, and are complyingwith the requirements as per the referred OM dated 23.07.2020 except Sl. 11 of the OM, including subsequent amendments and clarifications thereto. Accordingly, we are also enclosing necessary certificates (Annexure to this format) in support of the above complianceunder the RfS. We understand that in case of us being selected under this RfS, any of the abovecertificates is found false, OREDA shall take appropriate action as deemed necessary.

We further declare that we are fully aware of the binding provisions of the ALMM Order and the Lists(s) thereunder, while quoting the price in RfS for___(Enter the name of the RfS). We further understand that the List-I (Solar PV Modules) of ALMM Order, Annexure-I of theOM, issued by MNRE on 10th March, 2021 will be updated by MNRE from time to time. Wealso understand that the Modules to be procured for this project, shall be from the List-I of theALMM Order applicable on the date of invoicing of such modules.

We also further understand and accept that we shall be liable for penal action, including but not limited to blacklisting and invocation of Performance Bank Guarantee, if we are found notcomplying with the provisions of ALMM Order, including those mentioned above.

Dated the_____ day of_____, 20….

Thanking you,
We remain, Yours
faithfully,

Name, Designation, Seal and Signature of Authorized Person in whose name Power ofAttorney/ Board Resolution/ Declaration.

Annexure to Format 7.8/7.8A

DECLARATION

RESTRICTION ON PROCUREMENT FROM CERTAIN COUNTRIES:
MoF OM No 6/18/2019-PPD dated 23.07.2020

(To be submitted on the Letter Head of the Bidding Company/ Each Member of Consortium)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidding Company/Member of Consortium*)

_____

_____

Tel.#:

Fax#:

E-mail address#

To

OREDA Limited

S3/59, Mancheswar Industrial Estate,

Bhubaneswar, Odisha - 751 017

Sub: Response to the RfS No.....dated ……

Dear Sir/ Madam,

This is with reference to attached order No. OM no. 6/18/2019-PPD dated 23rd July 2020 issuedby Department of Expenditure, MoF, Govt of India.

We are hereby submitting the following declaration in this regard:

"l have read the clause regarding restrictions on procurement from a bidder of a country whichshares a land border with India; I certify that this bidder is not from such a country or, if fromsuch a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfils all

requirements in this regard and is eligible to be considered. Where applicable, evidence of valid registration by the Competent Authority shall be attached]."

We further declare that the above statement is true & correct. We are aware that if at any stageit is found to be incorrect, our response to the tender will be rejected.

Dated the_____day of_____, 20….

Thanking you,
We remain, Yours
faithfully,

Name, Designation, Seal and Signature of Authorized Signatory.
Enclosure: OM dated 23.07.2020, as referred above

Format 7.10

FORMAT FOR SUBMISSION OF FINANCIAL BID

(The Covering Letter should be submitted on the Letter Head of the Bidding Company/ Lead Member of Consortium)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidding Company/ Lead Member of Consortium*)

_____

_____

Tel.#:

Fax#:

E-mail address#

To

OREDA Limited

S3/59, Mancheswar Industrial Estate,

Bhubaneswar, Odisha - 751 017

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

I/ We,_____(*Insert Name of the Bidder*) enclose herewith the Financial Proposal for selection of my/ firm for Odisha, as Bidder for theabove.

I/We have applied for SPWPS to be set up in Odisha_____under thisRfS.

I/We agree that this offer shall remain valid for a period upto the date as on 24 months from the due date of submission of the response to RfS and such further period as may be mutually agreed upon.

Dated the_____day of_____, 20….

Thanking you,
We remain, Yours
faithfully,

Name, Designation, Seal and Signature of Authorized Person in whose name Power ofAttorney/ Board Resolution/ Declaration.

Notes:

1. *For each line item (i.e., for each type of pump) there can be only one price applied for by the Bidder. If the bidder quotes two prices or combination thereof for theline item, then the bid shall be considered as non-responsive.*

2. *If the bidder submits the financial bid in the Electronic Form at the portal not in line with the instructions mentioned therein, then the bid shall be considered as non-responsive.*

3. *Price requirement shall be quoted as a fixed amount in Indian Rupees only. Conditional proposal shall be summarily rejected.*

4. *In the event of any discrepancy between the values entered in figures and in words, the values entered in words shall be considered.*

5. *Price should be in Indian Rupee up to two decimal places only.*

Format 7.11

DECLARATION REGARDING BANNING, LIQUIDATION, COURT RECEIVERSHIP ETC.

(To be submitted on the Letter Head of the Bidder)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidder)*

Tel.#: Fax#:

E-mail address#

To

OREDA

Bhubaneswar, Odisha – 751 017

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

We hereby confirm that we are not on the Banning List by OREDA ,MNRE, any other PSU or any other department of Govt. Of Odisha due to poor performance or Corrupt/ Fraudulent/ Collusive/ Coercive Practices or any other reason or banned by Government department/ Public Sector on due date of submission of bid.

Further, we confirm that neither we nor our allied agency(ies) are on banning list by OREDA ,MNRE, any other PSU or any other department of Govt. Of Odisha

We also confirm that we are not under any liquidation, court receivership or similar proceedings or bankruptcy.

In case it comes to the notice of OREDA that we have given wrong declaration in this regard, thesame shall be dealt as Fraudulent Practices and we shall be banned by OREDA for a period whichshall be decided by OREDA on case-to-case basis, subject to minimum period of banning being 06 months from the date of issuance of banning order.

Further, we also confirm that in case there is any change in status of the declaration prior to award of contract, the same will be promptly informed to OREDA by us.

(Name and Signature of the Authorized Signatory)

Format 7.12

DECLARATION FOR THE LOCAL CONTENT

(To be submitted on the Letter Head of the Bidder)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidder)*

Tel.#: Fax#:

E-mail address#

To OREDA

Bhubaneswar, Odisha – 751 017

Sub: Response to RfS No._____dated_____for_____

Dear Sir/ Madam,

We declare that we will be using indigenously manufactured solar panels with indigenoussolarcells and modules. Further, we are agreeing to accept and follow Guidelines for theimplementation of PM-KUSUM scheme issued by MNRE on 22-07-2019 and its subsequent amendment(s).

Further, we hereby undertake that I/We certify that we/our Collaborator/JV Partner are/isare not being under debar list/undergoing debarment period on account of breach of the code of integrity under Rule 175(1)(i)(h) of the General Financial Rules for giving falsedeclarations of local content.

List of imported components used in the manufacturing of solar water pumping system:

S. No.	Item Imported

(Name and Signature of the Chartered Accountant) (Name and Signature of the Authorized Signatory)UIDN

Number of Chartered Accountant:

Format 7.13

DECLARATION FOR USING SAME MAKE OF EQUIPMENTS AS PER THE TEST CERTIFICATE

(To be submitted on the Letter Head of the Bidder)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidder)*

Tel.#: Fax#:

E-mail address#

To

OREDA

Bhubaneswar, Odisha – 751 017

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

We are agreeing to accept that the same make of solar panels, pumps, VFD/inverter/controllerfor which the test report is to be submitted to the Implementing agency, as per MNRE solar pump testing procedure 2019 and amendments thereof, will be supplied by us.

In case, if some different make of solar panels, pumps, VFD/inverter/controller will be suppliedduring the implementation or AMC period, we will submit the test report for that particular make component(s). We also agree that such test reports shall be issued by the National Institute of Solar Energy and any other lab accredited by NABL for testing of solar PV water pumping system as per MNRE specifications and testing procedure.

(Name and Signature of the Authorized Signatory)

Format 7.14

DECLARATION FOR SUBMITTING THE TEST CERTIFICATE AS PER MNRE TECHNICAL SPECIFICATIONS FOR SOLAR WATER PUMPSETS ISSUED IN 2023

(To be submitted on the Letter Head of the Bidder)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidder)*

Tel.#: Fax#:

E-mail address#

To

OREDA Limited

Bhubaneswar, Odisha – 751 017

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

We are agreeing to accept that the test certificates are to be submitted to the Implementing Agency, reports as per MNRE technical specifications and testing procedures issued in 2023 and amendments thereof, will be submitted by us within 30 days of issuance of Letter of Empanelment by Implementing Agency. In failure of which our empanelment will stand cancelled, without any prior intimation. These certificates shall be submitted either in originalform or attested copy by the issuing test lab.

(Name and Signature of the Authorized Signatory)

Format 7.15

CERTIFICATE REGARDING COMPLIANCE OF MeitY NOTIFICATION VIDE FILE NO. 1(10)/2017-CLESdt. 02.07.18

(To be submitted on the Letter Head of the Bidder)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidder)*

Tel.#: Fax#:

E-mail address#

To

OREDA

Bhubaneswar, Odisha – 751 017

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

Dear Sir/Madam,

This is to certify that the products/items being offered/ quoted against ref. RfS by M/s…….. meet the definition of domestically manufactured/produced Cyber Security Products as per Para 4 of MeitY notification vide Fileno. 1(10)/2017−CLES dt. 02.07.18 and any amendments thereafter and the bidder shall strictly abide by all provisions of the subject notification.

(Name and Signature of the Authorized Signatory)

Format 7.15

FORMAT FOR SUBMISSION OF PRICE BID (Only for catagory-A)

(The Covering Letter should be submitted on the Letter Head of the Bidder/ Lead Member of Consortium)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidder / Lead Member of Consortium*)

_____

_____

Tel.#:

Fax#:

E-mail address#

To

OREDA Limited

Bhubaneswar, Odisha – 751 017

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

I/ We,_____(*Insert Name of the Bidder*) enclose herewith the Price Bid/Financial Proposal for selection of my/our firm, in line with the Price Bid Scheduleenclosed herewith.

I/We agree that this offer shall remain valid for a period of 24 months from the date of openingof price bids under this RfS..

Dated the_____day of_____, 20….

Thanking you,
We remain, Yours
faithfully,

Name, Designation, Seal and Signature of Authorized Person in whose name Power ofAttorney/ Board Resolution/ Declaration.

Notes:

1. *Only a single price bid for each line item (i.e.for each type of pump) for the cumulative Project capacity quoted by the bidders, shall have to be filled online in theElectronic Form provided at the portal.*

2. *The instructions mentioned in the Financial Bid Electronic Form have to be strictly followed without any deviation, else the bid shall be considered as non-responsive.*

3. *Price bids requirement shall be quoted as a fixed amount in Indian Rupees only. Conditional proposal shall be summarily rejected.*

4. *Tariff should be in Indian Rupee up to two decimal places only.*

PRICE BID SCHEDULE

(To be submitted on the Letter Head of the Bidder/ Lead Member of Consortium) The excel file annexed as Annexure-C of the RfS shall be used for entering the price bid. Signed and scanned copy of the same will be required to be uploaded on the portal)

Annexure - A

TECHNICAL SPECIFICATIONS OF SOLAR WATER PUMPING SYSTEM

Attached separately to the RfS

Annexure - B

SPECIAL INSTRUCTIONS TO BIDDERS FOR e-TENDERING GENERAL

The Special Instructions (for e-Tendering) supplement 'Instructions to Bidders', as given in these RfS Documents. Submission of Online Bids is mandatory for this RfS.

e-Tendering is a new methodology for conducting Public Procurement in a transparent and secured manner. Now, the Government of India has made e-Tendering mandatory. Suppliers/ Vendors will be the biggest beneficiaries of this new system of procurement. For conducting electronic tendering, *Odisha Renewable Energy Development Agency (OREDA)* has adopted a securedand user friendly e-tender system enabling bidders to Search, View, Download tender document(s) directly from the e-tendering portal through **www.tenderwizard.com/OREDA** portal. This portal is based on the world's most 'secure' and 'user friendly' software.

Benefits to Suppliers are outlined on the Home-page of the portal.

INSTRUCTIONS

Tender Bidding Methodology:

Sealed Bid System

Single Stage Two Envelope

Broad Outline of Activities from Bidder's Perspective:

1. Procure a Class III Digital Signing Certificate (DSC).
2. Register on ElectronicTender System® (ETS)
3. Create Marketing Authorities (MAs), Users and assign roles on ETS. It is mandatory tocreate at least one MA
4. View Notice Inviting Tender (NIT) on ETS
5. For this tender -- Assign Tender Search Code (TSC) to a MA
6. Download Official Copy of Tender Documents from ETS. Note: Official copy of Tender Documents is distinct from downloading 'Free Copy of Tender Documents'. To participate in a tender, it is mandatory to procure official copy of Tender Documents for that tender.
7. Clarification to Tender Documents on ETS
   a) Query to OREDA (Optional)
   b) View response to queries posted by OREDA
8. Bid-Submission on ETS
9. Respond to OREDA Post-TOE queries

For participating in this tender online, the following instructions are to be read carefully. Theseinstructions are supplemented with more detailed guidelines on the relevant screens of the ETS.

Digital Certificates

For integrity of data and authenticity/ non-repudiation of electronic records, and to be compliant with IT Act 2000, it is necessary for each user to have a Digital Certificate (DC), also referred to as Digital Signature Certificate (DSC), of Class III, issued by a Certifying Authority (CA) licensed by Controller of Certifying Authorities (CCA) [refer ***http://www.cca.gov.in***].

Registration

To use the ElectronicTender® portal vendors needto register on the portal. Registration of each organization is to be done by one of its senior persons who will be the main person coordinating for the e-tendering activities. In ETS terminology, this person will be referred to as the Super User (SU) of that organization. For further details, please visit the website/ portal, and click on the 'Supplier Organization' link under 'Registration' (on the Home Page), and follow further instructions as given on the site. Pay Annual Registration Fee as applicable.

After successful submission of Registration details and payment of Annual Registration Fee, please contact KEONICS Helpdesk (as given below), to get your registration accepted/ activated.

Important Note:

1. Interested bidders have to download official copy of the RfS & other documents after login into the e-tendering Portal of **www.tenderwizard.com/OREDA** portal. If the official copy of the documents is not downloaded from e-tendering Portal of KEONICS withinthe specified period of downloading of RfS and other documents, bidder will not be able toparticipate in the tender.

2. To minimize teething problems during the use of ETS (including the Registration process),it is recommended that the user should peruse the instructions given under 'ETS User- Guidance Centre' located on ETS Home Page, including instructions for timely registrationon ETS. The instructions relating to 'Essential Computer Security Settings for Use of ETS'and 'Important Functionality Checks' should be especially taken into cognizance.

   Please note that even after acceptance of your registration by the Service Provider, to respond to a tender you will also require time to complete activities related to yourorganization, such as creation of users, assigning roles to them, etc.

ISN-ETS/ **Helpdesk**	
Telephone/ Mobile	*Customer Support:* *(From 1000 HRS to 1800 HRS on all Working Days i.e. Monday toFriday except Government Holidays)*
Email-ID	*]*

Some Bidding Related Information for this Tender (Sealed Bid)

The entire bid-submission would be online on ETS (unless specified for Offline Submissions). Broad outline of submissions are as follows:

- Submission of Bid-Parts
- Envelope I (Technical-Bid)
- Envelope II (Financial-Bid)
- *Submission of digitally signed copy of Tender Documents/ Addendum*

In addition to the above, the bidders are required to submit certain documents physically offlinealso as per Clause 19 of the RfS, failing which the technical bids will not be opened.

Note: The Bidder should also upload the scanned copies of all the above mentioned originaldocuments as Bid-Annexures during Online Bid-Submission.

Internet Connectivity

If bidders are unable to access ISN-ETS's e-tender portal or Bid Documents, the bidders may please check whether they are using proxy to connect to internet or their PC is behind any firewall and may contact their system administrator to enable connectivity. Please note that Port SSL/ 443 should be enabled on proxy/firewall for HTTPS connectivity. Dial-up/ Broad and internet connectivity without Proxy settings is another option

SPECIAL NOTE ON SECURITY AND TRANSPARENCY OF BIDS

Security related functionality has been rigorously implemented in ETS in a multidimensional manner. Starting with 'Acceptance of Registration by the Service Provider', provision for security has been made at various stages in Electronic Tender's software. Specifically, for BidSubmission, some security related aspects are outlined below:

As part of the Electronic Encrypted® functionality, the contents of both the 'ElectronicForms®'and the 'Main-Bid' are securely encrypted using a Pass-Phrase created by the Bidder himself.Unlike a 'password', a Pass-Phrase can be a multi-word sentence with spaces between words (e.g. I love this World). A Pass-Phrase is easier to remember, and more difficult to break. It ismandatory that a separate Pass-Phrase be created for each Bid-Part. This method of bid- encryption does not have the security and data-integrity related vulnerabilities which are inherent in e-tendering systems which use Public-Key of the specified officer of a Buyer organization for bid-encryption. Bid-encryption in ETS is such that the Bids cannot bedecrypted before the Public Online Tender Opening Event (TOE), even if there is connivancebetween the concerned tender-opening officers of the Buyer organization and the personnel ofe-tendering service provider.

CAUTION: All bidders must fill ElectronicForms® for each bid-part sincerely and carefully, and avoid any discrepancy between information given in the ElectronicForms® and thecorresponding Main-Bid. For transparency, the information submitted by a bidder in the ElectronicForms® is made available to other bidders during the Online Public TOE. If it is found during the Online Public TOE that a bidder has not filled in the complete information inthe ElectronicForms®, the TOE officer may make available for downloading the correspondingMain-Bid of that bidder at the risk of the bidder. **If variation is noted between the information contained in the ElectronicForms® and the 'Main-Bid', the contents of the ElectronicForms® shall prevail.**

In case of any discrepancy between the values mentioned in figures and in words, the value mentioned in words will prevail.

The bidder shall make sure that the Pass-Phrase to decrypt the relevant Bid-Part is submitted into the 'Time Locked Electronic Key Box (EKB)' after the deadline of Bid Submission, and before the commencement of the Online TOE of Technical Bid. The process of submission of this Pass-Phrase in the 'Time Locked Electronic Key Box' is done ina secure manner by first encrypting this Pass-Phrase with the designated keys provided by OREDA Limited.

Additionally, the bidder shall make sure that the Pass-Phrase to decrypt the relevant Bid-Part is submitted to OREDA Limited in a sealed envelope before the start date and time of the Tender OpeningEvent (TOE).

There is an additional protection with SSL Encryption during transit from the client-endcomputer of a Supplier organization to the e-Tendering Server/ Portal.

OTHER INSTRUCTIONS

For further instructions, the vendor should visit the home-page of the portal and go to the **User-Guidance Center**

The help information provided through 'ETS User-Guidance Center' is available in three categories – Users intending to Register/ First-Time Users, Logged-in users of Buyer organizations, and Logged-in users of Supplier organizations. Various links (including links for User Manuals) are provided under each of the three categories.

Important Note: It is strongly recommended that all authorized users of Supplier organizations should thoroughly peruse the information provided under the relevant links, and take appropriate action. This will prevent hiccups, and minimize teething problems during the use of ETS.

SEVEN CRITICAL DO'S AND DON'TS FOR BIDDERS

Specifically, for Supplier organizations, the following **'SEVEN KEY INSTRUCTIONS for BIDDERS**' must be assiduously adhered to:

1. Obtain individual Digital Signing Certificate (DSC or DC) of Class III well in advance ofyour tender submission deadline on ETS.
2. Register your organization on ETS well in advance of the important deadlines for your first tender on ETS viz 'Date and Time of Closure of Procurement of Tender Documents'and 'Last Date and Time of Receipt of Bids'. Please note that even after acceptance of your registration by the Service Provider, to respond to a tender you will also require timeto complete activities related to your organization, such as creation of -- Marketing Authority (MA) [ie a department within the Supplier/ Bidder Organization responsible forresponding to tenders], users for one or more such MAs, assigning roles to them, etc. It ismandatory to create at least one MA. This unique feature of creating an MA enhances security and accountability within the Supplier/ Bidder Organization
3. Get your organization's concerned executives trained on ETS well in advance of your firsttender submission deadline on ETS.
4. For responding to any particular tender, the tender (i.e. its Tender Search Code or TSC) has to be assigned to an MA. Further, an 'Official Copy of Tender Documents' should be procured/ downloaded before the expiry of Date and Time of Closure of Procurement of Tender Documents. Note: Official copy of Tender Documents is distinct from downloading 'Free Copy of Tender Documents'. Official copy of Tender Documents is the equivalent of procuring physical copy of Tender Documents with official receipt in thepaper-based manual tendering system.
5. Submit your bids well in advance of tender submission deadline on ETS (There could belast minute problems due to internet timeout, breakdown, etc.)
6. It is the responsibility of each bidder to remember and securely store the Pass-Phrase for each Bid-Part submitted by that bidder. The bidders are required to submit correct, valid and operative Pass-Phrase to decrypt either Technical Bid Part or Financial Bid Part in a separate sealed envelope before due date and time of submission of bid. In the event, the bids are not opened with the pass-phrase submitted by bidder, OREDA Limited may ask for re- submission/ clarification for correct pass-phrase. If bidder fails to submit correct pass- phrase immediately as requested by OREDA Limited, the Bid Processing Fee and Document Fee, if applicable, shall be forfeited and bid shall not be opened, and EMD shall be refunded. No request on this account shall be entertained by OREDA Limited.
7. ETS will make your bid available for opening during the Online Public Tender Opening Event (TOE) 'ONLY IF' the status pertaining Overall Bid-Submission is

‘COMPLETE’.For the purpose of record, the bidder can generate and save a copy of ‘Final Submission Receipt’. This receipt can be generated from 'Bid-Submission Overview Page' only if thestatus pertaining overall Bid-Submission’ is ‘COMPLETE’

NOTE:

While the first three instructions mentioned above are especially relevant to first-time users ofETS, the fourth, fifth, sixth and seventh instructions are relevant at all times.

Annexure-C

Type and Capacity of Solar Pump for Price Bid.

Pump Capacity (HP)	Pump Type	Pump Position	Controller Type
1	AC	Submersible	Normal (Without USPC)
1	AC	Surface	Normal (Without USPC)
1	DC	Submersible	Normal (Without USPC)
1	DC	Surface	Normal (Without USPC)
2	AC	Submersible	Normal (Without USPC)
2	AC	Surface	Normal (Without USPC)
2	DC	Submersible	Normal (Without USPC)
2	DC	Surface	Normal (Without USPC)
3	AC	Submersible	Normal (Without USPC)
3	AC	Surface	Normal (Without USPC)
3	DC	Submersible	Normal (Without USPC)
3	DC	Surface	Normal (Without USPC)
5	AC	Submersible	Normal (Without USPC)
	AC	Surface	Normal (Without USPC)
	DC	Submersible	Normal (Without USPC)
	DC	Surface	Normal (Without USPC)
7.5	AC	Submersible	Normal (Without USPC)
	AC	Surface	Normal (Without USPC)
	DC	Submersible	Normal (Without USPC)
	DC	Surface	Normal (Without USPC)

Annexure-D

Attached separately to the RfS

CRC

Annexure-'A'

SPECIFICATION FOR SOLAR PHOTOVOLTAIC WATER PUMPING SYSTEMS

1. SCOPE

These specification covers design qualifications and performance specifications for Centrifugal Solar Photo Voltaic (SPV) Water Pumping Systems from 1HP (0.75kW) to 25 HP (18.75 kW) suitable for bore-well, open well, water reservoir, water stream, etc., and specifies the minimum standards to be followed under MNRE Schemes.

2. TERMINOLOGY

In addition to the terminology specified in **3** of IS 5120 and IEC 62253, the following shall also apply.

2.1 Static Water Depth — It is the depth of water level below the ground level when the pump is not in operation.

2.2 Draw-Down — It is the elevation difference between the depth of static water level and the consistent standing water level in the bore-well during the operation the of pump set.

2.3 Submergence — It is the minimum height of the water level after drawdown above the pump suction casing.

2.4 Manometric Suction Lift — Manometric suction lift is the vacuum gauge/suction manometer reading in the meter of the water column when the pump operates at suction lift.

2.5 Suction Lift —Suction lift/head is the vertical distance be the ween sump water level and center of Surface Mono-set inlet.

2.6 Daily Water Output — It is the total water output on a clear sunny day with three times tracking SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 KWh / m^2 on the surface of SPV array (i.e., coplanar with the SPV Modules).

2.6 Wire to Water Efficiency — It is the combined system efficiency of SPV Module, Converter/Controller with Inbuilt MPPT mechanism, Pump set and piping.

2.7 Pump Controller — Pump Controller converts the DC voltage of the SPV array into a suitable DC or AC, single or multi-phase power and may also include equipment for MPPT, remote monitoring, and protection devices.

2.8 Maximum Power Point Tracker (MPPT) — MPPT is an algorithm that is included in the pump controller used for extracting maximum available power from SPV array under a given condition. The voltage at which SPV array can produce maximum power is called 'maximum power point' voltage (or peak power voltage).

3. CONSTRUCTIONAL FEATURES

3.1 General

3.1.1 SPV Water Pumping System set uses the irradiance available through SPV array. The SPV array produces DC power, which can be utilized to drive a DC or an AC pump set using pump controller.

3.2 A SPV Water Pumping system typically consists of:

3.2.1 *Motor Pump Set see 3.4.*

3.2.2 *SPV Controller*

Note: Some controllers are inbuilt in the motors

Specifications of Controller/Drive for Solar Water Pumping Systems

S.No.	Requirement	Specifications
1.	*Controller Power Capacity to drive the Pump*	Controller Power Capacity should be at-least equal to Solar Panels Power Capacity (Wp), not Pump Capacity. Example: For **5HP** pumps, the pump capacity will be 3750W as per MNRE Specs, the solar panel capacity will be at-least 4800Wp the controller capacity should match the solar panel capacity.
2.	*Point Tracking (MMPT)*	Should track power only and not Voltage at Maximum power point
3.	*Enclosure*	The Controller with RMS must have **IP65** protection.
4.	*Isolator Switch*	Should be between Solar panels and the controller
5.	*RMS (GSM/GPRS connectivity)*	Controller shall be integrated with Remote Monitoring System with GSM/GPRS and Geo tagging. GSM/ GPRS Charges are to be included in the Costing till the end the of the Warranty period of the Pump set.

6.	Controller display/screen	The various parameters should be present on the SPV Pump Controller display/screen such as:- Pump On/Off status, Array Input DC Voltage, DC/AC output Current & voltage, operating frequency, Latest RMS Latitude, Latest RMS Longitude, Pump Capacity (HP), PV Module Capacity (KW), Pump Status, Current Generation (kW), Today Solar Generation (kWh), Cumulative Solar Generation (kWh), Today Runs Hours (Hrs.), Cumulative Pump Run Hours (Hrs.), Cumulative Water Discharged (Litres), Total Water Discharged (Litres), Peak Power (kW) supplied by the controller to Motor-Pump Set.

For IS 16221 (Part-2) certification of the SPV pump controller the latest quality control order released by MNRE regarding IS 16221 (Part-2) must be followed.

3.2.2.1 *Remote Monitoring System (RMS)*

The detailed Specification of RMS is attached at Annexure I.

3.3 Solar Photo Voltaic (SPV) Array

3.3.1 SPV arrays contains required number of PV modules of similar type and specifications, connected in series or parallel to obtain the required voltage or current output. The SPV water pumping system should be operated with a PV array of minimum capacity in the range of **900 Wp to 22500Wp**, measured under Standard Test Conditions (STC). A Sufficient number of modules in series and parallel could be used to obtain the required voltage or current output. The power output of individual PV modules used in the SPV array, under STC, should be a minimum of **300 Wp**, with adequate provision for tolerances measurement. Use of PV modules with higher power output is preferred.

3.3.2 Modules supplied with the SPV water pumping systems shall have a certificate as per IS 14286/IEC 61215 specifications or equivalent National or International /Standards. Lab certified STC performance data supplied with the modules shall not be more than one year old.

3.3.3 Modules must qualify to IS/IEC 61730 Part I and II for safety qualification testing.

3.3.4 The minimum module efficiency should be minimum 19 percent and fill factor shall be more than 75 percent.

3.3.5 Modules must qualify to IEC TS 62804-1:2015 for the detection of potential-induced degradation - Part 1: Crystalline silicon (Mandatory in case the SPV array Open Circuit voltage is more than 600 V DC)

3.3.6 In case the SPV water pumping systems are intended for use in coastal areas the solar modules must qualify to IEC TS 61701:2011 for salt mist corrosion test.

3.3.7 The name plate shall conform to IS 14286/IEC 61215.

3.3.8 Module to Module wattage mismatch in the SPV array shall be within ± 3 percent.

3.3.9 Any array capacity above the minimum array wattage requirement as specified in these specifications for various models of solar pumping systems is allowed.

3.3.10 The PV Modules must be warranted for output wattage, which should not be less than 90% of the rated wattage at the end of 10 years and 80% of the rated wattage at the end of 25 years.

3.3.11 The RFID tag shall be placed on the SPV Modules inside the glass laminate.

3.4 Motor-Pump Set

3.4.1 The SPV water pumping systems may use any of the following types of motor pump sets: a) Surface Mono-set

b) Submersible motor-pump set.

c) Any other type of the motor pump set after approval from Ministry.

3.4.2 Motor

The motors of the pump set may be of the following types: -

a) AC Induction Motor.

b) DC Motor (PMSM/BLDC/SRM)

3.4.3 The "Motor-Pump Set" should have a capacity in the range of 1 HP (0.75 kW) to 25 HP (18.75kW) and should have the following features:

a) The closed coupled or mono block DC/ AC centrifugal motor pump set with appropriate mechanical seals which ensures ensure zero leakage.

b) The motor of the capacity ranging from 1 HP to 25 HP should be AC/DC. The suction and delivery head will depend on the site-specific condition of the field.

c) Submersible pumps could also be used according to the dynamic head of the site at which the pump is to be used.

3.4.4 The pump and all external parts of the motor used in the submersible pump which are in contact with water, should be of stainless steel of grade 304 or higher as required. Further for submersible pumps used in coastal areas or bores with higher salinity, stainless steel of grade 316 or a higher grade may be used.

3.4.5 Total Harmonic Distortion (THD) of the AC output waveform of the inverter at the motor input of the motor-pump set shall be less than or equal to 10 % and further no individual harmonic shall exceed the limit of 6 %. For checking its compliance it should done as per IS 16221.

3.4.6 The suction/ delivery pipe shall be of HDPE or uPVC column pipes of appropriate size, electric cables, floating assembly, civil work, and other fittings required to install the Motor Pump set. In the case of HDPE pipes the minimum pressure rating of 8 kg/sqcm-PE100 grade for pump sets up to 3 HP, 10 kg/sqcm-PE100 grade for 5 HP pump set and further higher minimum pressure rating for above 5 HP as appropriate shall be used.

3.5 Module Mounting Structures and Tracking System

3.5.1 The PV modules should be mounted on metallic structures of adequate strength and appropriate design, which can withstand the load of modules and high wind velocities up to 150 km per hour. The raw material used and the process for manufacturing of module mounting structure including welding of joints should conform to applicable IS 822. The module mounting structure should be hot dip galvanized according to IS 4759. Zinc content in working area of the hot dip galvanizing bath should not be less than 99.5% by mass.

3.5.2 In order to make the structure rigid, the gap between Telescopic pattern supports should be minimal, further, for bearing of center load of whole structure only pins should be used instead of threaded bolts. To enhance the performance of SPV water pumping systems arrangement for seasonal tilt angle adjustment and three times manual tracking in a day should be provided. In order to make structure rigid, the gap between Telescopic pattern supports should be minimal, further, for bearing of center load of whole structure only pins should be used instead of threaded bolts.

3.5.3 The general hardware for structure fitment should be either SS 304 or 8.8 grade. Modules should be locked with antitheft bolts of SS 304 Grade. Foundation should be as per the site condition, based on the properties of soil. Foundation can be done either with the help of 'J Bolt' (refer to IS 5624 for foundation hardware) or direct pilling, it should be decided as per the site and relevant IS i.e., IS 6403 / 456 / 4091 / 875 should be referred for foundation design.

3.5.4 Details of Module Mounting Structure (MMS) for pumps of capacity 1HP and above are attached at Annexure-II. These are indicative of minimum standards and an Implementing Agency may specify higher standards which shall be certified by the recognized structural engineering department of any IIT/NIT or IISC. The format of the certificate is placed at Annexure-III.

3.6 SPV Controller

3.6.1 Maximum Power Point Tracker (MPPT) shall be included to optimally use the power available from the SPV array and maximize the water discharge.

3.6.2 The SPV Controller with RMS must have **IP65** protection.

3.6.3 Adequate protections shall be provided in the SPV Controller to protect the solar powered pump set against the following:

a) Dry running;
b) Open circuit;
c) Output short circuit;
d) Under voltage;
e) Reverse polarity;

3.6.4 Static MPPT efficiency of controller shall be equal or more than 98% during operation of 10 to 100% of rated STC PV power, and average MPPT tracking efficiency in the dynamic condition should be greater than 97 % with hot and cold profiles. To ascertain the above requirement, controller shall be tested as per the procedure laid down by MNRE for testing of USPC with respect to the water pumping load only.

3.6.5 A DC switch as per IS/IEC 60947-1 & 2 suitable for switching dc power ON and OFF shall be provided in the SPV Pump Controller.

3.6.6 All cables used shall be as per IS 694 or IS 9968(Part 1). Suitable size of cable shall be used in sufficient length for inter-connection between the SPV array to SPV Controller and the SPV Controller to solar powered pump set. Selection of the cable shall be as per IS 14536.

3.6.7 The various parameters should be present on the SPV Pump Controller display/screen such as:- Pump On/Off status, Array Input DC Voltage, DC/AC output Current & voltage, operating frequency, Latest RMS Latitude, Latest RMS Longitude, Pump Capacity (HP), PV Module Capacity (KW), Pump Status, Current Generation (kW), Today Solar Generation (kWh), Cumulative Solar Generation (kWh), Today Runs Hours (Hrs.), Cumulative Pump Run Hours (Hrs.), Cumulative Water Discharged (Litres), Total Water Discharged (Litres), Peak Power (kW) supplied by the controller to Motor-Pump Set.

3.7 Protections

The system should be provided with all necessary protections like earthing, Lightning, and Surge Protection etc., as described below:

3.7.1 Earthing and Lightning Protection

1) The Earthing shall be done in accordance with the IS 3043 including its amendments and updated versions.

2) The Earthing system should be designed in such a way that its should able to restrict the potential of each conductor according to the level of insulation applied and magnitude of the current conducted through human body should be less than the value that can cause ventricular fibrillation of heart.
3) Earth connections shall be done in such a way that they are visible for inspection and all the earth electrodes can easily be tested at any point of time.
4) It is recommended to keep the value of resistance of earth electrode less than 5 ohms.
5) All the materials, fittings etc. used for doing earthing shall conform to the Indian standard, wherever exists.
6) The actual value of soil resistivity should be considered while designing the earthing system at the site and for reference, selection criteria of the site, for any type of soil treatment to improve earth electrode resistance, etc. the IS 3043 shall be referred.
7) The electrode material should be selected according to the corrosivity of the soil in which it is used, for the relation between resistivity and corrosivity of the soil and method to safeguard the conductor against excessive corrosion the IS 3043 shall be referred.
8) It is recommended for selection of type and installation of the earth electrode the provisions of the IS 3043 should be considered. However, the pipe or rod-type earth electrode is preferable.
9) In case of the two-earth electrode or more the separation among them should be twice the length of the electrode driven in the ground. Except in special conditions (for e.g.- where the soil is hard to dig out), a number of electrodes in parallel are to be preferred to a single long electrode.
10) The provisions given in the IS 3043 should be considered while selecting or connecting the earthing/protective/grounding conductor from the components to the earth pit.
11) Separate earthing conductor shall be provided for the controller, pump-motor set and SPV array etc. for its connection to the earthing pit and it should be continuous in nature for electrical conductivity. However, even for the earthing of light current equipment (for example, high voltage testing equipment) the cross-sectional area of the earthing lead shall not be less than 6 mm2.
12) For the maintenance of the earth electrode and measurement of the Earth electrode resistance the provisions of IS 3043 shall be referred.
13) Motor shall have suitable provision for earthing to facilitate earthing of the motor as per IS 3043 at the time of installation. In case GI pipes are used for the purpose of earthing the motor, an earthing connection may be made to the discharge pipe clamps. However, in case of

HDPE/PVC pipes, a separate metallic cable from the motor to the control panel shall be provided and earthing given as if a four-core cable is used, the fourth core not connected to the terminals can be used for earthing.

14) Lightning protection shall be provided as per IEC 62305 and IEC 63227 standards including its amendments and updated versions.
15) An external lightning Rod, whose height should be more than the highest point in the system with a lightning protection system (LPS) designed to comply with class III or higher shall be installed, based on the site requirement which in turn depends on the area-specific lightning activity, etc. parameters.

16) Arrangement and positioning of the separate air-termination systems can be determined using different methods given in the IEC 62305-3. While determining the position following points are to be considered such as: -
    a) The structure to be protected is fully located within the protected volume provided by the air-termination system.
    b) There should be separation distance between the air-termination system and PV power supply system to prevent dangerous sparking against parts of the PV power supply system in case of direct lightning. The separation distances determined in accordance with IEC 62305-3 & IEC 63227 shall preferably be maintained.
    c) The possibility of the PV modules being shadowed by air-termination systems shall be taken into account and distance from the PV modules can be calculated using the IEC 63227.
17) A separate earth electrode is required for the dispersion of the lightning current into the ground with suitably low value of the earthing resistance i.e., less than 5 ohm. And the minimum length (l_1) of vertical earth electrodes for lightning protection level III or higher shall be determined according to the IEC 62305-3.
18) The cross-section of the metal sub-structures used for the connection of the lightning arrestor to the earth electrode should be no less than 16 mm^2 Cu or 25 mm^2 Al or GI of equivalent current carrying capacity should be used, which will also depend upon the class of the Lightning protection system.
19) The earth pits given with the SWPS {i.e., Earth pit(s) for the BoS system (other than LA) and Earth Pit for LA} should be made equipotential bonded to each other.

3.7.2 Surge Protection Device

1) For SPDs IEC 63227 and its updated versions or amendments should be followed.
2) At the DC Input side of the controller, it should have protection from an External Surge Protection Device of Type-2 or higher (i.e.,Type-1) in accordance with the IEC 61643-31.
3) If the distance between the SPD and the Pump controller to be protected is greater than 10 m, then SPD according to IEC 63227 should be applied.
4) The rated voltage of SPDs on the DC side depends on the type of protective circuit and the magnitude of the maximum operating voltage of the PV modules.

3.8 Use of indigenous components

It will be mandatory to use indigenously manufactured solar modules with indigenous mono/multi-crystalline silicon solar cells. Further, the motor-pump-set, controller and balance of system should also be manufactured indigenously. The vendor has to declare the list of imported components used in the solar water pumping system.

4 PERFORMANCE REQUIREMENTS

4.1 Under the "Average Daily Solar Radiation" condition of 7.15kWh / sq.m. on the surface of PV array (i.e., coplanar with the PV Modules), the minimum water output from a Solar PV Water Pumping System at different "Total Dynamic Heads" should be as specified below:

For D.C. Motor Pump Set:

i) 110 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 meter (Suction head, if applicable, minimum of 7 meter static suction lift corrected for atmospheric pressure and water temperature) and with the shut off head being at least 12 meter.

ii) 55 liters of water per watt peak of PV array, from a Total Dynamic Head of 20 meter (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and with the shut off head being at least 25 meter.

iii) 38 liters of water per watt peak of PV array, from a Total Dynamic Head of 30 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 45 meter.

iv) 23 liters of water per watt peak of PV array, from a Total Dynamic Head of 50 meter (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 70 meter.

v) 15 liters of water per watt peak of PV array, from a Total Dynamic Head of 70 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 100 meter.

vi) 10.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 100 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 150 meter.

vii) 9.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 120 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 180 meter.

viii) 7.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 150 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 225 meter.

ix) 5.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 200 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for

atmospheric pressure and water temperature) and the shut off head being at least 300 meter.

x) 4.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 250 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 375 meter.

The actual duration of pumping of water on a particular day and the quantity of water pumped could vary depending on the solar intensity, location, season, etc.

Indicative performance specifications for the Shallow and Deep well SPV Water Pumping Systems are attached at Annexure IV.

For A.C. Induction Motor Pump Set:

i) 99 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 meter (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and with the shut off head being at least 12 meter.

ii) 49 liters of water per watt peak of PV array, from a Total Dynamic Head of 20 meter (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and with the shut off head being at least 25 meter.

iii) 35 liters of water per watt peak of PV array, from a Total Dynamic Head of 30 meter (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 45 meter.

iv) 21 liters of water per watt peak of PV array, from a Total Dynamic Head of 50 meter (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 70 meter.

v) 14 liters of water per watt peak of PV array, from a Total Dynamic Head of 70 meter (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 100 meter.

vi) 9 liters of water per watt peak of PV array, from a Total Dynamic Head of 100 meter (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 150 meter.

vii) 8.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 120 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 180 meter.

viii) 6.7 liters of water per watt peak of PV array, from a Total Dynamic Head of 150 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 225 meter.

ix) 5.0 liters of water per watt peak of PV array, from a Total Dynamic Head of 200 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 300 meter.

x) 4.0 liters of water per watt peak of PV array, from a Total Dynamic Head of 250 meters (Suction head, if applicable, minimum of 7-meter static suction lift corrected for atmospheric pressure and water temperature) and the shut off head being at least 375 meter.

The actual duration of pumping of water on a particular day and the quantity of water pumped could vary depending on the solar intensity, location, season, etc.

Indicative performance specifications for the Shallow and Deep well SPV Water Pumping Systems are attached at Annexure V.

5 TESTS FOR HYDRAULIC AND ELECTRICAL PERFORMANCE OF PUMPSET

5.1 The AC motor-pump set shall be tested independently for hydraulic and electrical performance as per the relevant IS specification including the following test

a) Constructional requirements/features
b) General requirements
c) Design features
d) Insulation resistance test
e) High voltage test
f) Leakage current test

In case of the DC motor-pump set for (a), (b), (c) declaration will be given by the vendor and for (d), (e), (f) the relevant clause of IS 9283:2013 will be followed for testing until BIS notifies the Standard about it. Once the Standard gets released then it will be effective for DC motor-pump set from its Date of notification.

5.2 Testing of SPV Water Pumping Systems shall be done as per the procedure specified by the MNRE.

6 GUARANTEE OF PERFORMANCE

6.1 The SPV Water Pumping Systems shall be guaranteed for their performance of the nominal volume rate of flow and the nominal head at the guaranteed duty point as specified in 7**.1** under the "Average Daily Solar Radiation" condition of 7.15 kWh/m^2 on the surface of SPV array (i.e., coplanar with the Photo Voltaic (PV) Modules). The actual duration of pumping of water on a particular day and the quantity of water pumped could vary depending on the solar intensity, location, season, etc.

6.2 Solar Photo Voltaic Water Pumping Systems shall be guaranteed by the manufacturer against the defects in material and workmanship under normal use and service for a period of at least 60 months from the date of commissioning.

6.3 Sufficient spares for trouble free operation during the Warrantee period should be made available as and when required

7 MARKING AND PARAMETERS TO BE DECLARED BY THE MANUFACTURER

7.1 The motor pump-set and Controller used in SPV Water Pumping Systems shall be securely marked with the following parameters declared by the manufacturer:

7.1.1 Motor Pump-set

a) Manufacturer's name, logo or trade-mark;
b) Model, size and SI No of pump-set (To be engraved/laser marked on the motor frame); c) Motor Rating (kW / HP);
d) Total head, m, at the guaranteed duty point;
e) Capacity (LPD) at guaranteed head;
f) Operating head range, m;
g) Maximum Current (A);
j) Voltage Range (V) and;
k) Type - AC or DC Pump set; &
l) Photo Voltaic (PV) Array Rating in Watts peak (W_p)
m) Country of origin

Note: -In addition, a metal name plate containing the above details shall be fixed on the module mounting structure for the information of user.

7.1.2 Controller

a) Manufacturer's name, logo or trade-mark;
b) Model Number;
c) Serial Number;
d) Voltage Range;
e) Power Range in kW for Controller; and
f) Current rating (A)

g) Country of origin

8 OPERATION AND MAINTENANCE MANUAL

8.1 An Operation and Maintenance Manual, in English and the local language, should be provided with the solar PV water pumping system. The Manual should have information about solar energy, photovoltaic, modules, DC/AC motor pump set, tracking system, mounting structures, electronics and switches. It should also have clear instructions about mounting of PV module, DO's and DONT's and on regular maintenance and Trouble Shooting of the pumping system. Helpline number, Name and address of the Service Centre and contact number of authorized representative to be contacted in case of failure or complaint should also be provided. A warranty card for the modules and the motor pump set should also be provided to the beneficiary.

9 COMPREHENSIVE OPERATION AND MAINTENANCE

i. The Contractor should provide 5 years comprehensive maintenance of the Solar Photovoltaic Water pumping system set, which shall include corrective maintenance as well as routine service visits during CMC period.

ii. CMC shall be in line with scheme guidelines and its amendment (if any). Apart from the monitoring, regular periodical maintenance of system has to be done. The report has to be maintained in a prescribed format containing Month, Inspection Date, Action taken against the Defects found in the System and along with signatures of both service Engineer and the farmer/ beneficiary. Maintenance report in digital form to be sent to Scheme implementing agency (SIA) and also uploaded on the portal of SIA whenever such portal or mobile app is made available.

iii. The deputed personnel shall be in a position to check and test all the equipments regularly, so that preventive actions, if any, could be taken well in advance to save any equipment from damage.

iv. Normal and preventive maintenance of the Solar Photovoltaic Water pumping systems such as cleaning of module surface, tightening of all electrical connections, changing of tilt angle of module mounting structure, cleaning & greasing of motor pump sets, changing filters etc. are also the duties of the deputed personnel during maintenance visits.

v. During the operation and maintenance period of the Solar Photovoltaic Water Pumping Systems, if there is any loss or damage of any component due to miss management or miss handling or due to any other reasons pertaining to the deputed personnel by empaneled vendor, what-so-ever, the supplier shall be responsible for immediate replacement or rectification. The damaged component may be repaired or replaced by a new component.

vi. The maintenance shall include replacement of any component irrespective of whether the defect was a manufacturing defect or due to wear and tear.

LIST OF REFERRED INDIAN STANDARDS

456:2000	Plain and reinforced concrete - Code of practice (Fourth Revision)
811:1987	Specification for cold formed light gauge structural steel sections (Second Revision)
822:1970	Code of procedure for inspection of welds
IS 875: Part 1: 1987	Code of practice for design loads (Other Than Earthquake) for buildings and structures: Part 1 dead loads - Unit weights of building materials and stored materials (Second Revision)
694:2010	Polyvinyl Chloride Insulated Unsheathed--And Sheathed Cables/cords With Rigid And-Flexible Conductor for Rated Voltages-Up To And Including 450/750 V
1079:2017	Hot rolled carbon steel sheet, plate and strip - Specification (Seventh Revision)
1161:2014	Steel tubes for structural purposes - Specification (Fifth Revision)
1239 (Part 1):2004	Steel tubes, tubulars and other wrought steel fittings - Specification: Part 1 steel tubes (Sixth Revision)
2062:2011	Hot rolled medium and high tensile structural steel - Specification (Seventh Revision)
2629:1985	Recommended practice for hot-dip galvanizing of iron and steel (First Revision)
2633:1986	Method for testing uniformity of coating on zinc coated articles (Second Revision)
3043:1987	Code of Practice for Earthing
4091:1979	Code of practice for design and construction of foundations for transmission line towers and poles (First Revision)
4759:1996	Hot - Dip zinc coatings on structural steel and other allied products - Specification (Third Revision)
5120:1977	Technical requirements for rotodynamic special purpose pumps (First revision)
5624:1993	Foundation bolts - Specification (First Revision)
6403:1981	Code of practice for determination of bearing capacity of shallow foundations
6745:1972	Methods for determination of mass of zinc coating on zinc coated iron and steel articles
7215:1974	Tolerances for fabrication of steel structures

8034:2018	Submersible pump sets - Specification (third revision)
9079:2018	Monoset pumps for clear, cold water for agricultural and water supply purposes - Specification (third revision)
9283:2013	Motors for submersible pump sets
9968 (Part 1):1988	Specification for elastomer insulated cables: Part 1 for working voltages up to and including 1100 volts (First Revision)
14220:2018	Open well submersible pump sets - Specification (first revision)
14536:2018	Selection, installation, operation and maintenance of submersible pumpset - Code of practice (First Revision)
IS/IEC61701: 2011	Salt mist corrosion testing of photovoltaic (PV) modules First Revision
IS 17210 (Part 1): 2019 IEC TS 62804-1 : 2015	Photovoltaic (PV) Modules — Test Methods for the Detection of PotentialInduced Degradation Part 1 Crystalline Silicon
IS/IEC 60034-1:2004	Rotating Electrical Machines ─ Part 1 Rating and Performance
IS/IEC 61683:1999	Photovoltaic System-Power Conditioners — Procedure for Measuring Efficiency
IEC 62253:2011	Photovoltaic Pumping Systems – Design qualification and performance measurements
IS 14286: 2010 /IEC 61215 : 2005	Crystalline Silicon Terrestrial Photovoltaic (Photo Voltaic (PV)) modules - Design Qualification and Type Approval (First Revision)
IS/IEC 61730-1: 2004	Photovoltaic (Photo Voltaic (PV)) Module Safety Qualification Part 1 Requirements for Construction
IS/IEC 61730-2: 2004	Photovoltaic (Photo Voltaic (PV)) Module Safety Qualification Part 2 Requirements for Testing
IEC 60068-2-6:2007	Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)
IEC 60068-2-30:2005	Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 + 12h cycle)
IS 16221 (Part-2)	Safety of Power Converters for use in Solar Photovoltaic Power Systems
IEC 62305-1/2/3/4	Lightning Protection
IEC 63227	Lightning and Surge Voltage Protection for photovoltaic (PV) power supply systems
IEC 61643-31	Low-voltage surge protective devices
IS/IEC 60947: PART 1: 2007	Low - Voltage switchgear and control gear: Part 1 general rules (First Revision)
IS xxxxxx (Doc No MED/20/13071)	Solar Photovoltaic Water Pumping Systems — Testing Procedure Guidelines

Annexure-I

Specifications for Remote Monitoring System (RMS)

The Remote Monitoring System shall be capable of providing and handling the following:

a. Solar System Performance: DC Voltage, DC current, AC output Current, Power, Drive frequency, Energy, etc.
b. Pump Performance: Running Hours, Water Discharge (Output), etc.
c. RMS Performance: %Device Connectivity, %Data Availability, etc.
d. Geo Location: Real time latitude and longitude should be captured with an accuracy of less than 10m horizontal.

   This is required to ensure that system is not moved from its original location.
e. Events and Notifications: Faults related to Pump Operation, Solar generation, Controller/Drive faults like overload, dry run, short circuit, etc.
f. Consumer Management: Name, Agriculture details, Service No. Contact Details, etc.
g. Asset Management: Ratings, Serial Number, Make, Model Number of Pump, Panel and Controller, Geo Location, IMEI number (of communication module) and ICCID (of SIM).
h. Complaint and Ticket Management: Complaint management system is a part of centralized monitoring software platform.
i. Consumer Mobile Application: Generation, Running Hours, Water Discharge, Complaint logging, etc.

Communication Architecture of the RMS should be as mentioned below:

a. Communication Connectivity:

i. **Pump Controller Connectivity:** Communication between RMS and Pump Controller should be on UART/RS485 MODBUS RTU protocol to ensure interoperability irrespective of make and manufacturer.

ii. **Remote Connectivity:** RMS of SWPS should be using GSM/GPRS/2G/3G/4G cellular connectivity.

iii. **Local Connectivity:** Ethernet/Bluetooth/Wi-Fi connectivity to configure parameters, notifications, communication interval, set points etc. or to retrieve locally stored data

iv. **Sensor Connectivity:** RMS should have provision for at least two Analog and Digital inputs with 0.1% accuracy to address the requirement of local sensors connectivity if required by SIA/Consumer for applications such as irradiation, flow meter for water discharge, moisture sensor for micro-irrigation, etc.

As mentioned in specifications, Analog and digital sensor inputs will be required for integration of flow meter for water discharge, moisture sensor for micro irrigation, level sensor for overhead tank water storage etc. Only provision for Analog and digital inputs with 0.1% accuracy of Full-Scale Range is required. Sensors will not be in scope of bidder.

v. RMS should have provision to give various modes of operations which are as follows:

i. Remote Mode: - Pump can be made ON/Off using the Mobile App or in case, farmer do not have a smart phone, farmer shall be able to on-off pump thru SMS/missed call.

ii. Auto Mode: - Pump can ON/Off automatically using the sensor data which are installed in the field by the beneficiary. (Cost of sensors will be worn by the beneficiary)

iii. Timer Mode: - Pump controller shall operate pump as per configured schedule using mobile application i.e.,daily start time and running hours of pump.

iv. Manual Mode: - Pump can be made to run into manual mode from field.

To save ground water, provision for remote operation is required so that farmer can switch on and off remotely.

b. Communication Modes:

i. Push Data on Event/Notification: such as pump on, pump off, protection operated, etc.

ii. Push Data Periodically: important parameters of solar pump (as mentioned above) should be pushed to central server on a configurable interval.
Default interval should be of 15 minutes. However, if required, it should be possible to configure the periodic interval in multiple of 1 minute starting from 1 minute and up to 15 minutes. Further, in case of any abnormalities or events, RMS should push on event immediately.

iii. Command on Demand: It should be possible to send commands via GSM or GPRS to RMS either to control pump operations or to update configuration.

c. Communication Protocol: RMS should provide data on MQTT protocol to establish communication with thousands of systems.

d. Security:

i. Communication between RMS and Server should be secured and encrypted using TLS/SSL/X.509 certificate etc.

ii. As a part of IoT protocol, Authentication and Authorization should be implemented using a token/password mechanism

e. Message Format: RMS should provide data in a JSON message format as per requirement of implementing agency.

f. Data Storage: In case of unavailability of cellular network, RMS should store data locally and on availability of network it should push data to the central Server. Local data storage should be possible for one year in case of unavailability of a cellular network. RMUs should have configuration updates over the Air of multiple parameters such as IP, APN, Data logging Interval, Set Points etc. is essential. Software updating should be possible with 2G and even without the presence of SD card. Software updating process and/or failure to update software shouldn't disrupt pumping operations.

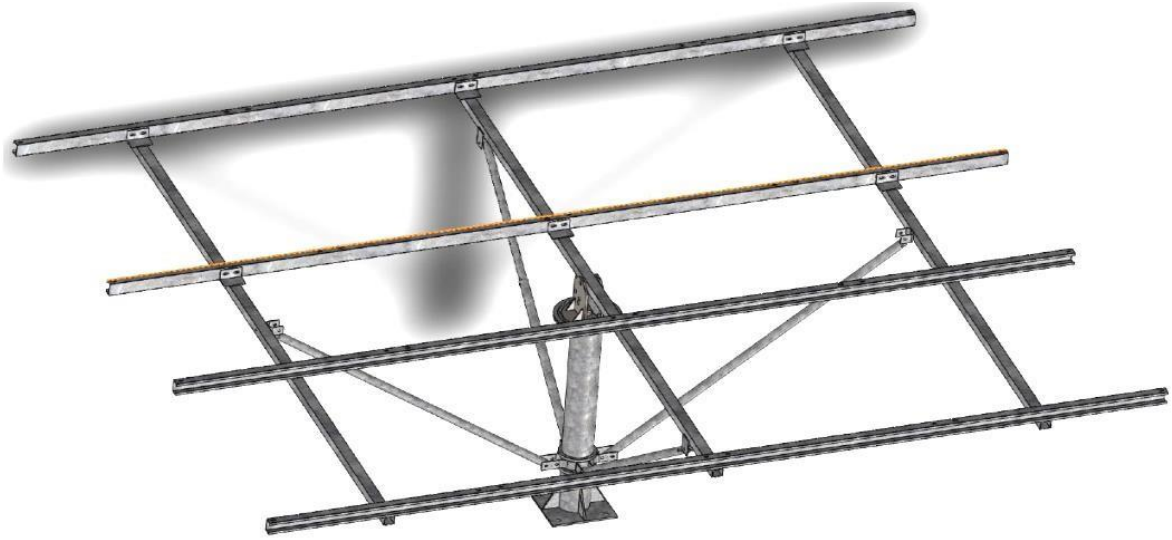
RMS should be connected to the Solar Energy Data Management Platform of the implementing Agency.

g. RMUs should have configuration updates over the Air of multiple parameters such as IP, APN, Data logging Interval, Set Points etc. is essential. Software to be updated through "Programming over the air" on SIA server. Software updating process and/or failure to update software shouldn't disrupt pumping operations.

Manufacturer should consider Programming Over the Air (POTA) instead of Firmware Over the Air (FOTA) to update configurable parameters such as server IP, URL, Port, APN, Periodic Interval etc.

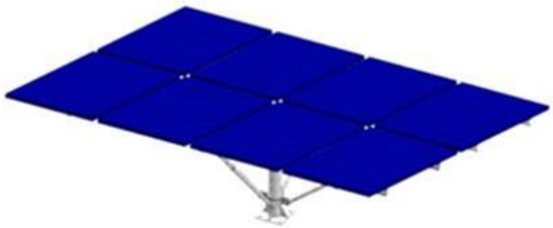
Annexure-II

Specifications for Dual Axis Manual Tracking Type
Module Mounting Structure (MMS) for Solar Water Pumping System



4 Module MMS

6 Module MMS



8 Module MMS

10 Module MMS

A-1 Standard MMS for 4, 6, 8 and 10 solar modules have been specified. These standard MMS may be used in combinations for different capacities of solar water pumping systems as follows:

1. Standard MMS of 4 Modules for 1 HP
2. Standard MMS of 6 Modules for 2 HP
3. Standard MMS of 10 Modules or Combination of standard MMS of 4 Modules and standard MMS 6 Modules for 3 HP
4. Combination of two standard MMS of 8 Modules or combination of standard MMS of 10 Modules and standard MMS 6 Modules for 5 HP

5. Combination of three standard MMS of 8 Modules or combination of two standard MMS of 10 Modules and one standard MMS 6 Modules for 7.5 HP and so on….

A- 2 Specifications of the main parts used in MMS are given below:

A-2.1 Centre Shaft

Centre shaft used in structure shall be of:

a) For 4, 6 and 8 Modules structure - minimum 139 OD with a minimum thickness of 4 mm with base plate minimum 10 mm thickness if used and foundation hardware shall be as per IS 5624.
b) For 10 Modules structure - minimum 165 OD with a minimum thickness of 4 mm with base plate minimum 20 mm thickness if used and foundation hardware shall be as per IS 5624.

For a system without a base plate i.e., direct pilling is shall be as per the site condition based on the properties of Soil and refer (IS 6403 / 456 / 4091 / 875) for foundation design.

A-2.2Rafters

The Main and secondary rafter used in the structure shall be of either SHS & RHS pipe sections.

A-2.3Purlin

Mounting Purlins used in the structure shall be made of Cold form steel section as per IS 1079 with a minimum thickness of 2 mm. **A-2.4 Provision for Seasonal Tilt**

In one structure at least four telescopic supports (three may be used in MMS for 4 modules) either round hollow sections or square hollow sections to be provided to support the mounting structure.

A-2.5 Provision for Daily Tracking

Provision for Daily tracking shall be provided by the way of providing min. 8 mm thick metal sheet with precision cut grooves.

A-2.6 Module Locking System

Modules shall be locked with antitheft bolts of SS 304 Grade. **A-2.7General**

Hardware for Structure Fitment

Either SS 304 or 8.8 grade hardware shall be used for fitment. **A-2.8Hot**

Dip Galvanizing

All structure parts shall be hot dip galvanized according to IS 4759. **A-2.9Tolerance**

for Fabrication

Tolerance for fabrication of steel structure shall as per IS 7215. **A-2.10Welding**

Welding shall be done as per IS: - 822 & grade of welding wire shall be (ER70S-6).

A-2.11 Raw Material Test Certificates (MTC)

MTC of all types of raw material used in dual-axis manual tracking type MMS as per appropriate Indian Standards shall be submitted along with dispatch documents.

A-2.12 Square washer to be used for all the nut-bolts arrangement.

A-2.13 Tests to be performed on Dual Axis Manual Tracking Type MMS for Solar Water Pumping System.

A-2.13.1 For ascertaining proper welding of structure part following shall be referred.

a) Weld wire grade shall be of grade **(ER 70 S - 6);** and
b) D.P. Test (Pin Hole / Crack) **(IS 822)**

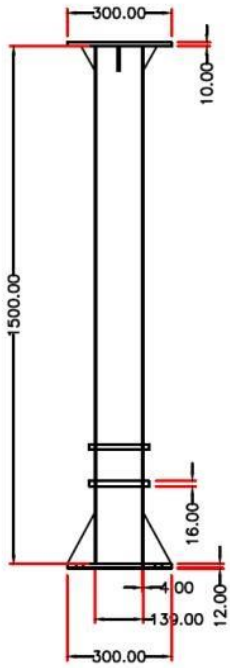
A-2.13.2 For ascertaining hot dip galvanizing of fabricated structure following shall be referred: -

a) Min coating required shall be as per IS 4759.
b) Testing of galvanized material.
c) PREECE Test (CuSO4 Dip Test) **(IS 2633)**
d) Mass of Zinc **(IS 6745 or IS 4759)**

e) Adhesion Test **(IS 2629)**

A-2.14 Due to the use of the higher capacity SPV Modules for the Solar Photovoltaic Water Pumping System the size and weight of each SPV module changes wrt to the lower capacity module. Therefore, the appropriate changes should be made in the MMS design which is to be used with the higher capacity modules such that the stress on the individual structural members shall not exceed the stresses in the corresponding member as specified in the MNRE specification.

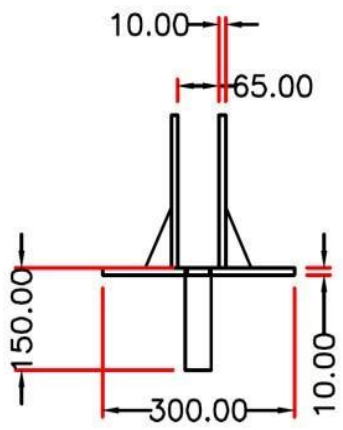
Part1 – Mail Column

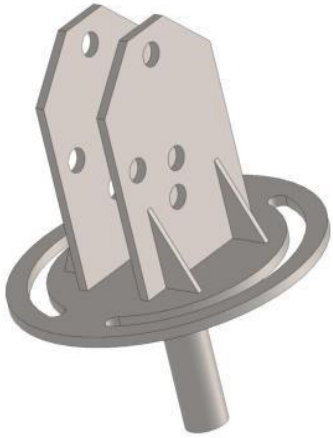


Notes: -

1. All Dimensions are in mm.
2. Main Column material grade should be YST - 240 as per: -IS: 1161 / 1239 & E250 as per: - IS: 1079 / 2062.

Part 2 – Top Plate

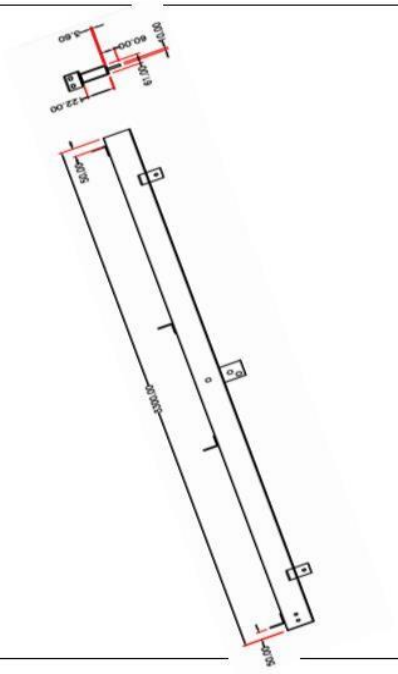




Notes: -

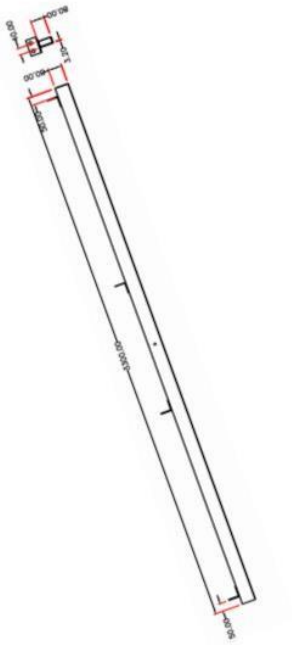
1. All Dimensions are in mm.
2. Top Plate material grade should be YST - 240 as per: -IS: 1161 / 1239 & E250 as per: - IS: 1079 / 2062.

Part 3 – Main Tube



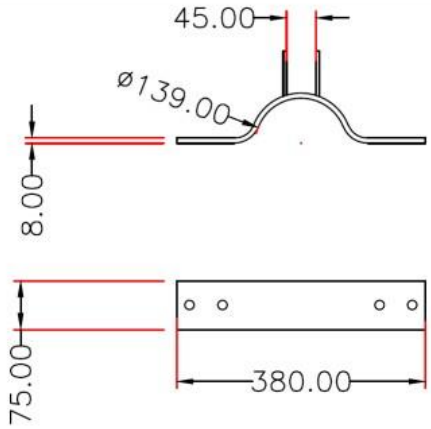
Notes: -

1. All Dimensions are in mm.
2. Main Tube material grade should be YST - 240 as per: -IS: 1161 / 1239 & E250 as per: - IS: 1079 / 2062.

Part 4 – Side Tube	
	
Notes: - 1. All Dimensions are in mm. 2. Side Tube material grade should be YST - 240 as per: -IS: 1161 / 1239 & E250 as per: - IS: 1079 / 2062.	

Part 5 – Purlin	
	
Notes: - 1. All Dimensions are in mm. 2. Mounting Purlin material grade should be E250 as per: - IS: 1079 / 2062 & IS: 811.	

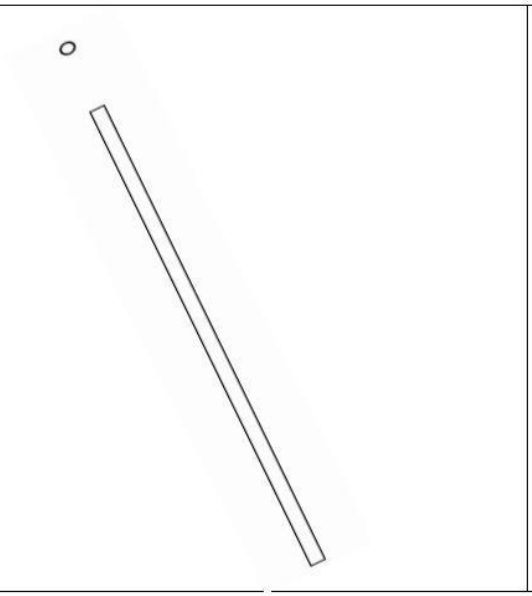
Part 6 – Clamp with Blade



Notes: -

1. All Dimensions are in mm.
2. Clamp with Blade material grade should be as per: - IS: 1079 & E250 as per: - IS: 2062.

Part 7 – Supporting Pipes



Notes: -

1. All Dimensions are in mm.
2. Supporting Pipes material grade should be YST - 240 as per: -IS: 1161 / 1239 & E250 as per: - IS: 1079 / 2062.

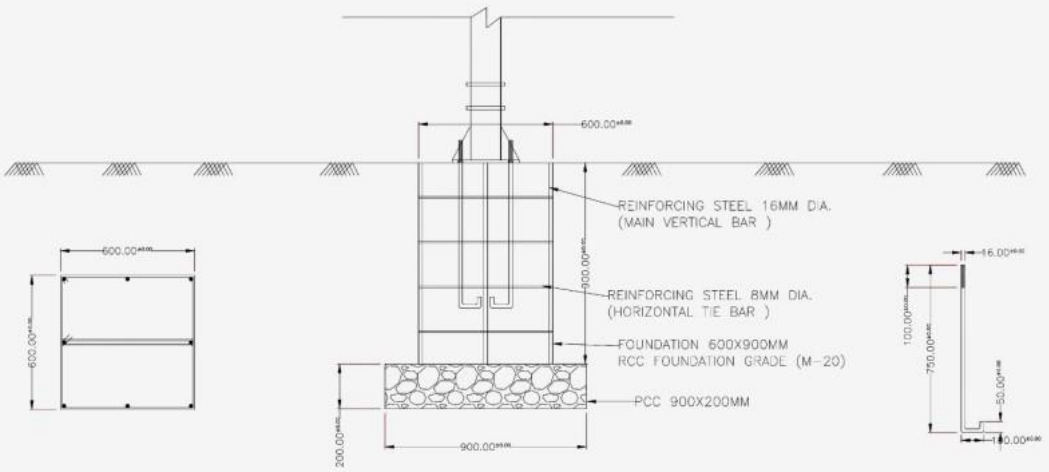
Main Parts of MMS for Solar Water Pumping System

SR. NO.	PART NAME	CROSS SECTION DETAIL	LENGTH (MM)	QUANTITY PER SET
1.	**MAIN POLE**			
	4, 6 and 8 Modules	139 OD	1500	1
	10 Modules	165 OD	1500	1
2.	**TOP PLATE (Common for all)**	300 OD	--	1
3.	**CLAMP WITH BLADE**			
	4, 6 and 8 Modules (for 139 OD pole)	75X8	380	2
	10 Modules (for 165 OD pole)	75X8	380	2
4.	**SUPPORTING PIPES**			
	4, 6 and 8 Modules	41 OD & 33 OD	--	6
	10 Modules	41 OD & 33 OD	--	8
5.	**MAIN TUBE**			
	4 and 6 Modules	60X60X3.6	3300	1
	8 and 10 Modules	122X61X3.6	3300	1
6.	**SIDE TUBE**			
	4 and 6 Modules	50X50X3.6	3300	2
	8 and 10 Modules	80X40X3.2	3300	2
7.	**MOUNTING PURLIN**			
	4 Modules	80X50X15X2	2050	4
	6 Modules	80X50X15X2	3100	4
	8 Modules	80X50X15X2	4150	4
	10 Modules	100X50X15X2	5200	4

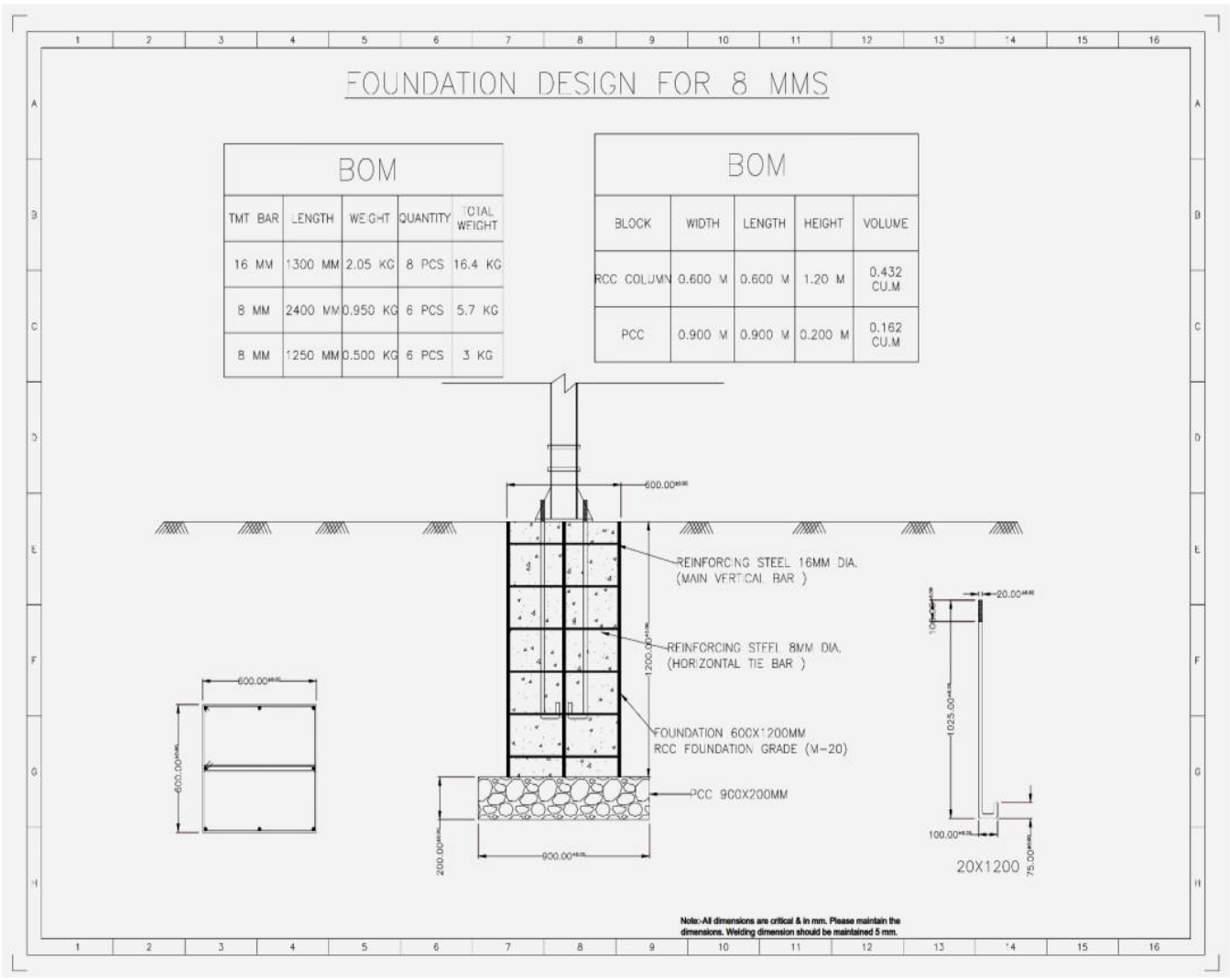
FOUNDATION DESIGN FOR 4/6 MMS

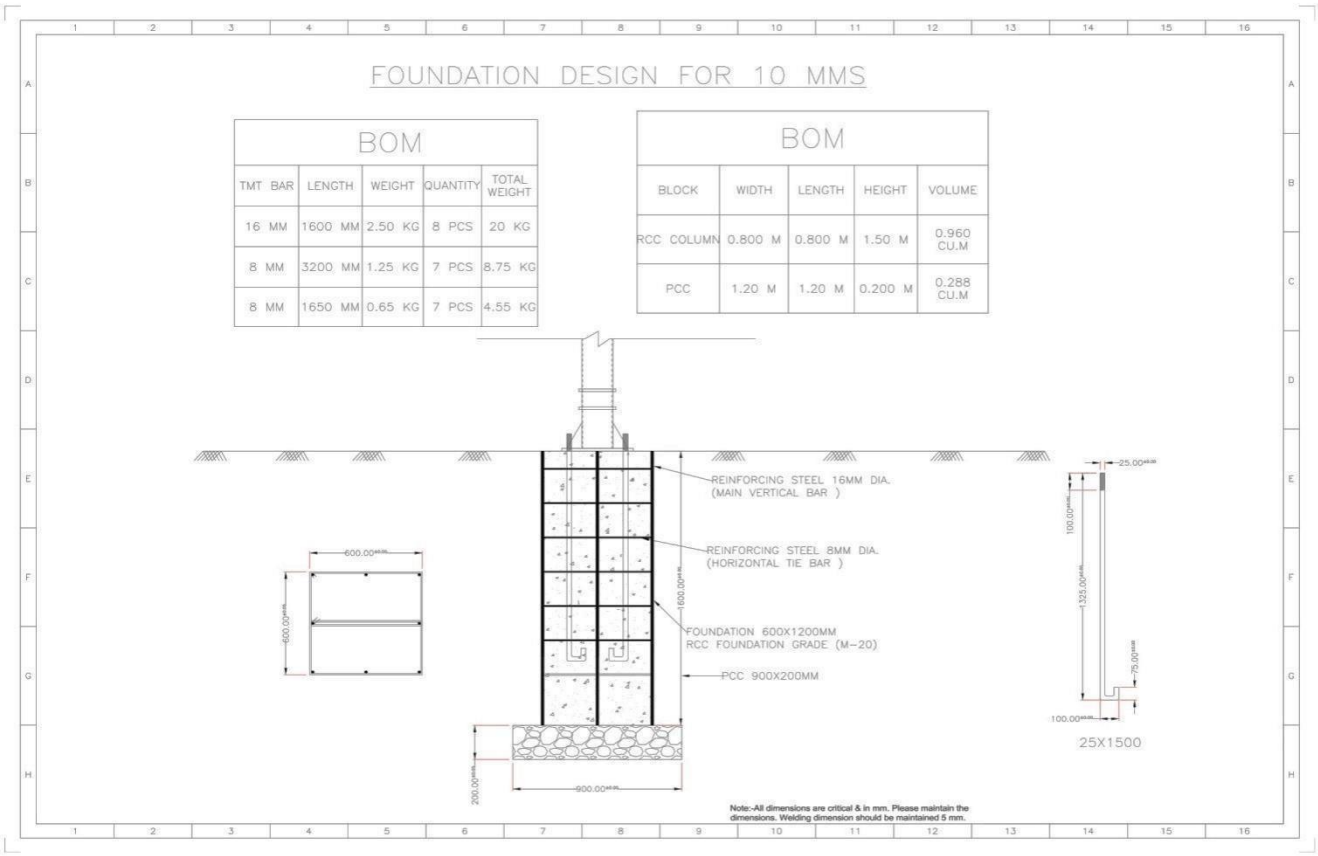
BOM				
TMT BAR	LENGTH	WEIGHT	QUANTITY	TOTAL WEIGHT
16 MM	1000 MM	1.578 KG	8 PCS	12.6 KG
8 MM	2400 MM	0.950 KG	4 PCS	3.8 KG
8 MM	1250 MM	0.500 KG	4 PCS	2 KG

BOM				
BLOCK	WIDTH	LENGTH	HEIGHT	VOLUME
RCC COLUMN	0.600 M	0.600 M	0.900 M	0.324 CU.M
PCC	0.900 M	0.900 M	0.200 M	0.162 CU.M



Note:-All dimensions are critical & in mm. Please maintain the dimensions. Welding dimension should be maintained 5 mm.


FOUNDATION DESIGN FOR 8 MMS
BOM
TMT BAR | LENGTH | WEIGHT | QUANTITY | TOTAL WEIGHT
16 MM | 1300 MM | 2.05 KG | 8 PCS | 16.4 KG
8 MM | 2400 MM | 0.950 KG | 6 PCS | 5.7 KG
8 MM | 1250 MM | 0.500 KG | 6 PCS | 3 KG
BOM
BLOCK | WIDTH | LENGTH | HEIGHT | VOLUME
RCC COLUMN | 0.600 M | 0.600 M | 1.20 M | 0.432 CU.M
PCC | 0.900 M | 0.900 M | 0.200 M | 0.162 CU.M
600.00
REINFORCING STEEL 16MM DIA.
(MAIN VERTICAL BAR)
REINFORCING STEEL 8MM DIA.
(HORIZONTAL TIE BAR)
1200.00
FOUNDATION 600X1200MM
RCC FOUNDATION GRADE (M-20)
PCC 900X200MM
200.00
900.00
20.00
1025.00
100.00
75.00
20X1200
Note:-All dimensions are critical & in mm. Please maintain the dimensions. Welding dimension should be maintained 5 mm.


FOUNDATION DESIGN FOR 10 MMS
BOM
TMT BAR | LENGTH | WEIGHT | QUANTITY | TOTAL WEIGHT
16 MM | 1600 MM | 2.50 KG | 8 PCS | 20 KG
8 MM | 3200 MM | 1.25 KG | 7 PCS | 8.75 KG
8 MM | 1650 MM | 0.65 KG | 7 PCS | 4.55 KG
BOM
BLOCK | WIDTH | LENGTH | HEIGHT | VOLUME
RCC COLUMN | 0.800 M | 0.800 M | 1.50 M | 0.960 CU.M
PCC | 1.20 M | 1.20 M | 0.200 M | 0.288 CU.M
REINFORCING STEEL 16MM DIA. (MAIN VERTICAL BAR)
REINFORCING STEEL 8MM DIA. (HORIZONTAL TIE BAR)
FOUNDATION 600X1200MM RCC FOUNDATION GRADE (M-20)
PCC 900X200MM
600.00
600.00
1600.00
200.00
900.00
25.00
100.00
1325.00
75.00
100.00
25X1500
Note:-All dimensions are critical & in mm. Please maintain the dimensions. Welding dimension should be maintained 5 mm.

Annexure-III

Format of Certificate by the Structural Engineering Department for MMS *(To be submitted on the letterhead of the Department/College)*

This is to certify that the MMS structure drawing along with the foundation ……..(copy enclosed) supplied by……...(Vendor Name) is evaluated at our structural Engineering Department facility at……..(College Name) and it is found superior(in terms of the structural integrity/ load bearing capacity/ stress on the individual structural member) to the MMS structure along with foundation specified in the Specification of Solar Water Pumping System notified by the Ministry of New and Renewable Energy (MNRE) vide **F.No-41/3/2018-SPV Division dated 02.02.2023**.

The following are the changes when compared to the MNRE's MMS suggestive design: -

S.No.	According to the MNRE MMS	According to the vendor MMS

These are the following improvements in the MMS design submitted by the vendor over the MNRE's MMS suggestive design: -

1.
2.

Note:- The lab may attach drawings/calculations wherever needed

Signature of the head (Structural engineering department)

ANNEXURE – IV

Indicative Technical Specifications of Shallow Well (Surface) Solar Pumping Systems with D.C. Motor Pump Set with Brushless.

Description	**Model-1**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**	**Model-8**	**Model-9**	**Model-10**	**Model-11**	**Model-12**	**Model-13**
PV array (Wp)	900	1800	2700	2700	4800	4800	4800	6750	6750	6750	9000	9000	9000
Motor Pump-set capacity (HP)	1	2	3	3	5	5	5	7.5	7.5	7.5	10	10	10
Shut Off Dynamic Head (meters)	12	12	12	25	12	25	45	12	25	45	12	25	45
Water output * (Liters per day)	99000 (from a total head of 10 meters)	198000 (from a total head of 10 meters)	297000 (from a total head of 10 meters)	148500 (from a total head of 20 meters)	528000 (from a total head of 10 meters)	264000 (from a total head of 20 meters)	182400 (from a total head of 30 meters)	742500 (from a total head of 10 meters)	371250 (from a total head of 20 meters)	256500 (from a total head of 30 meters)	990000 (from a total head of 10 meters)	495000 (from a total head of 20 meters)	342000 (from a total head of 30 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE – IV (CONTD.)

Indicative Technical Specifications of Shallow Well (Surface) Pumping Systems with D.C. Motor Pump Set with Brushless.

Description	**Model14**	**Model15**	**Model16**	**Model17**	**Model18**	**Model19**	**Model20**	**Model21**	**Model22**	**Model23**	**Model24**	**Model25**	**Model26**
PV array (Wp)	11250	11250	11250	11250	13500	13500	13500	13500	15750	15750	15750	18000	18000
Motor Pump-set capacity (HP)	12.5	12.5	12.5	12.5	15	15	15	15	17.5	17.5	17.5	20	20
Shut Off Dynamic Head (meters)	12	25	45	70	25	45	70	100	45	70	100	45	70
Water output * (Liters per day)	1237500 (from a total head of 10 meters)	618750 (from a total head of 20 meters)	427500 (from a total head of 30 meters)	258750 (from a total head of 50 meters)	742500 (from a total head of 20 meters)	513000 (from a total head of 30 meters)	310500 (from a total head of 50 meters)	202500 (from a total head of 70 meters)	598500 (from a total head of 30 meters)	362250 (from a total head of 50 meters)	236250 (from a total head of 70 meters)	684000 (from a total head of 30 meters)	414000 (from a total head of 50 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If surface pumps are used in lieu of submersible pumps, the water output must match that of the submersible pumps as specified in this table.

ANNEXURE – IV (CONTD.)

Indicative Technical Specifications of Shallow Well (Surface) Pumping Systems with D.C. Motor Pump Set with Brushless.

Description	**Model27**	**Model28**	**Model29**	**Model30**	**Model31**	**Model32**	**Model33**	**Model34**
PV array (Wp)	18000	18000	20250	20250	20250	22500	22500	22500
Motor Pump-set capacity (HP)	20	20	22.5	22.5	22.5	25	25	25
Shut Off Dynamic Head (meters)	100	150	70	100	150	70	100	150
Water output * (Liters per day)	270000 (from a total head of 70 meters)	189000 (from a total head of 100 meters)	465750 (from a total head of 50 meters)	303750 (from a total head of 70 meters)	212625 (from a total head of 100 meters)	517500 (from a total head of 50 meters)	337500 (from a total head of 70 meters)	236250 (from a total head of 100 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If surface pumps are used in lieu of submersible pumps, the water output must match that of the submersible pumps as specified in this table

ANNEXURE – IV (CONTD.)

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with D.C. Motor Pump Set with Brushless.

Description	**Model-1**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**	**Model-8**	**Model-9**	**Model10**	**Model11**	**Model12**	**Model13**	**Model14**
PV array (Wp)	1200	1800	3000	3000	3000	4800	4800	4800	6750	6750	6750	9000	9000	9000
Motor Pump-set capacity (HP)	1	2	3	3	3	5	5	5	7.5	7.5	7.5	10	10	10
Shut Off Dynamic Head (meters)	45	45	45	70	100	70	100	150	70	100	150	70	100	150
Water output * (Liters per day)	45600 (from a total head of 30 meters)	68400 (from a total head of 30 meters)	114000 (from a total head of 30 meters)	69000 (from a total head of 50 meters)	45000 (from a total head of 70 meters)	110400 (from a total head of 50 meters)	72000 (from a total head of 70 meters)	50400 (from a total head of 100 meters)	155250 (from a total head of 50 meters)	101250 (from a total head of 70 meters)	70875 (from a total head of 100 meters)	207000 (from a total head of 50 meters)	135000 (from a total head of 70 meters)	94500 (from a total head of 100 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE – IV (CONTD.)

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with D.C. Motor Pump Set with Brushless.

Description	**Model15**	**Model16**	**Model17**	**Model18**	**Model19**	**Model20**	**Model21**	**Model22**	**Model23**	**Model24**	**Model25**	**Model26**	**Model27**	**Model28**
PV array (Wp)	11250	11250	11250	11250	13500	13500	13500	13500	15750	15750	15750	15750	18000	18000
Motor Pump-set capacity (HP)	12.5	12.5	12.5	12.5	15	15	15	15	17.5	17.5	17.5	17.5	20	20
Shut Off Dynamic Head (meters)	100	150	180	225	100	150	180	225	100	150	180	225	150	180
Water output * (Liters per day)	168750 (from a total head of 70 meters)	118125 (from a total head of 100 meters)	106875 (from a total head of 120 meters)	84375 (from a total head of 150 meters)	202500 (from a total head of 70 meters)	141750 (from a total head of 100 meters)	128250 (from a total head of 120 meters)	101250 (from a total head of 150 meters)	236250 (from a total head of 70 meters)	165375 (from a total head of 100 meters)	149625 (from a total head of 120 meters)	118125 (from a total head of 150 meters)	189000 (from a total head of 100 meters)	171000 (from a total head of 120 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE – IV (CONTD.)

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with D.C. Motor Pump Set with Brushless.

Description	**Model29**	**Model30**	**Model31**	**Model32**	**Model33**	**Model34**	**Model35**	**Model36**	**Model37**	**Model38**	**Model39**
PV array (Wp)	18000	18000	20250	20250	20250	20250	20250	22500	22500	22500	22500
Motor Pump-set capacity (HP)	20	20	22.5	22.5	22.5	22.5	22.5	25	25	25	25
Shut Off Dynamic Head (meters)	225	300	150	180	225	300	375	180	225	300	375
Water output * (Liters per day)	135000 (from a total head of 150 meters)	99000 (from a total head of 200 meters)	212625 (from a total head of 100 meters)	192375 (from a total head of 120 meters)	151875 (from a total head of 150 meters)	111375 (from a total head of 200 meters)	91125 (from a total head of 250 meters)	213750 (from a total head of 120 meters)	168750 (from a total head of 150 meters)	123750 (from a total head of 200 meters)	101250 (from a total head of 250 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE – V

Indicative Technical Specifications of Shallow Well (Surface) Solar Pumping Systems with A.C. Induction Motor Pump Set

Description	**Model-**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**	**Model-8**	**Model-9**	**Model-10**	**Model-11**	**Model-12**	**Model-13**
PV array (Wp)	900	1800	2700	2700	4800	4800	4800	6750	6750	6750	9000	9000	9000
Motor Pump-set capacity (HP)	1	2	3	3	5	5	5	7.5	7.5	7.5	10	10	10
Shut Off Dynamic Head (meters)	12	12	12	25	12	25	45	12	25	45	12	25	45
Water output * (Liters per day)	89100 (from a total head of 10 meters)	178200 (from a total head of 10 meters)	267300 (from a total head of 10 meters)	132300 (from a total head of 20 meters)	475200 (from a total head of 10 meters)	235200 (from a total head of 20 meters)	168000 (from a total head of 30 meters)	668250 (from a total head of 10 meters)	330750 (from a total head of 20 meters)	236250 (from a total head of 30 meters)	891000 (from a total head of 10 meters)	441000 (from a total head of 20 meters)	315000 (from a total head of 30 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4. (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE –V (CONTD.)

Indicative Technical Specifications of Shallow Well (Surface) Solar Pumping Systems with A.C. Induction Motor Pump Set

Description	**Model14**	**Model15**	**Model16**	**Model17**	**Model18**	**Model19**	**Model20**	**Model21**	**Model22**	**Model23**	**Model24**	**Model25**	**Model26**
PV array (Wp)	11250	11250	11250	11250	13500	13500	13500	13500	15750	15750	15750	18000	18000
Motor Pump-set capacity (HP)	12.5	12.5	12.5	12.5	15	15	15	15	17.5	17.5	17.5	20	20
Shut Off Dynamic Head (meters)	12	25	45	70	25	45	70	100	45	70	100	45	70
Water output * (Liters per day)	11,13,750 (from a total head of 10 meters)	5,51,250 (from a total head of 20 meters)	3,93,750 (from a total head of 30 meters)	2,36,250 (from a total head of 50 meters)	6,61,500 (from a total head of 20 meters)	4,72,500 (from a total head of 30 meters)	2,83,500 (from a total head of 50 meters)	1,89,000 (from a total head of 70 meters)	5,51,250 (from a total head of 30 meters)	3,30,750 (from a total head of 50 meters)	2,20,500 (from a total head of 70 meters)	6,30,000 (from a total head of 30 meters)	3,78,000 (from a total head of 50 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE – V (CONTD.)

Indicative Technical Specifications of Shallow Well (Surface) Solar Pumping Systems with A.C. Induction Motor Pump Set

Description	**Model27**	**Model28**	**Model29**	**Model30**	**Model31**	**Model32**	**Model33**	**Model34**
PV array (Wp)	18000	18000	20250	20250	20250	22500	22500	22500
Motor Pump-set capacity (HP)	20	20	22.5	22.5	22.5	25	25	25
Shut Off Dynamic Head (meters)	100	150	70	100	150	70	100	150
Water output * (Liters per day)	2,52,000 (from a total head of 70 meters)	1,62,000 (from a total head of 100 meters)	4,25,250 (from a total head of 50 meters)	2,83,500 (from a total head of 70 meters)	1,82,250 (from a total head of 100 meters)	4,72,500 (from a total head of 50 meters)	3,15,000 (from a total head of 70 meters)	2,02,500 (from a total head of 100 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE – V (CONTD.)

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with A.C. Induction Motor Pump Set

Description	**Model-1**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**	**Model-8**	**Model-9**	**Model10**	**Model11**	**Model12**	**Model13**	**Model14**
PV array (Wp)	1200	1800	3000	3000	3000	4800	4800	4800	6750	6750	6750	9000	9000	9000
Motor Pump-set capacity (HP)	1	2	3	3	3	5	5	5	7.5	7.5	7.5	10	10	10
Shut Off Dynamic Head (meters)	45	45	45	70	100	70	100	150	70	100	150	70	100	150
Water output * (Liters per day)	42000 (from a total head of 30 meters)	63000 (from a total head of 30 meters)	105000 (from a total head of 30 meters)	63000 (from a total head of 50 meters)	42000 (from a total head of 70 meters)	100800 (from a total head of 50 meters)	67200 (from a total head of 70 meters)	43200 (from a total head of 100 meters)	141750 (from a total head of 50 meters)	94500 (from a total head of 70 meters)	60750 (from a total head of 100 meters)	189000 (from a total head of 50 meters)	126000 (from a total head of 70 meters)	81000 (from a total head of 100 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE – V (CONTD.)

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with A.C. Induction Motor Pump Set

Description	**Model15**	**Model16**	**Model17**	**Model18**	**Model19**	**Model20**	**Model21**	**Model22**	**Model23**	**Model24**	**Model25**	**Model26**	**Model27**	**Model28**
PV array (Wp)	11250	11250	11250	11250	13500	13500	13500	13500	15750	15750	15750	15750	18000	18000
Motor Pump-set capacity (HP)	12.5	12.5	12.5	12.5	15	15	15	15	17.5	17.5	17.5	17.5	20	20
Shut Off Dynamic Head (meters)	100	150	180	225	100	150	180	225	100	150	180	225	150	180
Water output * (Liters per day)	157500 (from a total head of 70 meters)	101250 (from a total head of 100 meters)	95625 (from a total head of 120 meters)	75375 (from a total head of 150 meters)	189000 (from a total head of 70 meters)	121500 (from a total head of 100 meters)	114750 (from a total head of 120 meters)	90450 (from a total head of 150 meters)	220500 (from a total head of 70 meters)	141750 (from a total head of 100 meters)	133875 (from a total head of 120 meters)	105525 (from a total head of 150 meters)	162000 (from a total head of 100 meters)	153000 (from a total head of 120 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

ANNEXURE – V (CONTD.)

ANNEXURE – V (CONTD.)

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with A.C. Induction Motor Pump Set

Description	**Model29**	**Model30**	**Model31**	**Model32**	**Model33**	**Model34**	**Model35**	**Model36**	**Model37**	**Model38**	**Model39**
PV array (Wp)	18000	18000	20250	20250	20250	20250	20250	22500	22500	22500	22500
Motor Pump-set capacity (HP)	20	20	22.5	22.5	22.5	22.5	22.5	25	25	25	25
Shut Off Dynamic Head (meters)	225	300	150	180	225	300	375	180	225	300	375
Water output * (Liters per day)	120600 (from a total head of 150 meters)	90000 (from a total head of 200 meters)	182250 (from a total head of 100 meters)	172125 (from a total head of 120 meters)	135675 (from a total head of 150 meters)	101250 (from a total head of 200 meters)	81000 (from a total head of 250 meters)	191250 (from a total head of 120 meters)	150750 (from a total head of 150 meters)	112500 (from a total head of 200 meters)	90000 (from a total head of 250 meters)

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of 7.15 kWh/ sq.m. on the surface of PV array (i.e. coplanar with the PV Modules).

Notes:

1. Suction head, if applicable, minimum 7 meters.
2. For higher or lower head / PV capacity, or in between various models; water output could be decided as per the clause 4 (i.e. Performance Requirements) specified earlier.
3. If submersible pumps are used in lieu of surface pumps, the water output must match that of the surface pumps as specified in this table.

Annexure-'B'

Guidelines on
Testing Procedure for Solar Photovoltaic Water Pumping System

1 SCOPE

These Guidelines lays down basis for the testing set up and testing procedures for Solar Photovoltaic (SPV) water pumping systems. The SPV water pumping system covered are centrifugal pumps of all types from 1HP (0.75 kW) to 25 HP (18.75 kW).

2 REFERENCE STANDARDS

The Indian and IEC Standards listed at Annex A contain provisions which, through reference in this text, constitute provision of this standard. The latest editions of the indicated standards should be considered.

3 DEFINITIONS OF SYSTEMS AND PARAMETERS

3.1 Systems

3.1.1 *Stand-Alone Solar PV Water Pumping System*

A Solar PV Water Pumping System in stand-alone operation is neither connected to the grid nor to the battery bank and is comprised mainly of the following components and equipment:

PV Modules, cabling, controller, motor pump-set, and hydraulic piping. The combination of all these components shall be unique for different capacities. Any change in combination will be treated as a different model of pumping system.

3.1.2 *Motor-Pump Set*

The Motor-pump set consists of the pump (centrifugal pump) and the driving motor.

3.1.3 *Controller*

The controller converts the DC power (DC voltage & Current) of the PV array into a high or low DC voltage power, or converts this DC power into single -phase or multi-phase alternating-current power (voltage or alternating current) suitable for driving the motor of Motor-pump set.

NOTE: - The Controller may also include equipment for MPPT, monitoring, metering and for protection purposes.

3.2 Parameters

Following parameter shall be referred during testing of SPV pumping system:

Table 1 - Parameters

Parameter	**Symbol**	**Unit**
(1)	**(2)**	**(3)**
Array voltage (DC)	V_a	V
Array current (DC)	I_a	A
Array open circuit voltage (DC)	V_{oc}	V
Array short circuit current (DC)	I_{sc}	A
Array maximum power point voltage(DC)	V_{mpp}	V
Array maximum power point current (DC)	I_{mpp}	A
Pressure as measured	p	kg/cm^2
Flow rate	Q	Lps /Lpm /m^3/h
Motor voltage DC or AC	V_m	V
Motor current DC or AC	I_m	A
Motor voltage (multi-phase AC)	V_{rms}	V
Motor current (multi-phase AC)	I_{rms}	A
Power factor	$cos\emptyset$	-
AC frequency (or DC switching frequency)	F	Hz
Motor speed	N	Min^{-1}
Radiation	E_e	W/m^2
Temperature	T	^oC

4 TEST SETUP

4.1 Test Set-Up

Illustration(s) of test set-ups are shown in Figure 1 & Figure 2, and a block diagram of required test set-up is shown in Figure 3. All test set-ups shall conform to applicable model test set-ups referred

to above and the water level in the sump well, locations the of throttle valve, flow meter and pressure gauge/sensor connections as indicated in the test set-up(s) shall conform to Figure 1, Figure 2 & Figure 3 accordingly.

4.2 Precautions for Test Setup:

Before initiating testing of the SPV pump the following precautions must be followed:

i) In case of a direct coupled pump-set, proper alignment of the input pipe, output pipe and sensors shall be ensured.

ii) Air tightness in suction line shall be ensured and the general layout of the system pipe work should be designed to avoid airlocks.

iii) The offset pipe of suction line shall either be horizontal or inclined upward towards the pump and shall never be inclined downward towards the pump to avoid air trapping. iv) For the delivery head, a pressure gauge/sensor shall be connected to the delivery line with tapping as shown in Figures 1 or 2 or 3. The tapping shall be flush with the inside of the pipe and shall have its axis at right angles to the direction of flow. The pipe set up between the pump outlet and the pressure sensor should be the same diameter as the manufacturer's outlet fitting. Sensor/gauge may be connected to the tapping point through a flexible hose.

v) Preferably, a Digital Pressure sensor/gauges of suitable range need to be used for the measurement of head. Care shall be taken to eliminate any leaks in the connecting pipes and to avoid the trapping of air in the connecting pipe or hose.

vi) It is assumed that over the normal operating range of the pump, the pressure drop due to frictional losses between the pump outlet and the pressure sensor will be negligible and the kinetic energy component of the water at the pump outlet will be small compared to the increase in potential energy due to the increased pressure across the pump.

vii) For instantaneous performance testing, pressure can be sustained by means of a simple gate valve in which backpressure is sustained by restricting the flow. An automatic control valve(s) may be used to sustain a constant upstream pressure. Pressure may also be sustained by means of a pre-pressurized air chamber operating with a pressure maintaining valve at the outlet. A real water column may also be used.

viii) A good quality digital flow meter with electrical output linearly proportional to flow rate shall be connected at the other end of the delivery pipe. The distance between the auto control valve and flow meter shall be a minimum of 1.5 meters to ensure the laminar flow of water. ix) After flow meter the end of the discharge pipe should be beneath the water surface to prevent splashing. This could cause a mixed water / air bubbles fluid entering the pump inlet and affecting its proper operation. If so then a vertical baffle or a similar arrangement shall be inserted in the tank between the pump intake and the return pipe such that water does not make any splash and avoid any bubbles when spread to the bottom of tank to reach the input pump. In this way any small bubbles will be excluded, as they will

remain near the surface. Alternatively, a large pipe can be placed around the pump with its top breaking the surface and an arch cut in its base to allow water entry.

4.3 Priming Arrangement

A non-return valve/ foot valve shall be used in suction line, further it may also require a suction pipe need to be filled with water for priming purpose in case of surface pumps.

4.4 PV Module Array Structures:

For testing the SPV pump using the actual solar array, outdoor PV array structures with different module mounting capacities (4,6,8,10, etc.) should be used. The modules are mounted on the structures with a tracking facility to optimize irradiance, power output and accordingly, the total quantity of water pumped in a day.

4.5 Sun Simulator PV Module Tester:

To estimate the wattage of the PV modules under STC, a high precession (at least class AAA as per IEC 60904-9) sun simulator module tester is required in the pump testing lab. Alternatively, all PV modules should have STC testing certificate from an NABL accredited test laboratory and the date of testing should not be older than a year. In the STC testing, if the module is found degraded, the degraded data should be used.

4.6 Simulator (Electrical) Testing

Ideally, the SPV pump should be tested as per the site conditions where it is designed to operate. The details of outdoor testing are discussed in the next sessions. However, for testing under simulated conditions, a programmable Solar PV (SPV) array simulator capable of simulating a given solar PV array configuration (i.e., the number of modules, the type and the series / parallel combination), site radiation and temperature conditions shall be required for laboratory. Measurement equipment with acceptable accuracy and precision shall be used for the detection and data logging of the parameters listed in Table 2.

Table 2 - Core Parameters to be Measured and Recorded

Parameter	**Symbol**	**Unit**	**Measurement Uncertainty**
(1)	**(2)**	**(3)**	**(4)**
SPV Array voltage	*Va*	V	≤1 percent
SPV Array current	*Ia*	A	≤1 percent
Pressure/head as measured	*p*	Kg/cm^2	≤2 percent

Flow rate	Q	lps	≤2 percent
Solar irradiance	E_e	W/m^2	≤2 percent

4.7 Sump Well (Hydraulic Testing)

For the performance testing of SPV pumps a sump well with sensors for sensing, monitoring and recording of pump parameters will be required. The details of the resources required are given below:

a) Water tank/sump of required dimensions,
b) PV Modules, Controller, Motor-pump set, and Other Accessories (Test Sample)
c) Pressure transducer with data logging system
d) Flow Meter with data logging system
e) Suction pipe(s) (if applicable)
f) Discharge pipe(s)
g) Pyranometers and Temperature sensors with data logging system
h) Auto control valves
i) SPV array Simulator(s) for simulation of module arrays for testing
j) SPV array for realistic testing
k) Structure for mounting modules for realistic condition testing
l) AAA class Sun simulator for testing of modules performance at STC

Refer to the block diagram in Figure 3.

4.8 Constant Head Requirement

Dynamic head variation during test shall be within limit as specified in column 2 of table 3 and the allowable variation in arithmetic average (from the start of flow point to the end of flow point refer to figure 5) of the dynamic head shall be within value specified in column 3 of table 3. Any data with head variation during the test beyond the limit specified in column 2 of table 3 shall be treated as garbage data and shall not be considered in calculations of daily water output.

Table 3 - Allowable variation in arithmetic average of dynamic head

Required Dynamic head in (meters)	Allowable variation in dynamic head during test	Allowable variation in arithmetic average of dynamic head
(1)	**(2)**	**(3)**
10	± 15 % = ± 1.5 meter	± 0.5 meter
20	± 10 % = ± 2 meter	± 0.5 meter
30	± 10 % = ± 3 meter	± 0.7 meter

50	± 8 % = ± 4 meter	± 0.8 meter
70	± 7 % = ± 4.9 meter	± 0.8 meter
100	± 7 % = ± 7 meter	± 1 meter
120	± 7 % = ± 8.4 meter	± 1 meter
150	± 7 % = ± 10.5 meter	± 1 meter
200	± 7 % = ± 14 meter	± 1 meter
250	± 7 % = ± 17.5 meter	± 1 meter

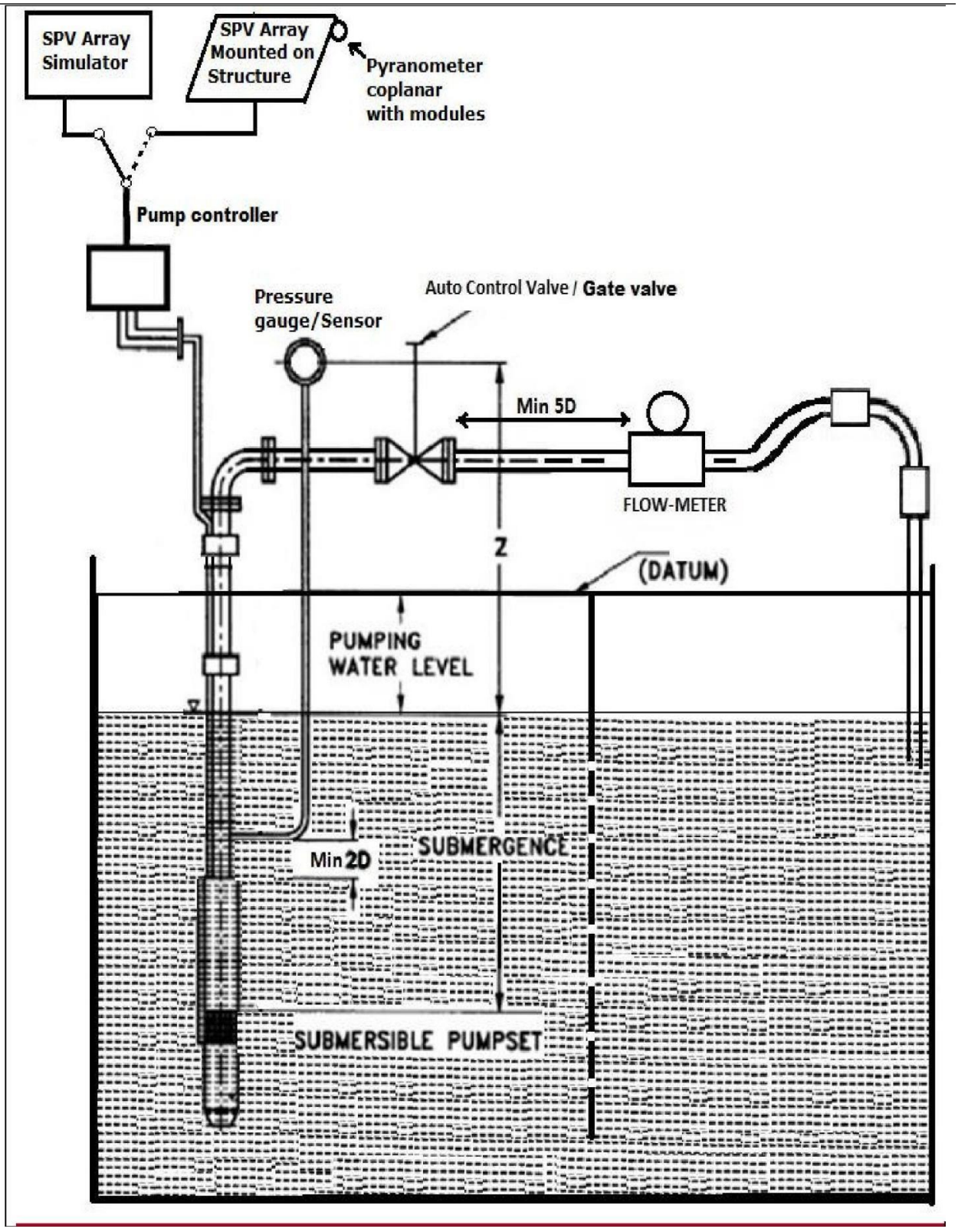


FIGURE 1. TYPICAL TEST SET-UP FOR SUBMERSIBLE SPV WATER PUMP-SET

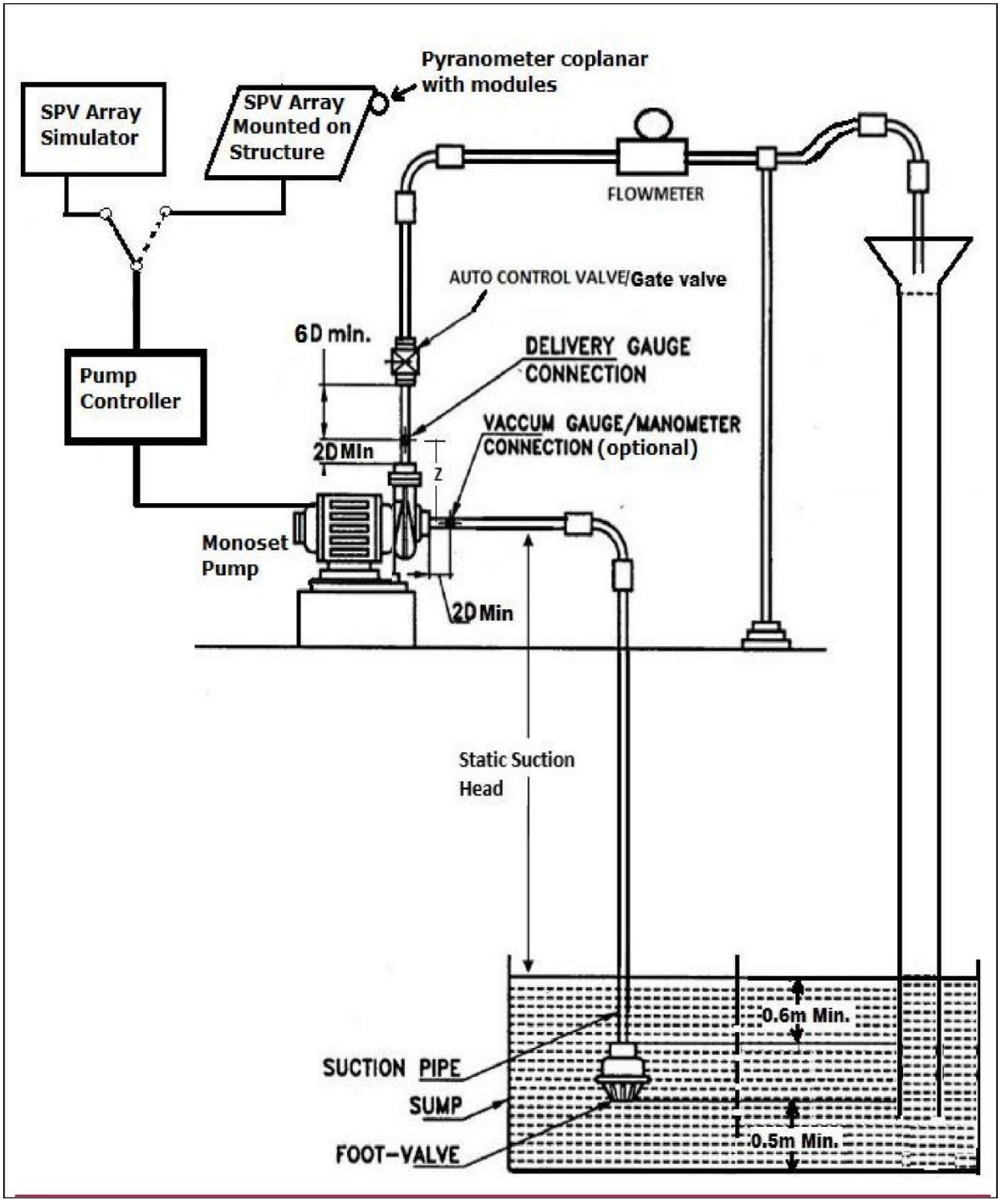


FIGURE 2 . TYPICAL TEST SET-UP FOR SPV SURFACE/MONO-BLOCK WATER PUMP SET

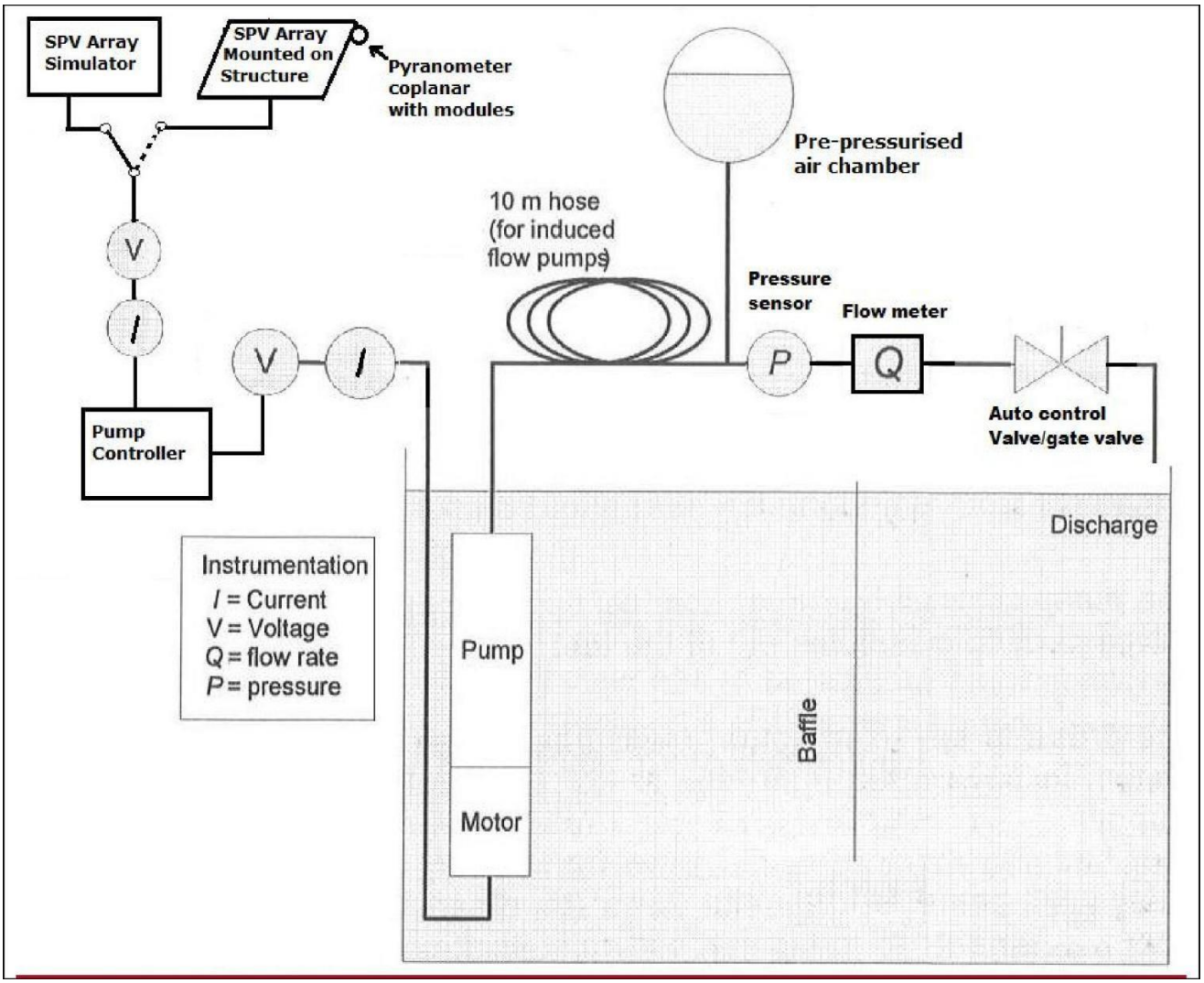


FIGURE 3 . BLOCK DIAGRAM OF TEST SETUP FOR SUBMERSIBLE PUMP-SET

5. TEST PROCEDURE FOR PERFORMANCE EVALUATION OF SPV PUMPING SYSTEM:

There are three major profiles to be completed for comprehensive certification and qualification of a sample SPV water pump as per this standard. Two steps correspond to two simulation profiles, Hot & Cold. The third step corresponds to actual outdoor conditions testing using natural sun radiation. The SPV water pump sample should attain or exceed the qualification benchmarks set by MNRE for the specified model & design, in all three profiles. Before executing the three profiles testing, it is necessary to conduct the following protections test on the sample:

1. **Dry running:** System must shut down within one minute/manufacturer specification in dry running condition (when the water level goes below pump inlet).
2. **Open circuit:** System should not operate if any phase become open circuited, the controller shall be tripped within one minute/manufacturer specified time.

3. **Short circuit:** System should not operate if any two or all three-phase short circuited.

4. **Reverse polarity:** System should not malfunction if the polarity of input power is reversed.

5.**Under Voltage**: System shall not operate if the terminal voltage goes below the limit specified by the manufacturer.

6. **Surge Protection:** A surge protection device (SPD) shall be installed on the input side.

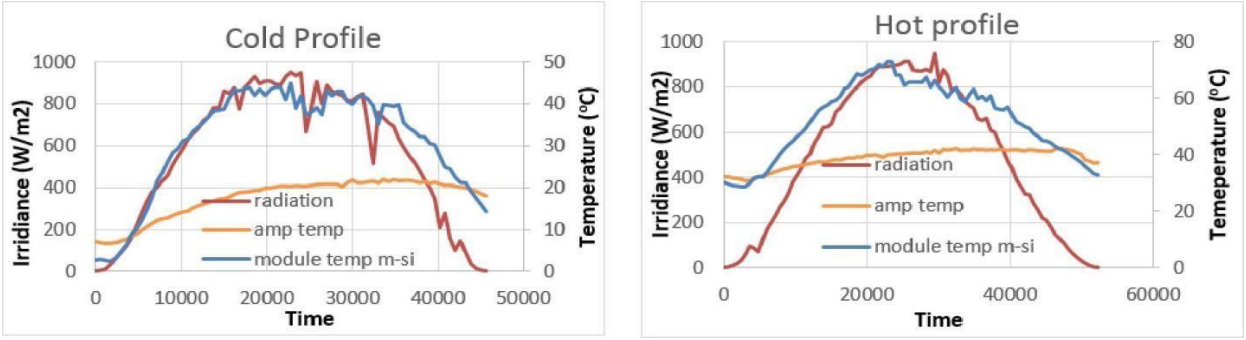
The performance testing of the SPV Pumping System for the three procedures are discussed in the following sections:

5.1 Simulator Methods:

Simulation methods are the easiest and fastest way of estimating SPV pump performance. However, in these methods actual PV array is not used, instead a PV array simulator is used. Here, a Programmable SPV array simulator capable of generating power output equal to actual SPV array under the given radiation and temperature conditions for a given SPV array configuration (i.e., the number of modules, the type and the series / parallel combination) will be used. Although any radiation & temperature can be created, for the purpose of testing, two conditions one Hot summer day conditions (hot profile) and the other Winter day conditions (cold profile) shall be used.

Hot & Cold Profiles:

The typical Hot & Cold day profiles are shown in Figure 4. These profiles of full-day Solar irradiance and temperature shall be loaded in PV array simulator, sequentially one after the other. The simulator output is connected to the motor & pump through the pump controller and



the profiles are run-on a real-time basis. The performance parameters as given in table 2 are collected every minute for the entire duration of run time (per day). The total water output and output in liters /watt STC/ day can be estimated at desired constant head / dynamic head for complete duration of profiles. The temperature coefficient of power shall be derived from the IEC 61215/IS 14286 standard test report for the module supplied with the pump of the same model.

FIGURE 4 . TYPICAL SOLAR RADIATION HOT AND COLD PROFILE

Note: Per second data for hot and cold profile may be downloaded from MNRE website using the following link: - https://mnre.gov.in/solar/standard-specs-cost

5.2 Outdoor Condition using sun radiation:

For operating the motor-pump set using the actual PV array, an array as per the Motorpump set HP capacity is to be designed. The STC wattage of all the PV modules is measured first, as per IEC 60904-1/ IS 12762-1 or clause number 11.6 of IEC 61215/ clause number 10.6 IS1 4286. The modules will then be installed on the structures, both in series and parallel combinations, as required, are connected and a designed PV module array is created. The array output is connected to the Motor & Pump through the pump controller.

The Per day water output test has to be performed at desired constant dynamic head for the complete day from dawn to dusk (sunrise to sunset). Irradiance shall be measured at coplanar to modules. Tracking may be done manually or automatically. Total flow shall be corrected at reference Average Daily Solar Radiation of 7.15 kWh/m^2 on the surface of SPV array (i.e., coplanar with the SPV Modules). Results of the SPV pumping system obtained under outdoor conditions shall be compared with data supplied by the applicant and also from the results obtained through simulator testing to assess the performance of the system.

NOTE: -

- Handle PV modules carefully during installation.
- PV modules should be free of dirt (sand, bird droppings etc.,) during the test.
- Install PV modules in shadow free and accessible area. - Tracking shall be minimum of three times a day for maximum performance
- Pyranometer should be mounted co-planer with SPV modules.

Recording, measurement & logging of flow for the period of hot profile, cold Profile and Realistic condition needs to be done.

5.3 Remote Monitoring System Verification

Provision for remote monitoring of the installed pumps must be made in the controller through an integral arrangement and it should be capable of providing live status/parameters through web portal.

6 MEASUREMENTS AND APPARATUS

6.1 Solar Radiation Measurement

Solar radiation at surface co-planar with the Module shall be measured using a pyranometer. Response time of the pyranometer should not be more than 15 seconds. The interval between two readings should not be more than one minute for the calculation of average daily solar radiation.

6.2 Measurement of Head 6.2.1 *Delivery Head*

Digital pressure gauge/sensor shall be used, also a data logging system must be used for calculation of average head through day. The interval between the two readings should not be more than one minute for calculating average head. Accuracy for pressure sensor shall be within ± 0.5 percent.

6.2.2 *Suction Lift*

Suction head shall be kept constant by maintaining a constant vertical distance between sump water level and the centre of the Pump's impeller. Correction in head shall be applied as per atmospheric pressure at the testing place.

Distance measuring scale or laser-based sensors can also be used for suction head measurement.

6.3 Measurement of Rate of Flow

A good quality Magnetic flow-meter of minimum 0.5% accuracy class shall be used for flow measurement, data logging system shall be used for calculating cumulative water volume throughout the day. The maximum flow rate of flowmeters should be at least 1.5 times the maximum flow rate of pumps. Instrument can be selected as per 3.2 of IS 11346. The interval between two readings should not be more than one minute for the calculation of cumulative flow. The accuracy of flowmeters shall be within ± 0.5 percent.

7 CALIBRATION OF APPARATUS

All measuring instruments have to be calibrated periodically as per requirement.

8 STEP-WISE TEST PROCEDURE

8.1 Per Day Water Flow Test of Submersible Pumps

a) Install the Pump-set as per Figure 1.

b) Connect Pump-set with controller as per manufacturer instruction

c) Use Solar PV Array Simulator Or actual output from SPV array, for testing the pump-set at the given profile.

d) Connect controller with SPV array Simulator or with actual SPV array output as per requirement of profile

e) Input STC performance data of each module in the array into simulator and invoke the desired profile and run the same.

f) For a realistic condition test, make an array by mounting all SPV modules on structure(s) by connecting modules in series or parallel as per requirement.

g) Start the controller after connecting it with the array or array simulator.

h) Use a head control valve or pre-pressurize tank to maintain constant desired dynamic head.

i) Tabulate the readings in Table 2 and the recording interval shall be less than or equal to 1 minute.

8.2 Per Day Water Flow Test of Surface Pumps

a) The pump-set should be installed as demonstrated in Figure 2

b) Maintain height to get desirable static suction head as per requirement

c) Install foot valve or non-return valve as per manufacturer instructions; and

d) Follow steps (b) to (i) of para-No. 8.1

9 OBSERVATIONS

The following observations of the complete day profile shall be recorded in a test record sheet. The following observations shall be used to derive pump characteristics:

a) Instantaneous Solar irradiation (W/m^2), pyranometer reading
b) Delivery gauge/sensor readings
c) Suction gauge/sensor readings / Distance between water level to impeller eye, (if applicable)
d) Gauge distance correction factor, Z
e) Calculate cumulative daily solar radiation on surface co-planar with solar modules (kWh/m^2),
f) Calculate total water discharge in a day at the desirable constant head (Litres per Day)
g) Water output per day per watts peak (Litres/Wp)

10 COMPUTATION OF TEST READINGS

10.1 Computation of Total Head for Surface (Mono-set) Pump

Total Head $H = H_{SSL} + H_d + Z + ((V_d^2 - V_s^2) /2g)$

H_{SSL} = Total Static suction Lift in meters of water column (measured by calibrated measuring tape or any distance measuring sensors)

H_d = Delivery gauge/sensor reading in meters of water column

Z = Gauge distance correction factor for delivery gauge centre and inlet pipe centre in meters (refer figure 2). If the delivery gauge centre is below the inlet pipe centre, Z should be subtracted from the delivery gauge reading and if the delivery gauge centre is above inlet pipe centre, should be added to the delivery gauge reading; the gauge distance correction factor shall never be applied to the suction vacuum gauge or mercury manometer reading irrespective of their positions:

V_d = Velocity at delivery gauge/sensor connection, m/s;
V_s = Velocity at suction gauge/sensor connection, m/s;
and g = Acceleration due to gravity in m/s2.

The Total Static Suction Lift in surface pump (H_{SSL})

H_{SSL} = Height in meter from water level to impeller + Altitude correction in meter + water temperature correction in meter.

10.1.1 Correction for Altitude

Barometric pressure shall be recorded at the test place. The difference between atmospheric pressure at the test place and 10.33 mWC (that is atmospheric pressure at MSL) shall be deducted from Static suction lift.

10.1.2 Correction for Water temperature

Static suction lift specified in the below Table shall be increased or reduced as given below when the water temperature is below or above 33°C.

Table 4 - Correction for water temperature

Hourly Average of Water Temperature °C	Vapour pressure mWC	Correction in Static suction lift above and below 33°C water temperature mWC
10	013	+ 0.39
15	0.18	+ 0.34
20	0.24	+ 0.28
25	0.33	+ 0.19
30	0.43	+ 0.09
33	0.52	0.00
35	0.58	- 0.06
40	0.76	- 0.24
45	1.00	- 0.48
50	1.28	- 0.76

Suction head shall be adjusted minimum 3 times in a day as per average water temperature and barometric pressure, by adjusting water level of tank.

Following formula can also be used on behalf of table
4 $y = -0.0007 x^2 + 0.0130 x + 0.3079$

Where
y = Correction in Static suction lift x =
Average water temperature.

10.2 Computation of Total Head for Submersible Pump-sets

Total head $H = Hd + Z + ((V_d^2) / 2g)$ Where:

H_d = Delivery gauge/sensor reading in meters of water column;
Z = Gauge distance correction factor for delivery gauge. Distance between gauge/sensor center to tank water level (refer figure 1).
V_d = Velocity at delivery gauge/sensor connection in m/s; g = Acceleration due to gravity in m/s^2.

10.3 Total Water Per-Day

Total water output per day shall be calculated by Integration (Sum) of flow rate with respect to time. Integration shall start from the time when pump set achieves desired constant head in morning time (start point refer figure 5) and ends at the time when pump set is unable to achieve desired constant head in evening time (End point refer figure 5).

In case if Average Daily Solar Radiation found less than requirement then test shall be performed on next sunny day.

10.4 Water Output Per Day Per Watt Peak

Water output per day per watts peak (liter/Wp) = Water output (Liters) per day at specified head / Array STC power in watts-peak

10.5 Cumulative Daily Solar Radiation

Cumulative Solar Radiation (kWh/m^2) in a day= Average of instantaneous irradiance reading from Dawn to Dusk (kW/m^2) X period of time in hours.

This can be obtained through time weight summation of pyranometer readings.

Dawn = Time of sunrise when irradiance become positive from zerovalue. Dusk = Time of sunset when irradiance become zero from positive value.

10.6 Mismatch in maximum power at STC among modules of array

The mismatch shall be calculated as under:

$$\%\text{Power mismatch in array} = \frac{(P\text{Max} - PMin)}{(PMax + PMin)} \text{x} 100$$

PMax = Maximum power among modules in array
PMin = Minimum power among modules in array

10.7 Efficiency of Array

The efficiency of Array = The power output from array / (total area of modules in m^2 X Sun radiation in watts/m^2)

10.8 Fill Factor of Array

Fill factor of Array = This has to be measured using a PV array tester. This depends on the overall series resistances and shunt resistances of modules in the array.

10.9 Output Voltage of Array

Output Voltage of Array = Sum of voltages of modules in series
In parallel connected module strings, the lowest voltage generating strings will set the voltage.

10.10 Output Current of Array

Output Current of an Array = Sum of currents of the parallel strings in the array. The output current of a string is controlled by the lowest current generating module.

10.11 Output Power of Array

Output Power of Array = Sum of power of all modules- mismatch loss This can be measured by PV array tester.

11 EXAMPLES:

11.1 Total per day flow

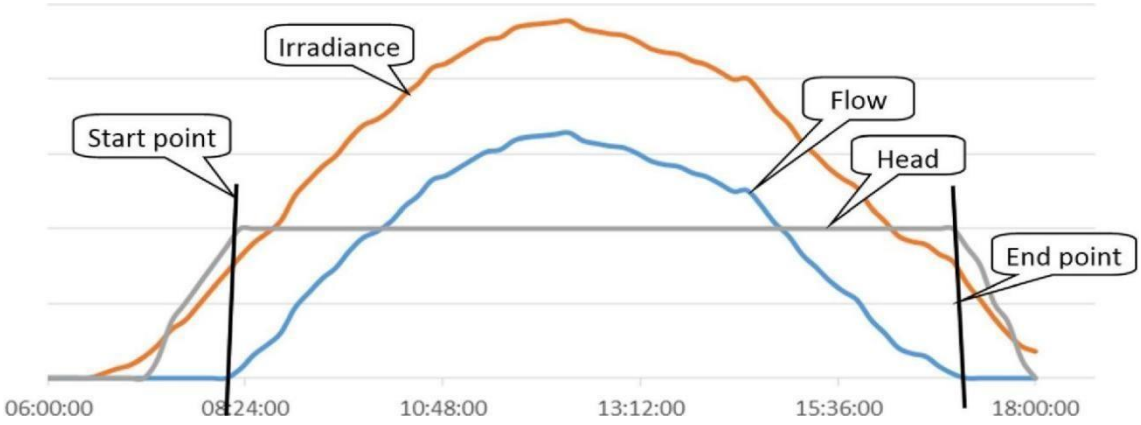


FIGURE 5- TYPICAL GRAPH FOR UNDERSTANDING CALCULATION

If pump achieved constant head at 8:15:30 AM (Start point in figure 5) and in evening Pump unable to keep constant desired head at 17:45:30 PM (End point in figure 5).Flow rate in lps is recorded from 08:15:30 AM to 17:45:30 PM (start point to end point) If the average discharge calculated is 3.55 lps, then the total flow will be

Total duration of flow = End Time - Start time

= 17:45:30 - 8:15:30

= 9 h: 30 m: 0 s Total

duration from start to end in seconds:

= (9x3600) + (30x60) + (0x1) = 34200seconds **Total**

discharge per day in liters = Average flow in lps x Total no of seconds

= 3.55 x 34200 = 121410 litters

For a realistic test, correct the total flow at reference Average Daily Solar Radiation as specified in MNRE specifications.

12 TEST REPORTS

In order to have uniformity, the test reports issued by the Labs shall use a common format developed by NISE. The test report shall be issued only in the name of applicant and shall clearly indicate that whether the Solar PV water pumping system qualify as per MNRE specifications or not along with the details. A soft copy of test report shall also be provided to the applicant and shall be made available on web-portal of test lab, which may be accessed by the implementing agencies for verifying the authenticity of the report.

13 USE OF OTHER BRAND OF SOLAR MODULES

In case a test lab has tested and issued an approval certificate for a particular model of SPV pumping system using a particular model of SPV Modules, the applicant may use different models of SPV Modules for the same model of SPV pumping system without going for re-testing of complete SPV pumping system with a different model of SPV Modules, provided the test lab certifies that the qualitative characteristics of newly proposed model of SPV Module are not inferior to the SPV Module with which the SPV pumping system was tested. In addition, the total wattage capacity of the Solar Array with the proposed model of SPV Modules shall be equal or higher than the wattage capacity specified by the MNRE for that model of SPV pumping system. The proposed model of SPV module shall also meet the following conditions:

- Solar Array Maximum voltage V_{mpp} with other brand module shall be within ±2% of earlier module.
- Modules Efficiency and Fill Factor shall qualify the minimum requirement of MNRE specifications
- Module to module mismatch in an array shall meet the MNRE specifications.
- SPV module shall follow the quality control order issued by MNRE from time to time.

14 LABS AUTHORISED FOR SOLAR PUMP TESTING

- Any lab accredited by NABL for testing of solar PV water pumping system as per MNRE specifications and testing procedure, and The National Institute of Solar Energy are authorized to issue approval certificate on successful testing of a solar PV water pumping system.

- Soft copy of test report shall be made available to implementing agencies on request basis.

- Logged data for Head, flow & radiation shall be preserved by laboratory at-least for 1 year.

	LIST OF REFFERED STANDARD
IS No.	**Title**
17018-1 : 2018	Solar Photovoltaic Water Pumping System Part 1 Centrifugal Pumps — Specification
14286 : 2010	Crystalline Silicon Terrestrial Photovoltaic (PV) Modules — Design Qualification and Type Approval
3043 : 1987	Code of Practice for Earthing
5120 : 1977	Technical requirements for rotodynamic special purpose pumps (first revision)
11346 : 2003	Tests for Agricultural and Water Supply Pumps — Code of Acceptance
6603 : 2001	Stainless Steel Bars and Flats
6911 : 2017	Stainless steel plate, sheet and strip Stainless steel plate, sheet and strip
7538 : 1996	Three-phase squirrel cage induction motors for centrifugal pumps for agricultural applications
8034 : 2018	Submersible pump sets - Specification (second revision)
9079 : 2018	Electric Monoset pumps for clear, cold water for agricultural and water supply purposes - Specification (second revision)
9283 : 2013	Motors for submersible pump sets
11346 : 2002	Code of acceptance tests for agricultural and water supply pumps (first revision)
14220 : 2018	Open well submersible pump sets — Specification
14582 : 1998	Single-phase small AC electric motors for centrifugal pumps for agricultural applications
ISO 9905 : 1994	Technical specifications for centrifugal pumps — Class I
IEC 60068-2-6 : 2007	Environmental testing – Part 2-6 Tests – Test Fc: Vibration (sinusoidal)
IEC 60068-2-30 : 2005	Environmental testing – Part 2-30 Tests – Test Db: Damp heat, cyclic (12 + 12h cycle)
IEC 60146-1-1 : 2009	Semiconductor converters - General requirements and line commutated converters Part 11 Specification of basic requirements
IEC 60364-4-41 : 2005	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock
IEC 60364-7-712 : 2017	Low voltage electrical installations - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
IEC 60529 : 1989	Degrees of protection provided by enclosures (IP Code)
IEC 60947-1 : 2007	Low-voltage switchgear and control gear - Part 1: General rules
IEC 61000-6-2 : 2016	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
IEC 61000-63:2006	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards -Emission standard for residential, commercial and light-industrial environments
IS/IEC 61683 :1999	Photovoltaic Systems — Power Conditioners — Procedure for Measuring Efficiency
IS/IEC 61730-1 : 2004	Photovoltaic (Photo Voltaic (PV)) Module Safety Qualification Part 1 Requirements for Construction
IS/IEC 61730-2 : 2004	Photovoltaic (Photo Voltaic (PV)) Module Safety Qualification Part 2 Requirements for Testing

IEC 618003:2017	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
IEC 621091:2010	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
IEC 623053:2010	Protection against lightning - Part 3: Physical damage to structures and life hazard
IEC 62458:2010	Sound system equipment – Electro-acoustical transducers - Measurement of large signal parameters
IEC 60904/IS 12762-1	Procedures for the measurement of current-voltage characteristics (*I-V* curves) of photovoltaic (PV) devices in natural or simulated sunlight.

Annexure-'C'

Universal Solar Pump Controller (USPC)

1. Preamble:

The Controller for Solar PV pumping system is the heart and brain of the system. The Solar PV pumping system deployed at huge cost to the farmer and the exchequer for the Government is currently utilised only for half of the days in a year (around 150 days per year) on an average. In order to optimally utilize the solar photovoltaic system that generates the electricity throughout the year during sunshine hours, the controller supplied for installation of solar pumping system should be able to perform several other tasks for agricultural and other needs of a farmer. This will increase the productivity of agriculture sector and income of farmer. With the use of USPC the solar system could be used effectively throughout the year.

2. Technical Specification for Stand Alone Application

The USPC with SPV modules and structure can be used for agrarian applications such as water pumping, apple grading and polishing system, wheat (grain) flour grinding machine / aata chakki, cutter/chaff, deepfridger / cold storage, blower fan for cleaning of grains, heating loads and any other standard voltage (400/415V) three phase motor/equipment of capacity not more than the capacity of Solar PV pumping system. The USPC operation schematic diagram is shown in Fig. 1. Further, the applications are not limited upto the few shown in the figure.

I. Following table gives specifications of electrical supply from USPC for motors other than the solar pumps. For operating the pump the USPC must follow the MNRE specifications for SPV pumping systems.

Sr No.	Description	Desired requirement
1	Motor Supply Phases	Three phase R-Y-B
2	Rated motor frequency	48-50Hz
3	Frequency operation	0 to 52Hz
4	Rated motor voltage	415V ± 5%
5	Desired motor operation	Constant V by F or constant motor flux control

II. Proposed electrical properties of USPC when operating motors other than motor- pump set:

Sr No.	Description	Desired requirement
1	Characteristic of voltages	Pure sinusoidal or Filtered AC output voltage at motor terminal. No PWM pulses allowed at the motor terminal, as it generates pronounced voltage spikes. The USPC output is intended to use for the traditional induction motors based applications which are design for sinusoidal grid supply.
2	THD of motor terminal voltages	Below 3%
3	THD of motor current (in case of balance/linear motor)	Below 5%

4	Balance supply	Three phases should be balanced and no negative sequence components to be allowed
5	Voltage spikes	Recurring or non-recurring voltage spikes more than 620V (peak of 440V AC supply) is not allowed
6	Alarms and Protections	between any two terminalsOutput voltage low, Output frequency low/high, Low irradiance/PV power, Current overload, Peak Torque overload

III. Controller should be able to run SPV pumping system as per MNRE specifications as well as any other type of motor of suitable rating, subject to the load characteristics of the equipment in which the motor is used is any of the following:

a) Constant torque loads
b) Constant power loads
c) Quadratic loads
d) Impact loads
e) Hydraulic loads

Subject to the maximum torque being not more than 150% of the rated torque of the motor.

IV. To ensure energy efficiency of solar PV system and to maintain reliability of PV installation against aging effect, module mismatch with time, partial shading, etc., the desired USPC properties and configuration should be as follows:

a) Static MPPT efficiency of USPC should be equal or more than 98% during operation of 10 to 100% of rated STC PV power, and average MPPT tracking efficiency in the dynamic condition should be greater than 97 % with hot and cold profiles when feeding the water pumping, hydraulic or heating loads, so as to maintain MPPT irrespective of variation in solar energy or irradiance. `

b) USPC efficiency should be as follows for the operation at 80% rated STC power of the PV array:

Sr No.	SPV pumping system capacity	Controller power efficiency should be more than or equal to
1	3 HP	93.00%
2	5 HP	93.00%
3	7.5 HP	94.00%
4	10 HP	94.50%
5	15 HP	94.50%

c) Considering voltage variation over the year due to variation in temperature, irradiance and effect due to ageing, environmental damages to PV panels with time, USPC should have MPPT channels as an integral part of system (or externally connected part) with wide range of input PV voltage for MPPT tracking of the PV panels. Input voltage range variation should be tested as per manufacturer declaration (min, nominal or 90% of the maximum) or if no declaration is made than at least it should be tested as per the table given below:-

Sr No.	Motor Pump set capacity	Input voltage range		
		Minimum	Nominal	Maximum
1	3 HP	(0.85*Vnominal)	Nominal	(1.15*Vnominal)
2	5 HP	(0.85*Vnominal)		(1.15*Vnominal)
3	7.5 HP	(0.85*Vnominal)		(1.15*Vnominal)
4	10 HP	(0.85*Vnominal)		(1.15*Vnominal)
5	15 HP	(0.85*Vnominal)		(1.15*Vnominal)

V. There should be Mode selection located on control panel of the USPC along with display and user should be able to select either to run motor-pump set of any other application. The software/firmware required to operate these applications must get automatically loaded when an appropriate position of the switch is engaged.

VI. USPC must have at least four numbers of three phase output cables to feed power to the applications. The output power cable for specific application should get selected automatically upon selection of applications via keypad or via mobile or via remote control connectivity. The manual selector switch should not be used at the output to manage different loads. This is to ensure the hassle-free operation of applications by farmer with adequate safety.

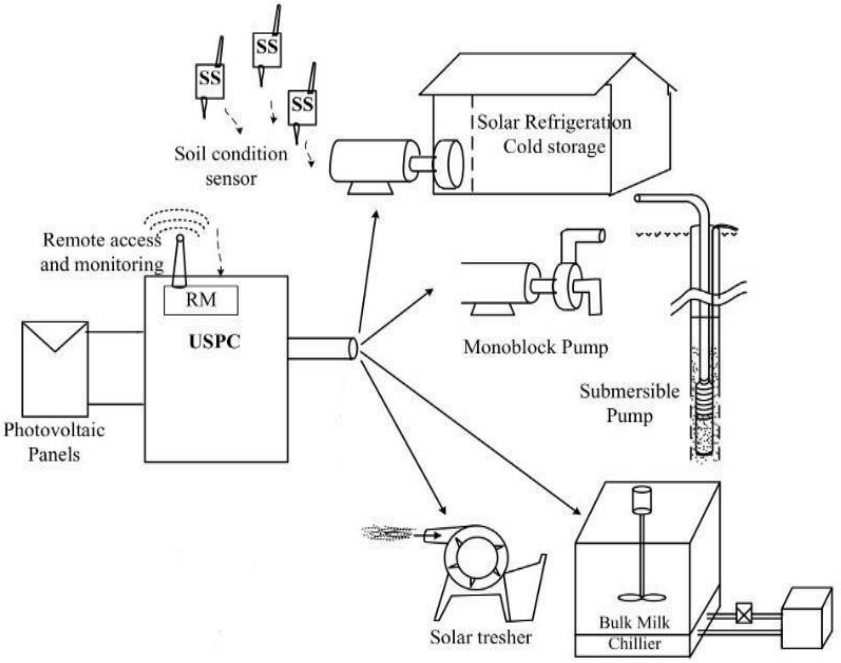


Fig. 1. USPC operation schematic diagram.

VII. USPC based Solar system must be equipped with Remote monitoring and remote fault identification:

a) Remote monitoring features should be integral part of solar pump controller and should provide time wise remote monitoring of PV voltage, PV Power, Water output, head, when used in solar pump mode. When operated in farm equipment mode, it should show, PV voltage, PV power, motor voltage, motor current and motor frequency.

b) Cumulative energy generation from PV panels for a month, year and 5 years should be provided.

c) Remote monitor should show current status of system like On, Off and fault.

d) Software associated with remote monitoring should also provide location of SPV pumping system.

e) Controller should have support of sufficient Internal memory/ SD card / memory card to support remote monitoring in case of network failure.

USPC must have IP65 protection or must be housed in a cabinet having at least IP65 protection.

Testing Procedure for Universal Solar Pump Controller (USPC)

USPC must be tested in two principle modes:

1. As an offgrid solar pump controller: the testing should be as per MNRE specifications and Test procedure.
2. As a controller to operate motorized farm equipment: The testing should be as described below.

To test the USPC in the second mode the test centres must have standard actual mode suitable for 4 loading modes. The input to the USPC must be from a solar PV simulator using the hot and cold profiles issued by MNRE. Following tests may be performed on USPC driving the agrarian load like Atta Chakki, Chaff Cutter and Deep Freezer under test. The USPC must be able to operate these motors of the attached agrarian load, so that they deliver the rated torque and are able to also operate till 150% of the rated torque for 30 seconds.

S.No .	Test Performed	Expected result	Test Lab Observation	Remarks
1	Application description on screen and selection of applications	LCD screen provided on controller need to shows various applications which can be selected by keypad using up-down and enter key		
2	Mode operation of applications (Automatic: through keypad or remote / Manual: control switches)	Universal Solar Agriculture controller should come with multiple outputs which can be permanently connected to the application by selecting appropriate options for example following applications should automatically started by USPC by appropriate mean such as keypad or remote for selection. (i) Water Pumping (ii) Chaff Cutter (iii) Deep fridge/ Cold Storage (iv) Atta Chakki Manual changeover is not allowed.		
3	Application Specific output (Application specific software)	USPC should have inbuilt individual application specific software to run the agrarian applications other than pumps and output of the controller should be suitable for above mentioned applications	-	

<table>
<tr><td>4</td><td>Input PV voltage range
Minimum – Voc at STC
Nominal – Voc at STC
Maximum – Voc at STC</td><td colspan="4"></td></tr>
<tr><td>5</td><td rowspan="20">USPC Efficiency measurement in Hot and cold profile should be measured as per BS EN 50530/IEC 62891</td><td colspan="4">Efficiency of the UPSC at minimum ..... VOC</td></tr>
<tr><td>Load %</td><td>Charge controller eff (%)</td><td>Power tracking Efficiency (%)</td><td>Overall charge controller efficiency (%)</td></tr>
<tr><td>10</td><td></td><td></td><td></td></tr>
<tr><td>25</td><td></td><td></td><td></td></tr>
<tr><td>50</td><td></td><td></td><td></td></tr>
<tr><td>75</td><td></td><td></td><td></td></tr>
<tr><td>100</td><td></td><td></td><td></td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="4">Efficiency of the UPSC at Nominal ..... VOC</td></tr>
<tr><td>10</td><td></td><td></td><td></td></tr>
<tr><td>25</td><td></td><td></td><td></td></tr>
<tr><td>50</td><td></td><td></td><td></td></tr>
<tr><td>75</td><td></td><td></td><td></td></tr>
<tr><td>100</td><td></td><td></td><td></td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="4">Efficiency of the UPSC at 90 % of Max ..... VOC</td></tr>
<tr><td>10</td><td></td><td></td><td></td></tr>
<tr><td>25</td><td></td><td></td><td></td></tr>
<tr><td>50</td><td></td><td></td><td></td></tr>
<tr><td>75</td><td></td><td></td><td></td></tr>
<tr><td>100</td><td></td><td></td><td></td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="4">Dynamic MPPT Efficiency</td></tr>
<tr><td>Hot Profile</td><td colspan="3"></td></tr>
<tr><td>Cold Profile</td><td colspan="3"></td></tr>
<tr><td>6</td><td>Ripple and distortion at output on full load</td><td colspan="2">Should below 5 % after 25 % loading condition</td><td></td></tr>
<tr><td>7</td><td>Measurement of Output voltage waveform</td><td colspan="2">Three phase output with up to 440 V rms pure Sine Wave to be measured at least 4 times between 300W/m2 irradiance and maximum irradiance as per the irradiance profile.</td><td>CF value should be provided by lab for voltage and current</td><td></td></tr>
</table>

8	Operation at different output from array with all four load types (Array wattage as per MNRE model:	Above..... Watt DC output Should not stop functioning at any load condition. Observation should be recorded.	Power value should be recorded by the lab with all agrarian load	Motor current should be recorded (for torque behavior) It must be almost constant

	Example 4800 Wp array) At 40% Power At 50% Power At 75% Power At 100% Power		supported by USPC	irrespective of available DC power from array (motor running condition). This is for Impact loading condition (such as Chaff cutter) current variation need to be recorded by laboratory.
9	Operation at different output from array with all four load types (Array wattage as MNRE model: Example 4800 Wp array) At 10 % Power At 25 % Power At 30 % Power	USPC need to run all the agrarian load in variable frequency at the lower irradiance value The load may be increased beyond 150% of rated torque to determine at what level the motor is stalling and stopping and it must trigger 'torque overload' alert. If it goes beyond 150% of the motor rated torque the USPC must trip indicating an 'overload tripping'.	Motor current should be recorded (for torque behavior) as it is a function of V/F ratio controlled by USPC	
10	Total circuit protection observation	• Soft Startup, • low radiation protection, • overload protection, • Open circuit protection • Reverse polarity protection		

Expected output of individual applications must be specify as per their power rating and SPV capacity, such as:

1. kg/hour grinding of atta chakki, and granularity.
2. Volumetric Iceing of cold storage in x hours.
3. Output in terms of kg/hours for a specific capacity grass-cutter.
4. Output must be quantified in terms of rate of volume or weight as above for any other applications.

All the test labs authorised to conduct testing for off-grid solar pumping system as per MNRE specifications may also conduct testing of USPC as per procedure prescribed above and issue testing certificates.

1.1. Appendix to SOW – CRC guidelines

1.1.1. **Disclaimer**

1.1.1.1. These guidelines meant for use of OREDA only.

1.1.1.2. These guidelines are prescribed for installation, Commissioning, Acceptance and Comprehensive Maintenance of renewable energy systems installed by/under OREDA only.

1.1.1.3. OREDA does neither recommend nor insist other organizations to follow these guidelines for the renewable energy systems developed by either by themselves or through any other organization other than OREDA.

1.1.1.4. OREDA reserves all the right to modify, amend or supplement these guidelines whenever such necessity arises.

1.1.1.5. Though adequate care has been taken for preparation of these guidelines the installation and maintenance details prescribed in this document are not the only and absolute prescriptions. Depending upon the on-site conditions, the installation/maintenance technician shall take his/her own well-judged decision while installing or maintaining a given RE system.

1.1.1.6. Though safety features have not been covered under these guidelines, Indian standard safety guidelines for construction work and electrical works must be followed by all involved in with installation and maintenance of RE systems under these guidelines.

1.1.2. **Declaration**

1.1.2.1. These guidelines will hereinafter be known as “General Guidelines for Installation and Maintenance of RE Systems under OREDA”

1.1.2.2. These guidelines shall be applicable to all distributed RE systems installed under the aegis of OREDA.

1.1.2.3. These guidelines shall be strictly followed by all vendors of OREDA.

1.1.2.4. These guidelines will also be strictly adhered to by all technicians and supervisory level officers of OREDA.

1.1.2.5. These guidelines will also constitute an integral part of all tenders of OREDA

1.1.2.6. The scoring system prescribed in these guidelines shall be applicable to all vendors of OREDA executing projects on behalf of OREDA

1.1.3. **Intent behind framing these guidelines**

1.1.3.1. These guidelines have been framed solely with the intention of improving the installation standards of RE systems and to extend the quality and timely maintenance services so as to minimize system downtime and guarantee customers’ satisfaction.

1.1.4. **Context**

1.1.4.1. The last few years have witnessed a tremendous rise in the number of RE installation particularly in remote, un-served and underserved parts of the state. In view of the absolute need of these installations to meet the basic requirements such as lighting, the supply of drinking water, irrigating farmlands, etc. it is imperative on the part of OREDA to ensure proper performance of the systems which largely depends on the quality of materials, standards of installation and the certainty and frequency of maintenance.

1.1.4.2. Ministry of New and Renewable Energy, GOI normally determines the quality and standards of the materials which are elaborately reiterated in the respective tender documents.

1.1.4.3. Project-specific installation procedures are often elaborated in the respective tender documents which the vendors are expected to follow meticulously. However, it has been observed that the vendors often do not adhere to these procedures which results in poor performance of the systems. To enable the vendors to follow the procedures meticulously a specific installation App has been developed by OREDA which will be shared with the vendors on their registered mobiles meant to be used by their designated Technicians. The App has been made in such a way that as a technician proceeds for installation of a certain system/device it opens up the step by step installation procedure for the given system/device which the technicians simply has to follow and upload pictures wherever camera buttons have been provided. As a technician completes installation the entire installation report along with pictures will be ready on his mobile for submission to OREDA.

1.1.4.4. Renewable Energy systems are known for their low maintenance needs. Often this is misconceived as “no-maintenance” which results in non-performance of such high value and efficient systems. Thus, all RE systems must be maintained well.

1.1.4.5. Though the primary responsibility of maintenance of the systems has been vested in the concerned vendor the rising number of unresolved service requests at the CRC calls for some serious organizational oversight. Moreover, it is presumed that many customers are also not able to register their requests due to poor or no mobile connectivity, ignorance about CRC and its toll-free number, etc.

1.1.4.6. Keeping the above in view, OREDA during September2018 introduced a Scheduled Maintenance Regime through its Customer Relationship Centre so as to introduce periodicity and certainty in the maintenance services being extended by the vendors. Like installation, the scheduled maintenance has also been made a mobile application based where the technician responsible for maintenance of the system can step by step follow the prescribed procedure for scheduled maintenance and upload pictures wherever camera buttons have been provided. At the end of the maintenance procedure, a maintenance report can also be generated by the technicians.

1.1.4.7. This initiative is not only expected to increase the performance level of the installations but also greatly reduce service requests by customers.

1.1.5. **Objectives:**

The primary objectives of this new initiative are

1. Increase the economic life span of installations.
2. Ensuring better performance of RE systems.
3. Higher returns on investments.
4. Higher customer satisfaction
5. Better acceptance of decentralized RE based power systems
6. Increased response to climate change mitigation.

1.1.6. **Stakeholders:**

Ensuring proper performance of RE installations calls for the combined effort of all stakeholders such as Customers, Sponsors, PRIs, Vendors, Independent Service Organizations, OEMs, and OREDA.

1.1.6.1. Customers:

Customers are the ultimate users and custodians of RE systems/devices. They are required to own the systems irrespective of the systems being privately owned by them or a public property installed inside their premises. They should be responsible for the safety and security of the systems as well as day-to-day maintenance of the systems as prescribed in the users’ manual.

1.1.6.2. Sponsors

Sponsors are the Government Departments/Organizations sponsoring the schemes/program under which the RE systems/devices are installed. Sponsors are responsible for availing and extending maintenance contracts and organizing funds for the same. Sponsors are to be kept informed about the maintenance activities as well as emergent situations that call for material and financial resources.

1.1.6.3. Panchayati Raj Institutions (PRIs)

PRIs are supposed to be the ultimate owners of community assets such as drinking water supply systems, streetlights, etc. They are expected to properly register the community assets in their asset registers as well as apportion funds from their grants/income for repair and maintenance of the assets beyond the scheduled maintenance period.

1.1.6.4. Vendors

Vendors are primarily responsible for supply, installation and commissioning of the RE systems/devices. They are also responsible for the effective maintenance of the systems for the first five years or as may be mentioned in the concerned tender. Vendors are required to extend scheduled maintenance services as well as on-call maintenance services to all systems installed by them. For extending such services smoothly they may establish their own service network or avail services of Independent Service Organizations. Vendors are also required to have back-to-back agreements with their OEMs for extending guarantee, warranty, the supply of spares, etc. Vendors shall work in close coordination with the customers, custodians, field units, respective technical divisions, and CRC of OREDA in order to deliver effective maintenance services.

1.1.6.5. Original Equipment Manufacturers (OEMs)

The Manufacturers of the original equipment used in RE systems/devices are important stakeholders as far as delivery of effective maintenance services is concerned. Without a proper inventory of spares at their end for the entire period of maintenance and quick response to the need for spares at the project site, it is almost impossible to deliver effective maintenance services on the part of the vendors. Hence OEMs must enter into tripartite agreements with vendors as well as OREDA with regards to the adequacy and timely supply of spares. OREDA may also consider empaneling OEMs of important items such as pumps, invertors, CPUs, etc.

1.1.6.6. OREDA

OREDA represented by its Technical Divisions, Field Units, CRC is the most important stakeholders in respects of

a) Managing processes and providing oversight
b) Establishing principles and parameters for extending maintenance services
c) Setting up performance parameters
d) Monitoring, measuring and analyzing stakeholders' performance.
e) Working for performance improvement
f) Identifying time-bound and appropriate actions as well as working on the same
g) Developing internal preparedness to repair, re-installing systems beyond the scope of the vendors.
h) Developing contingency resources and plans to force majeure situations.
i) Recognizing and encouraging good performance

1.1.7. **Process**

The overall process is hinged on three distinct sub-processes. They are

1. Onboarding the project
2. Installation & Commissioning of the systems
3. Creation of system IDs and linking to CRM
4. Managing the R&M.

The efficiency of maintenance is largely dependent on the quality and regularity of step 1,2&3. The processes are as follows:

1.1.7.1. ONBOARDING:

Onboarding refers to the creation of the project-specific database comprising of the following details. Onboarding of each project is to be done by the concerned Division Head of OREDA.

a) Name of the scheme (Generic-Specific)

b) Name of the sponsors.

c) Details of sanction order indicating the quantity, cost, locations, etc.

d) Date of floating of tender

e) Date of finalization of tenders.

f) Vendor details (name, the quantity of work awarded, the total cost of the work, locations assigned)

g) Date of Issue of LOI

h) Details of survey report submitted by the vendor in response to LOI

i) Details of project execution schedule submitted by the vendor in response to LOI

j) Date of issue of firm work order vendor wise

k) Final date of completion of the project.

This would get populated onto the database in phases as the scheme progresses from conception to inception. Once a scheme is on-boarded the details are to be intimated to CRC for the creation of a new account.

1.1.7.2. PROJECT EXECUTION: The vendor to whom a particular work has been assigned is responsible for the execution of the project. As soon as a project is on-boarded with the above details the same will appear on the dashboard of the concerned vendor(s). The vendor then has to assign the project to a specific technician(s) having registered mobile phones on which the installation apps have been loaded.

The technician will then be able to see his/her assigned projects on the app provided having details such as the name of the project, name of the customer, location details including GPS coordinates, the capacity of the project, etc. As the technician starts executing the project, he/she has to upload the following details as and when it happens

a) Date of commencement

b) Details of all hardwares

c) Exact location of installation

d) Complete step by step installation details including the picture as per the installation app.

e) Date of commissioning the project

This would get populated onto the database in phases as the scheme progresses from conception to inception.

1.1.7.3. SUPERVISION:

a)District Level: As soon as the on-boarding is complete the Officer-in-charge of the District RE Cell can see the details on his dashboard. Similarly, he can see the subsequent processes carried out at the vendor and technician levels. At any point in time as may be required the Officer-in-charge of the District RE Cell can undertake filed visits and supervise the progress of the work, quality of work execution, etc.

Once a project is commissioned the Officer-in-charge of District RE Cell can make necessary checks and upload the Joint Commissioning Certificate on the App provided to him within a stipulated timeline.

b) HQR. Level: After getting the commissioning reports and necessary checks thereon the concerned division of OREDA will create the project/system ID after which the project/system will automatically get linked to the CRC which will mark the beginning of the processes at CRC such as Scheduled Maintenance and Corrective Maintenance.

1.1.8. **R&M Management:**

The R&M regime involves two types of efforts. The first is the Scheduled Maintenance Activities, which is done as a preventive action. It is expected that these periodic maintenances will drastically reduce the incidents of breakdowns. This should be done at some periodicity and in each case, a list of activities must be done. The second is the Unscheduled Maintenance Activities which are of corrective nature. This means when any breakdown/ malfunction is detected, the appropriate corrective action needed can be initiated.

1.1.8.1. Scheduled (Preventive) Maintenance:

a)A master maintenance schedule is to be drawn up for the organization covering each installation.

b) This will be done by stratifying the districts into District Clusters based on logistical convenience.

c) Each Cluster will be broken down into three geographical patches (comprising of Blocks/ GPs) called as Maintenance Cluster to evenly distribute the ticket load across each month within that Maintenance Cluster.

d) The CRMS, well before the schedule, will fire a flurry of emails and SMS to the Vendors notifying about the list of installations they must cover in each of the Clusters within that Month. A ticket for each installation in the list will be automatically generated. It may be noted that though the list is sent in one list, separate emails will be sent for each ticket on which communication/ transactions have to be made by the Vendor

e) It's the responsibility of the Vendors to track each case through their authorized technicians and report compliance throughout the month as soon as they cover the installations.

f) The technicians/ SPOC of the vendor must share the documents/evidence required for the acceptance of resolution over e-mail in the same thread the ticket was raised. No resolution mail other than that thread will be accepted. The protocol of communication may get subsequently changed to improve operational efficiency.

g) The CRC as soon as it receives the resolution mail, will cross verify the claim of resolution by the technicians and may close the ticket or return for rework.

h) The CRMS at the end of the month will compute the performance of the ticket/ Vendor/ Scheme and release a scorecard.

1.1.8.2. Unscheduled (Corrective) Maintenance:

a) Breakdown occurs at one of the installations.

b) The customer calls the CRC to submit a service request.

c) The agent at the CRC using the CRMS identifies the customer and registers a request called a ticket.

d) Automatically a set of e-mails is fired to the Vendor, its Technician, Administering Dept. of the Scheme and OREDA.

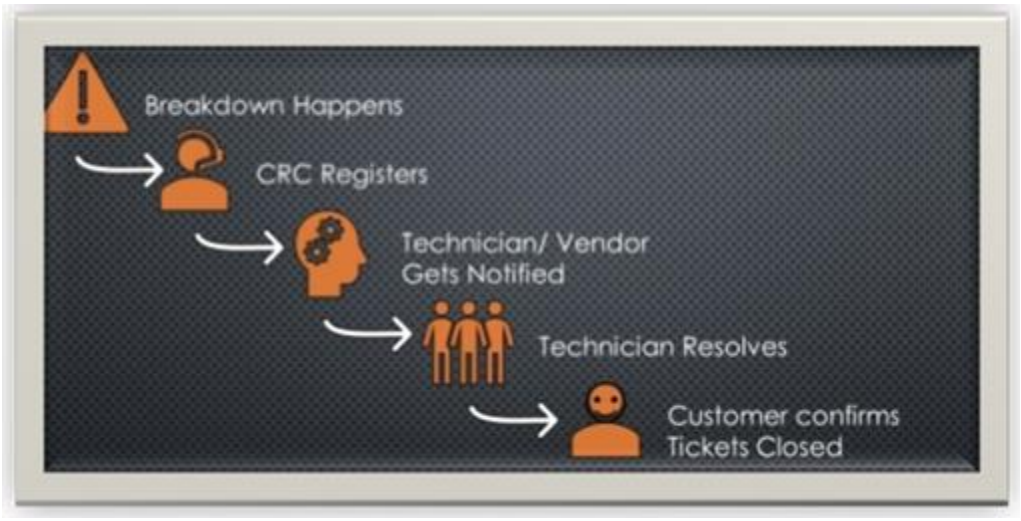
e) The CRMS tracks each ticket and follows up each case over e-mail and voice calls.

f) After the lapse of certain days, the CRMS auto escalates it to the Nodal Officer/ Scheme Officer for action.

g) The vendor/ Technician resolves the ticket at the field and intimates the CRC about it through the designated communication channel as per the protocol.

h) CRC cross-verifies it with the community/ customer and closes the ticket.

i) CRMS measures performance.



1.1.9. **Repair and Maintenance Regime:**

1.1.9.1. Scheduled Maintenance:

The schedule maintenance regime will focus on the vendor's **certainty and regularity** of visit to the installations under him as his performance parameter. He is expected to comply with a minimum of 90% visit against the Scheduled Tickets within that Service Month.

a) Activities under each category of Tickets:

The vendor is warranted to visit the installations and undertake a list of activities linked to that category of ticket. The ticket category can be of Quarterly, Half Yearly and Annual. To know the installation of a Class-specific and ticket Category-specific list of activities, kindly refer to Appendix Clause **Error! Reference source not found.**.

b) Time Limit:

It's expected that the vendor must complete the activities over the list of installations designated for that maintenance month within that calendar month itself.

It may be noted that they can work on any day without any bias to the day being notified as a holiday or otherwise.

c) Route/ Sequence:

Each installation must be visited once in every quarter, half-yearly and yearly for different categories of activities.

To maintain a uniform gap between the visits every time, the vendor is expected to stick to an optimal sequence in a route.

The number of routes that the vendor identifies depends on how big the list and how many technicians are to be deployed.

Care must be taken so that all installations not only are resolved within a month but also are closed.

d) Score:

On successful completion of one ticket as per the service standard, the vendor will earn certain points, and for each default, it will earn a negative score which is designed to be a deterrent.

The scores are:

Visits	Activity Types	Earnings	Penalties
Visit - 1	Q1	3	-9
Visit - 2	Q2	3	-9
	H1	1	-3
Visit - 3	Q3	3	-9
Visit - 4	Q4	3	-9
	H2	1	-3
	A1	1	-3

1.1.9.2. Corrective Maintenance:

a) Service Standards:

While the Schedule Maintenance regime focuses on the vender's certainty and regularity of visit to the installation as his performance parameter, Corrective Maintenance Regime focuses on the Timeliness of the vendor to respond to a breakdown situation.

The vendor upon being notified of a breakdown situation shall have to complete his assessment within 2 days and complete the repair work within the next 5 days. All (100%) tickets must be resolved within the time limit given above. If the scope of repair/ replacement is found to be beyond the scope of Maintenance Contract (MC), then the vendor immediately after the field reconnaissance must report the same to the CRC.

i. It is expected that at any point in time, none of the vendors would be having cases older than 7 days pending in their list.

ii. And, no vendor's installations under a scheme should show 'Non-Working' status of more than 2% of the installations.

b) Methodology:

Corrective maintenance requires a different approach as against the scheduled maintenance methodology. While the scheduled maintenance is predictable, corrective maintenance requires a case-specific approach. The following are recommendations for the most efficient methodology. But the vendors are free to adopt their own if they are complying with the time limit.

c) Reconnaissance:

Within 2 days of the ticket date.

iii. When a request of service is registered, the vendor as the first response must organize the collection of field level information about the nature of the problem.

iv. Based on that feedback from the field, the vendor must decide the following;

- The genuineness of the request,
- If the requirement of repair is beyond the scope of his MC,
- If it is within his scope, then, he must arrange labor, spares, materials needed for the repair, and mobilize them to attend the breakdown at the spot.

This will help the vendor to resolve the request in one visit. This is more necessary as at times the villagers without ascertaining the owner of the installation, register a request in the CRC, and, as there is the possibility of multiple installations in one village and the data matches, the ticket is raised against a working installation.

d) Repair:

Within 7 days of the ticket date.

i. The authorized technicians of the vendor must move to the location with the resources to undertake the repair.

ii. Upon completion of the repair, the installations must be tested in the presence of the customer/ custodian.

iii. Requisite evidence and documentation must be completed by the technicians and immediate intimation need to be sent to the CRC.

e) How to handle repair beyond the scope of MC

i. At the reconnaissance stage, when the vendor realizes that the requirement is beyond the scope of MC, he must request closure giving appropriate reasons.

ii. He must use the same communication channel as he would have used for resolution,

iii. The CRC then would take it off the Vendor list and transfer it to the OREDA list.

iv. OREDA will take this matter up with their principals for resolution.

f) Score:

i. Each vendor at the start will be given a Credit account of 8760 hrs. (365 Days x 24 hrs.) for each of the installation he is responsible for maintenance. That will be known as the 'Total Achievable Uptime'.

ii. When a request for service gets registered at the CRC the clock is started from the next day. The day the Vendor responds to a ticket informing successful resolution, the Clock stops on that day.

iii. At the end of a period, the time taken for each ticket for a resolution, which is converted into hours gets deducted from the 'Total Attainable Uptime' of that Ticket.

iv. And if the resolution time exceeds the set time of '7 Days', the system will treat those additional days with twice the score.

v. The system is so designed that the lesser the time is taken to resolve, the higher will be his Net Score. More he takes time to resolve; higher will be his penalty score which may erode his other good works.

1.1.10. **Implementation:**

1.1.10.1. Training and Orientation:

OREDA will conduct orientation and training sessions for the Vendors and their technicians

1.1.10.2. Helpdesk:

OREDA CRC will provide support to the field personnel of the vendors to acquaint themselves with various communication and process protocol.

1.1.10.3. Performance Evaluation:

The following paragraphs explain the way OREDA will evaluate both the performances and how it will turn it into a composite score of performance. The Scheduled Maintenance activities have been given primacy over the Corrective Maintenance activities. While the Scheduled Maintenance is given 80% weightage in the composite score, Corrective Maintenance is given 20%.

1.1.10.4. Computation of performance

Examples from the shared Excel sheets may be incorporated.

1.1.10.5. Streamlined and timebound service

i) Each district should have one individual ID and pass for monitoring all the installed asset for the respective district.

ii) The Assistant Directors should check the generated ticket and SM ticket for each and every asset of their jurisdiction every month and intimate the corresponding vendor if the ticket is not closed within 7-days.

iii) If a ticket is generated for an asset as well SM, then they should be communicated to the vendor, customer as well as the corresponding A.D., In-charge of the District through SMS as well as App. Issued by CRC.

iv) Every month the Assistant Directors will submit the report of the generated ticket and resolved ticket vendor wise within 10th to the Chief Executive, OREDA for necessary review of the vendor in presence of CRC.

v) For continuous delay in resolving generated ticket for the consecutive 2- months, the same will be marked as negative remark and further course of action will be taken against the default vendor.

vi) Similarly, Scheduled Maintenance notification as scheduled to be sent to vendor, concern Assistant Directors.

vii) After resolution/ closure of tickets, notification message regarding closure of the ticket should be sent and communicated to vendor, beneficiary and the Assistant Director.

viii) At least one before and after, photographs to be uploaded in the CRC portal for resolving a generated ticket.

1.1.10.6. Rewards and Recognitions

OREDA will do everything under its might to support the good performance of the vendors as achieving very high uptime of its installation and good customer relationship is its prime organizational focus. It also will weed out non-performing vendors by penalizing them for their bad performance and blacklisting them for good.

OREDA will.

a) Give preference to the high performing vendors in the upcoming tenders.
b) Institute Awards and Recognition during important days of OREDA
c) Recover Liquidated Damages in the shape of penalties
d) Blacklist vendors whose past performances are not at all good