

SECTION-4

TECHNICAL & SPECIAL CONDITIONS OF CONTRACT

NOTE: THE TERMS & CONDITIONS STIPULATED HEREIN (I.E., IN SECTION-4) WILL SUPERSEDE ANY CONTRADICTORY/ SIMILAR/ OVERLAPPING TERMS & CONDITIONS IN ANY OTHER SECTION/PART OF THE TENDER.

NOTE:

Bidders are requested to select the NON PARTICIPATING ITEMS and click on DELETE option and then PROCEED. Bidders has to mandatorily declare the participating ITEMS against this tender as per Attachment No.12 attached in Section-6 of tender documents. Only price-bid of the declared ITEMS in Attachment No.12 shall be opened subject to acceptance of technical bid.

Name of Work: - Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Water Pumping Systems of 1-10 HP in selected States on PAN India basis, including complete system warranty and its repair and maintenance for 5 Years under MNRE off-grid and decentralized solar PV applications scheme on behalf of State Nodal Agencies (SNAs).

**NIT/Bid Document No.: - EESL/06/2020-21/KUSUM/SWPS/1-10 HP/Off Grid/2021XXXX
Dated:- XX.12.2020**

BIDS ARE TO BE SUBMITTED AS FOLLOWS: -

Envelope 1, 2 and 3 will appear online in dynamic form. No Manual/Hard Copy of documents need to be submitted for these envelopes apart from below mentioned documents.

Envelope 1 (Pre-Qualifying documents) should contain following:

- a. Bid document fee in the form of Banker's Cheque/ Demand Draft drawn in favor of "Energy Efficiency Services Limited" payable at New Delhi. **(To be submitted in hard copy/ manually in the tender-box on and before Technical E-Bid Opening Date & Time. Scanned Copy to be uploaded at E-tendering portal.)**
- b. Bid Security Declaration as Attachment-2 . **(To be submitted in hard copy/ manually in the tender-box on and before Technical E-Bid Opening Date & Time. Scanned Copy to be uploaded at E-tendering portal.)**
- c. Letter of the bidder submitting the bid in the form as stipulated in the bid document i.e., as per Bid Form as **Attachment-1** of section - 6, Forms & Procedures. **(Scanned Copy to be uploaded at E-tendering portal)** Duly filled and Signed by authorized signatory.
- d. Power of attorney to sign the bid as **Attachment-3** of section 6, Forms & Procedure. Bidders to use their own format. **(Scanned Copy to be uploaded at E-tendering portal.)**
- e. Certificate regarding acceptance of important terms and conditions as per ITB clause 4.6 as **Attachment-4**. Format enclosed in section 6. **(Scanned Copy to be uploaded at E-tendering portal)** Duly filled and Signed by authorized signatory.
- f. Form of acceptance of EESL fraud prevention policy and declaration as per **Attachment- 7** of section 6, Forms & Procedure. **(Scanned Copy to be uploaded at E-tendering portal)** Duly filled and Signed by authorized signatory.
- g. NEFT/RTGS Bank details as per **Attachment-10** of section-6, forms and procedure. **(Scanned Copy to be uploaded at E-tendering portal)** Duly filled and Signed by authorized signatory.

- h. Certificate Regarding Compliance of Meity Notification Vide File No. 1(10)/2017-Cles Dt. 02.07.18 as per **Attachment 13** of Section-6, Forms & procedures Duly filled Signed by authorized signatory **(Scanned Copy to be uploaded at E-tendering portal).**
- i. Declaration form for quoted Clusters and Type of Pump **(as per format in Attachment -12)** duly filled and Signed on Company's Letter Head Pad with Company seal. **(Scanned Copy to be uploaded at E-tendering portal).**
- j. Certificate regarding Declaration of Local Content (as per Format in Attachment-14). (Scanned Copy to be uploaded at E-tendering portal).
- k. Self-Declaration duly signed and stamped at company's Letter Head for 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 false declarations of local content. **(Scanned Copy to be uploaded at E-tendering portal).** Bidder shall clearly mention tender reference number and date of signing the self-declaration.
- l. Self-Declaration for regarding "Restrictions on procurement from a Bidder of a country which shares a land border with India" as per **Attachment-7** **(Scanned Copy to be uploaded while submitting application online on E-tendering portal).**
- m. Self-Declaration for not been blacklisted or debarred by Central/State/UT Government or any Public sector entities duly signed and stamped at company's Letter Head. **(Scanned Copy to be uploaded at E-tendering portal as per attachment-16)**
- n. Compliance Matrix/Checklist for Bidder as per Annexure-IX duly filled and signed on Company's Letter head pad with company seal. **(Scanned Copy to be uploaded at E-tendering portal).**
- o. Compliance Matrix/Checklist for Technical and Financial QR as per Annexure-X duly filled and signed on Company's Letter head pad with company seal. **(Scanned Copy to be uploaded at E-tendering portal).**
- p. JV/Consortium Agreement (if applicable) on Rs. 100 stamp paper duly signed and notarized. Bidder to use there own format. **(Scanned Copy to be uploaded at E-tendering portal as per attachment -19).**

Envelope-II, i.e., Techno-Commercial Proposal of the Bid Should Contain (scanned copies of) the following:

- a) Deviation statement as per Attachment 5 of section - 6, Forms & Procedure.
NOTE: EESL reserves the right to consider or disregard deviations, and reject bids in case of non-compliance. Bids containing material deviations from or reservation to the terms and conditions and specifications mentioned in the Tender will be treated as non-responsive and will not be considered further.
- b) Compliance to Technical Specification Defined at **ANNEXURE-I** with supporting documents.
- c) Techno-commercial bid as indicated in bid document, i.e., **documentary evidences regarding bidder's qualifications to perform the Contract, as required per the Qualifying Requirements (Attached at Annexure-II).**
- d) Specific Confirmation from the Bidder to be Filled and attached as provided in **ANNEXURE -IV.**
- e) **Attachment 14 to Attachment 17**
- f) One complete set of RfP documents and subsequent amendments (if any), duly signed and stamped on each page.
- g) **Duly Filled Format 1 and 2 as attached in the last of this section.** Please note that in absence of these formats, bid may not be evaluated.

Envelope-III should contain Price Bid (to be filled-up online)

Since the bids are to be submitted through E-tendering mode, the prices are to be filled on e-tender portal only and bidders are requested **not to submit the price bid in hard copy at EESL along with the documents. The same will not be entertained.**

1. Price Bid Sheet Format is prescribed at **ANNEXURE-V** in the Tender document – only for illustration purpose ***(prices are to be filled on E-tender portal only).***

- i. Price Bid in the format prescribed in the tender document
2. Cost for Guarantee for period of 6-10 years as per Attachment-14 in Section-6 Forms and procedure (**Bidder has to fill up separate form (provided in Attachment-14 of Section-6) and upload it in the portal ONLY along with Price Bid (i.e Envelope-3)**)

Opening & Further Processing of the Bids

Initially, Envelope-1 containing documents as stated above will be opened electronically.

Envelope-2 will be opened electronically preferably on the same day of only those bidders who have submitted EMD and requisite documents in Envelope-1.

In Envelope-3, Price Bid shall be opened subject to acceptance of Techno-Commercial Bid.

Opening date will be intimated to all those bidders, who are found technically & commercially acceptable to EESL.

Price-Bid of the technically disqualified bidders will not be opened.

Note- *Unorganized/Un-labelled Bids are liable to be rejected. Bidder to enclose an index of pages with proper nomenclature for each document enclosed and inserted page no. on the documents to be submitted online at E-tendering portal*

On behalf of EESL

Engineer Tech (SCM)

1. INTRODUCTION

Energy Efficiency Services Limited (EESL) is a joint venture of four National Public Sector Undertakings – NTPC Limited, Power Finance Corporation Limited, Rural Electrification Corporation Limited and POWERGRID Corporation of India Limited, set up under Ministry of Power, Government of India. EESL is a Super Energy Service Company (ESCO). It acts as the resource center for capacity building for State Distribution Companies (DISCOMs), Energy Regulatory Commissions (ERCs), State Development Authorities (SDAs), upcoming ESCOs, financial institutions, etc.

Objectives

- As a part of Implementation of "Off-grid and Decentralized Solar PV Applications Programme" during financial years 2019-20 and 2020-21 towards meeting the targets of the Jawaharlal Nehru National Solar Mission (JNNSM) main thrust was given on important applications especially relevant to rural development.
- Under the above said program, MNRE is going to implement approximate 3.07 lakh Solar Photovoltaic Water Pumping Systems (SPWPS) through centralized procurement process on behalf of SNAs.

Process:

1. The procurement process will be done by EESL.
2. Letter of Empanelment will be issued by respective SNAs.
3. After issuance of Letter of Empanelment, the empaneled firm will take list of prospective beneficiaries from SNA and get the consent from beneficiaries in their favors. After submission of beneficiaries' consent, SNA will issue **Notice To Proceed** to the empaneled firm for the installation of Solar Photovoltaic Water Pumping Systems (SPWPS).
4. The empaneled firm shall co-ordinate with SNAs (Implementing Agency) for repair and maintenance of SPWPS for a period of five years from the date of award of LoE.

2. SCOPE OF WORK

The Scope of Work of a bidder shall include to Design, Manufacture, Supply, Erection, Testing and Commissioning of Stand-alone **Off Grid Solar Photovoltaic Water Pumping Systems of 1-10 HP** in selected states on PAN India basis including complete system warranty and its repair and maintenance for 5 Years under MNRE off- grid and decentralized solar PV applications scheme: as per MNRE specifications and applicable BIS standards on behalf of SNAs for implementation after aggregating the demand from the States/UTs. This tender is for Component-B of PM-KUSUM Scheme, therefore, bidder shall follow all provisions of the Scheme Guidelines as amended from time to time.

The scope of work covers:

A. Supply and Manufacture

1. 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 block, the vendor shall have one authorized service center in each operational district and a help line(s) in English/Hindi or Regional language of the state where such SPWPS are installed.

2. 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 and Regional language of respective state and specific pump numbers and the Pump No. must have been captured by SNA's Web based Application (as per instruction of SNA) at the time of installation at site. During the time of PDI of each component, test report of equipment's, warranty certificates and calibration certificates should be provided by the bidder. Also, bidder should submit module structure wind withstand capacity certificate from certified Architecture Engineer for wind speed of 150 Km/hour. Successful bidder has to submit the PDI request within one week from the date of clearance (site allocation) given by SNA's.

B. Installation & Commissioning

1. Installation and commissioning solar photovoltaic water pumping systems of 1-10 HP shall be done by the successful bidder (s) as per the details provided by respective SNA. The vendors shall co-ordinate with respective SNAs for repair and maintenance of SPWPS for 5 yrs.
2. Empaneled firm have to submit monthly consent of beneficiaries in their favors to SNA for which SNA's will give **Notice To Proceed** and for this, empaneled firm shall complete the installation and Commissioning of SPWPS within 90 days of issuance of NTP for Cluster 1 to Cluster 8 as per **Annexure VI**.

However, for, **Clusters 9 and 10 as per Annexure VI**, empaneled firm shall complete the installation and Commissioning of SPWPS within 120 days of issuance of such NTP.

3. Bidder should conduct site survey and provide Progress Report (on fortnight basis) as per the requirement of SNA's.
4. Action plan should be submitting to SNA's including complete details of team, resources, service centers in each district within 30 days of acceptance of demand from SNA's.
5. Intimation to be given to SNA's before one week of Pre-Dispatch inspection call and should submit complete warranty and test certificates of each lot at the time of inspection.
6. Submission of installation reports as per the format given by SNA's on weekly basis.
7. Submission of completion reports of each district to SNA's within one week of 100 % completion of work as per allocation in each district.
8. Successful bidder should submit monthly and quarterly progress reports online to SNA's.
9. Bidder shall comply with all applicable regulatory and statutory norms. Bidder has to obtain approval/NOC (where ever required) from appropriate Govt. authority for implementing the project in each selected village.
10. Successful bidder should have finalized sub-bidders and purchase order (P.O.) on all materials such as Solar PV module, structures, Pump, Controller, etc. within 30 days from the date of notification of award of Contract and unpriced P. O. copies will be submitted to SNA's within 30days from date of issue of LOA. Successful bidder should commission minimum pumps/ quarter as defined in Scope of Work Clause B.2. Bidder has to obtain handing over certificates/ installation completion letters/certificates from respective village panchayats/ Local Govt. Bodies in parallel with installation (as per prescribed format and requirement of respective district administration else

prescribed format of SNA's may be adopted).

11. Each SPWPS is to be provided with a colored metallic sticker duly riveted displaying required details as provided by SNA's.
12. Successful bidder should submit the Certificate (as per prescribed format-to be provided by SNA) and photographs of each SPWPS installed which must show complete installation setup with beneficiary, Pump number etc.
13. Successful bidder has to ensure working of minimum 95% of total installed SPWPS at any point of time.

C. Technical Requirements and Testing

1. Systems 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-I. Non- compliance will be taken seriously to the extent of blacklisting of the vendor.
2. Only indigenously manufactured PV modules and Pumps should be used in the Programme. **'Made in India'** to be mentioned on solar panels and pumps.
3. Interpretation of the Guidelines: In case of any ambiguity in interpretation of any of the provisions of these guidelines, the decision of the Ministry shall be final.
4. Review of Guidelines: The Guidelines would be reviewed by an Internal Review Committee Chaired by Secretary in MNRE and modifications therein would be incorporated by the Ministry.
5. Systems installed under this Programme should also follow Office Memorandum - F. No. 283/22/2019-GRID SOLAR of Ministry of New & Renewable Energy, Government of India dated: 23-09-2020.

D. Operation & Maintenance (O&M), Training, Awareness and sensitization:

1. Successful bidder should keep necessary spare parts (min 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 the date of installation of each SPWPS. Bidder should also ensure to provide local training to local persons regarding proper maintenance of the SPWPS. Bidder should submit bi-weekly installation progress report to SNA's as per prescribed format provided during the installation phase.
2. Any complaint registered/ service calls received should be attended at the earliest and the system should be repaired/ restored/ replaced within 3 days from the date of complaint received/informed to the bidder.
3. The installation data should be punched in the Web Application Platform to be developed by SNA's as per the terms and conditions provided by MNRE.
4. The Ministry officials or designated agency may inspect the ongoing installation or installed plants. In case the installed systems are not as per standards, non-functional on account of poor quality of installation, or non-compliance of maintenance, the Ministry reserves the right to blacklist the vendor.

5. Bidder has to submit an Operation, Instruction and Maintenance Manual, in English and the local language, should be provided with each solar photovoltaic water pumping system to the beneficiary. The following minimum details must be provided in the Manual:
 - Basic principles of Photovoltaic.
 - A small write-up (with a block diagram) on solar photovoltaic water pumping system - its components, PV module, electronics and expected performance.
 - A simple single line diagram (SLD) depicting the electrical circuits and control mechanism.
 - Type, Model number, Voltage & capacity of the motor, used in the system.
 - The make, model number, country of origin.
 - Significance of indicators.
 - Clear instructions on regular maintenance and trouble-shooting of the solar photovoltaic water pumping system
 - Preventive maintenance schedule
 - Detail information about warranty coverage
 - DO's and DONT's.
 - Name and address of the contact person for repair and maintenance, in case of non-functionality of the solar photovoltaic water pumping system.
 - Description of frequent faults of PV module and pump and its remedy.
 - Minimum 10 hard copies (to be printed in booklet form) kept at each service center. Also, to be provided to SNA as and when required.
6. The Operation & Maintenance (O&M) cost of the system is in-built in the system cost. The bidder shall provide repair and maintenance of the system for 5 years.
7. Successful bidder shall do the preventive maintenance in line with PM-KUSUM guidelines and it's amendment (if any) and should submit the report in prescribed format to SNA's.
8. If complaint is not rectified within 3 days from the date of complaint received/informed to the bidder, in that case after 3 days INR 100 per pump/day penalty will be imposed, for first 3 days and thereafter Rs. 500/ per pump/day shall be imposed till the SPWPS put back to satisfactory working condition. This amount shall be recovered from running bills or CPG of the bidder.
9. Successful bidder shall submit the detailed report per district including local training, awareness and sensitization campaigns, Methodology for sustainable maintenance for further five years to the beneficiaries with relevant photographs.

3. TECHNICAL SPECIFICATIONS

Technical Specifications shall be as per Annexure-I

4. QUALIFYING REQUIREMENTS

Please refer Annexure-II for Qualifying Requirements

5. DECLARATION OF LOCAL CONTENT

Bidder shall submit a certificate stating the percentage of local content as per the format given in **Attachment-14 of Section-6 of Tender 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.

SPECIAL CONDITIONS OF CONTRACT (SCC)

SPECIAL CONDITIONS WILL PREVAIL UPON THE INSTRUCTION TO BIDDERS AND OTHER TERMS AND CONDITIONS

1. TERMS OF PAYMENT:

Stage I: - 90% of the value of month-wise nos. of SPWPS installed at site and 100% applicable taxes there upon based on:

- Submission of detailed work plan (Project Execution plan) with timeline for the lot supplied duly approved by SNA's representative;
- Submission of evidence in hard copy regarding completion of installation of SPWPS in good condition at site, duly verified and acknowledged by EIC, SNA and Farmer.
- All the relevant Warranty and quality (performance test reports) of the lot to be submitted.
- Signing of contract agreement between SNA and successful bidder.
- Submission of Contract Performance Guarantee (CPG) as per relevant CPG clause to SNA
- Submission of original supply Invoices/Bills duly verified/certified by EIC, SNA.
- Submission of report supported with labelled photograph on completion of village community training, awareness/ sensitization, capacity building measures undertaken and development of entrepreneurship etc. in each village with relevant photographs
- Submission of installation report as per prescribed format of SNA.
- Operation and Maintenance manual to be provided to each beneficiary
- Submission of handing over certificates of solar photovoltaic water pumping system signed by Farmer and duly certified by SNA's representative;
- Performance report for 1 day after commissioning based on data received from remote monitoring system or data logger in cases, where internet services are not available
- An undertaking shall need to be submitted by the Contractor certifying that the civil work will withstand the wind speed of 150 km/hr in all weather conditions

Stage II: - Balance 10% i.e. on completion of one month from the date of completion certificate

Note: -

- SNA has the right to seek any additional documents / information / certification it deems fit prior to the release of any payment relevant to the SPWPS.
- Payment will be made to the bidder within 30 Days after submission of Invoice complete in all respect i.e. with all the required documents and compliance of relevant terms & conditions of LOA duly accepted & certified by EIC, SNA
- If the invoice is incomplete in any respect or if there is any non-compliance with relevant Terms & Conditions of LOA, payment due date shall start from the date of submission of all necessary documents provided relevant terms & conditions of LOA have been fulfilled.

PROCESS FOR RAISING INVOICE/BILL: -

- The successful Bidder's request(s) for release of payment shall be made to the Engineer-In-Charge in writing, upon fulfillment of required obligations stipulated in the contract.
- The successful Bidder shall submit the invoice in triplicate showing description, quantity, Unit rate and total amount with all supporting documents as per terms of the Contract. After due verification by Engineer-In-

Charge, SNA shall process the verified Bill (s)/Invoice (s) for release of payment. In case successful Bidder fails to submit the Invoice/Bill with all the required documents, SNA reserves the right to hold the payment against such Bills/Invoices.

- The successful Bidder shall be responsible for submitting all the requisite documents for processing the Bill (s)/Invoice (s). The successful Bidder shall submit the Bills/Invoices for the work executed showing separately, GST and any other statutory levies in the Bill (s)/Invoice (s).

Note: SNA has the right to seek any additional documents / information / certification it deems fit prior to be release of any installment.

2. COMPLETION TIME:

- Successful bidder should ensure to complete the project as per Clause B.2 and instruction of SNA's.
- The implementation work on ground should start within 15 days from the date of **Notice To Proceed** from SNA's.
- Successful bidder shall submit the unpriced P. O. copies of solar pumpsets, controllers and Solar PV modules to SNA within 30 days from the date of notification of award of Contract. (Not applicable in case bidders itself manufacturing all the items.) In case unpriced PO copies within 30 days not submitted, SNA' s may, cancel the contract and award the same quantity to another bidder.
- In order to achieve the target, suitable number of teams (one team with minimum of three members) must be deployed by the bidder.
- 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 Engineer-in-charge designated by SNA's.

3. Purchase Preference as per 'Public Procurement (Preference to Make in India), Order 2017' (Latest Amendment Dated:16-Sept-2020)

In accordance with order No: P-45021/2/2017-PP (BE-II) dated: 16-Sept-2020 of Department of Promotion of Industry and Internal Trade and Order No F. No. 283/22/2019-GRID SOLAR, Ministry of New & Renewable Energy dated: 23-09-2020, **only 'Class-I Local Suppliers' are eligible to bid in this tender.**

Bidder shall carefully go through the above mentioned orders in order to understand the whole process and definition of various terms (e.g. Class-I Local supplier, Local content etc) pertaining to the said order.

Declaration of local content in the specified format shall be submitted by the bidder as per Clause 5 "Declaration of Local Content".

4. EVALUATION CRITERIA AND SELECTION OF BIDDERS

3.1 The Tender Consists of 10 Clusters as indicated in Annexure-VI

3.2 Each Cluster has following types of pumps as mentioned below:

- 1-10 HP AC Submersible Water Filled Pump with normal controller

- 3-10 HP AC Submersible Water Filled Pump with USPC
- 1-10 HP DC Submersible Water Filled Pump with normal controller
- 3-10 HP DC Submersible Water Filled Pump with USPC
- 1-10 HP AC Submersible Oil Filled Pump with normal controller
- 3-10 HP AC Submersible Oil Filled Pump with USPC
- 1-10 HP DC Submersible Oil Filled Pump with normal controller
- 3-10 HP DC Submersible Oil Filled Pump with USPC
- 1-10 HP AC Surface Pump with normal controller
- 3-10 HP AC Surface Pump with USPC
- 1-10 HP DC Surface Pump with normal controller
- 3-10 HP DC Surface Pump with USPC

3.3 **Bidder has an option to choose out of the 10 clusters for the ones he/she wishes to quote for. Bidder has to mandatorily submit declaration for Clusters it wishes to quote for (i.e. Attachment-12 of Section-6) subject to fulfillment of cumulative qualifying requirements of quoted clusters.**

3.4 In any quoted cluster, bidders may quote for any type of pump which shall be declared in Attachment-12 of Section-6. While quoting for any type of pump (Submersible/Surface Pump), it is mandatory to quote for both AC and DC type of pump under each quoted cluster.

3.5 A separate **Attachment -14** has been given in Section-6 Forms and procedures for filling up of prices for repair & maintenance cost for the period of 6-10 years. **Bidder has to quote these prices in Attachment-14 for quoted clusters and type of pumps which shall be uploaded ONLY along with the price bid. Quoting these rates is NOT mandatory and shall not be considered as part of price-bid evaluation.**

3.6 Price bids of all techno-commercially qualified bidders would be opened and L1 price would be decided for each line item separately. Selection of bidder will be done on techno-commercially acceptable and lowest cost basis for each line item (i.e type of pump for each cluster) ***Price bid of only those items (Cluster and Type of Pump) declared in Attachment-12 of Section-6 by the bidder shall be Opened.*** Price bid should be unconditional, failing which the bid shall be summarily rejected. The price to be quoted as per the prescribed format of price bid. Price will remain firm till **One Year** from the date of opening of price bid.

3.7 Bidders can select the NON-PARTICIPATING Item and click on DELETE option to remove the item. Bidder has to mandatorily declare the participating Clusters and Type of pump against this tender as per Attachment No.12 in Section-6 of tender documents.

3.8 Price Bids shall be opened for all the clusters simultaneously.

3.9 SNA reserves the right to divert the awarded quantity of successful bidder to another empaneled bidder if the bidder does not perform within one month as per the schedule on the risk and cost of the bidder.

3.10 SNA reserves the right for the variation of $\pm 20\%$ of awarded Quantity State wise.

3.11 In view of the large tender quantity all eligible bidders will be empaneled cluster-wise subject to their quoted price within a range of (L1+10% of L1) price and acceptance of L1 rates with all other terms and conditions as per tender.

- 3.12 In case the number of bidders within a range of (L1+10% of L1) price is less than five(5), a price bracket shall be extended to (L1+15% of L1) so that atleast 5 numbers of bidders can be empaneled.
- 3.13 Further, in case the number of bidders within a range of (L1+15% of L1) price is less than five(5), a price bracket shall be further extended to other bidders in the ascending orders of price quoted by them till five bidders agree for L1 price matching or all bidders have been given option to match L1 price, whichever is earlier.
- 3.14 Further, in case an empaneled party is not able to supply quantity allocated to them as per scheduled timelines, SNA reserves the right to shift the part/full quantity to another empaneled bidder, who has matched the price.
- 3.15 Please note that in all cases Matching of Prices will be on total landed cost (excluding GST) for complete scope of work.
- 3.16 For MSEs and startups purchase preference clause shall be valid as per the government guidelines. Refer to Section-2 of this tender document.

5. Allocation:

Quantity equivalent to 10% of total quantity (rounded off to nearest whole number) under the particular category/type of pumps of a cluster shall be allocated to L1 bidder and balance will be kept on market mode for all selected bidders including L1 bidder.

6. ADJUDICATOR

Adjudicator under the contract shall be appointed by the Appointing Authority of SNA. If the bidder does not accept the Adjudicator proposed by SNA, 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, the SNA and contractor have not agreed on the appointment of adjudicator, the adjudicator shall be appointed, at the request of either party, by the MNRE.

7. 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 respective cluster where programme is to be implemented shall have exclusive jurisdiction in all matters arising under the contract.

8. CONTRACT PERFORMANCE GUARANTEE (CPG)

Bidder shall submit a bank guarantee (BG) of 3% of the amount equivalent to the 10% of the value of total state-wise allocation or 100 nos. of SPWPS, whichever is lower, to respective Implementing Agency's with the validity of 1 year to be rolled over every year for the first five years. However, if total number of SPWPS is more than 10% of the value of total state-wise allocation or 100 nos. in the first list of consent of beneficiaries in bidder's favor, bidder shall submit another CPG equivalent to differential value of order as per NTP. In case of non-performance or failure in fulfilment of contractual obligation under the contract, will be liable to submit 10% CPG apart from other penal provision of the tender.

Illustration:

For Chhattisgarh bidder has submitted the CPG equivalent to the order value of 100 nos of SPWPS to Implementing Agency (as 10% of state allocation i.e, 20000 is equal to 2000 which is higher than 100). After

getting a list of beneficiaries, bidder submits consent of 1500 beneficiaries in his favor. In this case, bidder shall also submit a CPG of 3% of the amount equivalent to the 1400 (1500-100) nos. of SPWPS in addition to the previously submitted CPG equivalent to the order value of 100 nos of SPWPS to respective Implementing Agency to get NTP.

In case, if consent of beneficiaries in bidder's favor is less than the value of submitted CPG, Implementing Agency shall return the original CPG within 15 days of receiving the new CPG equivalent to total awarded quantity to the bidder. However, such request for return of the CPG equivalent to unawarded capacity shall be considered only after 12 months of issuance of LoA.

Illustration:

For any state, Bidder has submitted the CPG of 3% of the amount equivalent to the order value of 100 nos of SPWPS to Implementing Agency. However, in 12 months, bidder can only get 50 no.s of consent of beneficiaries in his favor. In this case, bidder can claim the return of CPG equivalent to the un-awarded capacity i.e, 50 (100-50) after submitting the CPG equivalent to the 3% of the amount of awarded capacity i.e, 50 no.s of SPWPS.

Any delay in submission of CPG shall be deemed as accruing of financial benefit to the supplier and SNA may take necessary interest penalty recovery action (interest @ SBI's MCLR + 2 %) from the payments due to the supplier for the period of delay. However, this provision does not bind SNA in any way from proceeding against the supplier (including cancellation of the LOA, etc.) for non-compliance towards non-submission of the CPG.

Bank guarantee shall be from any Nationalized Banks/other scheduled private banks as per list given in Section 6. SNA shall at his discretion have recourse to the said Bank Guarantee for the recovery of any or all amount due from the bidder in connection with the contract including of guarantee obligations. This shall include the recovery, if any, against the Penalties applicable during Repair and maintenance period as brought out under Liquidated Damages.

9. In addition, during assessment of work progress of the empanelled vendors, if it is found that they are not able to complete the installations in given timelines, the Ministry reserves right to empanel other vendors who are techno commercially qualified for same cluster or other clusters subject to matching L1 price and fulfilment and TnC's of this RfP document.
10. Successful bidder, on whom letter of award is placed, is to ensure all safety guidelines, rules and regulations, labor laws etc. Successful bidder indemnifies SNA 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. SNA has no role to play in this matter.
11. Successful bidder is to submit interchangeability certificate for its product supplied for replacement during warranty and maintenance period and even when it is purchased from open market. In case due to change in technology, the supplied product is not available during warranty/ maintenance period than the improved version of product can be used in warranty/ maintenance period with same or improved technical parameters or the combination thereof after written communication of Engineer in Charge of SNA at same Cost & terms and conditions. Successful Bidder, on whom letter of award has been placed, has also to confirm that the price of improved version of product is not lesser than the original product or its parts in comparison.
12. The Bidder shall be deemed to have examined the Bid document, to have obtained his own information in

all matters whatsoever that might affect carrying out the Works in line with the Scope of Work specified in the document at the offered rates and to have satisfied himself to the sufficiency of his Bid. The bidder shall be deemed to know the scope, nature and magnitude of the work and requirement of materials, equipment, tools and labour involved, wage structures and as to what all works he has to complete in accordance with the Bid documents irrespective of any defects, omissions or errors that may be found in the Bid documents. In case of non-performance of any bidder, work will be awarded to third party at the risk and cost of the existing bidder.

13. 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, 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.

14. TRANSPORTATION, DEMURRAGE, WHARFAGE, ETC.:

Contractor 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, 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, EESL/SNA 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.

EESL/SNA 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 suppliers.

The bidder should not have been black-listed by any Central / State Government or Public Sector Undertakings. If at any stage of tendering process or during the currency of the contract, any suppression / falsification of such information is brought to the knowledge, SNA/EESL shall have the right to reject the proposal or terminate the contract, as the case may be, without any compensation to the bidder & forfeiture of bid security/EMD/CPG.

- 15.** 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 this tender document) or received in damaged or broken conditions, not satisfactory owing to any reason of which we shall be the sole judge, we 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 bidder reserving to ourselves the right to forfeit the security deposit, furnished by the bidder against the contract. The bidder 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 bidder's risk and responsibility and storage charges, along with any other charges applicable, will be recoverable from the bidder.

- 16.** We 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 bidder.
- 17.** The bidder should not have been black-listed by any Central / State Government or Public Sector Undertakings. If at any stage of tendering process or during the currency of the contract, any suppression/ falsification of such information is brought to the knowledge, EESL/SNA shall have the right to reject the proposal or terminate the contract, as the case may be, without any compensation to the tenderer & forfeiture of bid security/EMD/CPG.
- 18.** Further SNA reserve the right to place a repeat order in case of urgency for equal to or more than ordered quantity in the Letter of Award for similar work. In case of poor performance/poor quality of material SNA reserves the right to short close / terminate the contract and award the work to third party at risk and cost of bidder.

19. 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, SNA's 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 5 % of the total value of the contract.

Alternatively, SNA's 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 SNA 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 SNA's 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 etc.

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

20. PERIOD OF BID VALIDITY

Bids shall remain valid for a period of 180 days after the closing date prescribed by the EESL for the receipt of bids. A bid valid for a shorter period may be rejected by the EESL as being non responsive. In exceptional circumstances, the EESL may solicit the bidder's consent to an extension of the bid validity period. The request and response thereto shall be made in writing thro' letters/ e-mails. If the bidder accepts to prolong the period of validity, the bid security/EMD shall also be suitably extended. A bidder may refuse the request for Bid Validity Extension without forfeiting its bid security. A bidder granting the request will not be required nor permitted to modify its bid.

21. PRE-BID MEETING

- The official representative of the Bidders may attend the pre-bid conference/meetings as per date, time and venue mentioned in Section-1.

- The purpose of the meeting will be to clarify any issues regarding the bid process.
- Record notes of the meeting including the text of the questions raised and responses given will be transmitted to all the bidders who were present at the meeting and will also be put on the web-site. The clarifications that could not be furnished during pre-bid conference will be separately communicated to all the purchasers of the RFP.
- Non-attendance at the pre-bid meeting will not be a cause for rejection of a Bidder.
- Based on the discussion in pre bid meeting, EESL/SNA reserved the right for modification in RFP.
- Bidder(s) are requested to send the queries 3 days in advance from the date of pre bid to the contact points mentioned in Section 1 in the following format:

Name of Tender				
Tender No.				
Tender ID				
Bid Opening Date				
Bidder's Name				
Contact person from Bidder with address, e-mail and				
Sr. No.	Section No.	Description as Per RFP	Queries/ Clarification of the bidder	Remarks
	Page No.			
	Para No/ Clause No.			
1.	Section No.			
	Page No.			
	Para No/ Clause No.			
2.	Section No.			
	Page No.			
	Para No/ Clause No.			
3.	Section No.			
	Page No.			
	Para No/ Clause No.			

22. Bid Security Declaration

Bidder participating in the tender need to submit "Bid Security Declaration" wherein as per Attachment 2 of the envelope-1 failing which bid shall be considered non-responsive and out rightly rejected.

23. Statutory Compliance/ Certification regarding Cyber Security Products:

A certificate (in the format at *Attachment-13 of Section-6) 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'.

24. PRICE BASIS

To be quoted as Firm at FOR Destination Basis.

25. WARRANTY AND MAINTENANCE:

- a. The complete Solar Photovoltaic Water Pumping System and display board / Name Plate (SNA's will provide the details) shall be warranted and maintained for 5 years from the date of installation.
- b. 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.
- c. Successful bidder, on whom letter of award is placed, is to ensure all safety guidelines, rules and regulations, labour laws etc. Successful bidder indemnifies SNA 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. SNA/EESL has no role to play in this matter.
- d. Local representative of bidder should meet governing authorities of each block and should submit the minutes of meeting to SNA's on quarterly basis.

26. COST OF TENDER DOCUMENTS

Interested bidders may view the tender documents at <https://eesl.eproc.in> or could be viewed after following the link of 'e-Tendering' on EESL home page, i.e. <http://eeslindia.org> from where the registered bidders [registration process is explained at EESL home page in "E-tendering" section] with EESL will be able to download the tender documents and submit their bids online.

The cost of tender documents is Rs. 25,000/- (Rupees Twenty-Five Thousand Only-Nonrefundable and Non Adjustable) which shall be payable in the form of DD/Pay order or Banker's Cheque in favour of "Energy Efficiency Services Limited" issued by any scheduled/nationalized bank payable in Noida/New Delhi (under this option the details of DD No. & Date, amount, bankers name etc. has to be submitted in relevant field/column of online module). Tenders without this cost are liable to be rejected. It should be ensured by the bidder that the original DD is received by EESL before opening time of techno-commercial bids for verification of the details of DD given online by the bidders.

The tender submission, tender closing and opening will be done electronically and online.

EESL will not be responsible for any delay, loss or non-receipt of Tender Document Cost sent by post/courier. The instrument should reach in original to EESL office before the Bid Opening date. Bids not accompanied with the requisite tender document cost may not be opened.

A. TECHNICAL SPECIFICATIONS OF SOLAR WATER PUMPING SYSTEM

General Specifications of SPV Pumping Systems shall be in accordance with prevailing guidelines of MNRE; however the specifications of some components are also mentioned as follows –

1. SCOPE

These specification covers design qualifications and performance specifications for Centrifugal Solar Photo Voltaic (SPV) Water Pumping Systems to be installed on a suitable bore-well, open well, water reservoir, water stream, etc., and specifies the minimum standards to be followed under New Scheme for Farmers launched by Government of India on 8.3.2019.

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 tube well during operation of pump set.

2.3 Submergence — It is the minimum height of 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 meter of water column when pump operates at suction lift.

2.5 Static Suction Lift — Static suction lift/head is the vertical distance between sump water level and center of pump 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 / m² on the surface of SPV array (i.e. coplanar with the SPV Modules).

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

2.8 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.

2.9 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 Pump Set

Pump set may be of any one of the following types:

- i) Mono-set pump;
- ii) Open well submersible pump;
- iii) Submersible pump;

3.2.2 Motor

The motor of the pump set may be of the following types:

- i) AC Induction Motor.
- ii) DC Motor [PMSM/BLDC/SRM (with brush or brushless)].

3.2.3 SPV Controller See 2.8

Note: Some controllers are inbuilt in the motors

Specifications of Controller/Drive for Solar Water Pumping Systems

Sl. No.	Requirement	Specifications
1.	<i>Controller Power Capacity to drive the Pump</i>	Controller Power Capacity should match to Solar Panels Power Capacity, not Pump Capacity. Example: For 5HP Project, As per MNRE Specs, Panels should be minimum 4800W , Controller capacity also should be minimum 4800W only.
2.	<i>Point Tracking (MMPT)</i>	Should track power only and not Voltage at Maximum power point
3.	<i>Enclosure</i>	The Controller must have IP65 protection or must be housed in a cabinet having at least IP65 protection.
4.	<i>DC Circuit Breaker Disconnect Switch</i>	Should be between Solar panels and controller
5.	<i>GSM/GPRS</i>	Controller shall be integrated with GSM/GPRS gateway with Geo tagging. GSM/ GPRS Charges to be included in the Costing till the end of Warranty period of the Pump set

3.2.4 Provision for remote monitoring for the pumps must be made in the pump controller through an integral arrangement having following basic functions:

- ❑ Controller must be assigned with a unique serial number and its live status must be observed remotely on online portal through login credentials.
- ❑ Live status must indicate whether controller is ON/ OFF
- ❑ The parameter i.e. the water output, water flow rate, in fault condition, array input voltage/ current, power and motor frequency should at logged at an interval of 10 minutes
- ❑ Controller must have a back up to store the data locally (at least for 1 year)

Requirements of Remote Monitoring System

1. State Implementing Agency (SIA) will have a common **SWPS** (Solar Water Pumping System) Management platform for monitoring of operation and performance of SWPS installed under PM KUSUM Scheme.
2. Remote Monitoring System (RMS) of SWPS should have following minimum features or modules:
 - 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. 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 – State Level Solar Energy Management Platform to be operated and maintained by the **State implementing agency (SIA)**.
 - i. Consumer Mobile Application: Generation, Running Hours, Water Discharge, Complaint logging, etc.
3. RMS provided by all bidder's should connect to State Level Solar Energy Data Management platform, which will have interface with National Level Solar Energy Data Management platform.
- As mentioned in above point, SIA will provide server infrastructure as well as software. SIA will maintain the same. All vendors should provide SIM card of suitable ISP having maximum Signal Strength in the respective location of SWPS and ensure connectivity as well as pushing of data to centralized platform as mentioned in specifications.**
4. Communication Architecture should be as per following:
- 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/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/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/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 remote On/Off command to pump through farmer mobile app. In case, farmer do not have a smart phone, farmer shall be able to on-off pump thru SMS/missed call.
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 configurable interval. Interval should be configurable for 60 sec or less.
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 event, 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 token/password mechanism
- e. Message Format:** RMS should provide data in a JSON message format as required by respective SNA
- 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 central Server. Local data storage should be possible for **one year** in case of unavailability of cellular network.
- g.** RMUs should have configuration update 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

3.3 Solar Photo Voltaic (SPV) Array

3.3.1 SPV arrays contains specified number of same capacity, type and specification modules 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 minimum capacity in the range of

900 Watts peak to 9000 Watts peak, measured under Standard Test Conditions (STC). 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 PV array, under STC, should be a minimum of **300 Watts peak**, with adequate provision for measurement tolerances. Use of PV modules with higher power output is preferred.

3.3.2 Modules supplied with the SPV water pumping systems shall have certificate as per IS14286/IEC 61215 specifications or equivalent National or International/ Standards. 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 15 percent and fill factor shall be more than 70 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 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 the IS 14286/IEC 61215

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

3.3.9 Variation in overall SPV array wattage from the specified wattages shall be within zero percent to +10 percent.

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 must be inside of module lamination. The module laminate, but must be able to withstand harsh environmental conditions.

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 mounted motor-pump set
- b) Submersible motor-pump set

3.4.2 The “Motor-Pump Set” should have a capacity in the range of 1 HP to 10 HP and should have the following features:

- a) The mono block DC/ AC centrifugal motor pump set with the impeller mounted directly on the motor shaft and with appropriate mechanical seals which ensures zero leakage.
- b) The motor of the capacity ranging from 1 HP to 10 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.

3.4.3 The pump and all external parts of motor used in submersible pump which are in contact with water, should be of stainless steel of grade 304 or higher as required. The motor- pump set should have a 5 years warranty and therefore, it is essential that the construction of the motor and pump should be made using parts which have a much higher durability and do not need replacement or corrode for at least 5 years of operation after installation.

3.4.5 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 case of HDPE pipes the minimum pressure rating of 8 kg/sqcm-PE100 grade for pumps up to 3 HP, 10 kg/sqcm-PE100 grade for 5 HP pumps 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 load of modules and high wind velocities up to 150 km per hour. The raw material used and process for manufacturing of module mounting structure including welding of joints should conform to applicable IS. 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 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 IS 5624 for foundation hardware) or direct piling, 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 for different capacity of SPV pumps are attached at Annexure-A. These are indicative of minimum standards and an Implementing Agency may specify higher standards.

3.5.5 The MMS design specified by the MNRE in the Technical Specification issued in 2019 shall be followed. However, in case of any change in MMS design having improved design features than MNRE specified design, the vendor shall submit a certificate to this effect from recognized structural engineering institutions like IIT Roorkee, IIT Madras, etc.

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 must have IP (65) protection or shall be housed in a cabinet having at least IP (65) 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) Accidental output short circuit;
- d) Under voltage;
- e) Reverse polarity;
- f) SPD to arrest high current surge

3.6.4 A good reliable DC Circuit Breaker as per IS/IEC 60947-2 suitable for switching DC power ON and OFF shall be provided in the SPV Controller.

3.6.5 All cables used shall be as per IS 694. 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.

3.6.6 Controller shall be integrated with GSM/GPRS Gateway with Geo tagging. GSM/ GPRS Charges to be included in the Costing till the end of Warranty period of the Pump set.

3.7 Earthing Arrangement

3.7.1 Earthing of the motor shall be done as per IS 9283 in accordance with the relevant provisions of IS 3043. Separate earthing shall be provided for Controller, pump and SPV array.

3.7.2 For safety purpose, it shall be ensured during installation that the earthing is capable of taking care of leakage current.

3.7.3 In case of uPVC/HDPE pipes used as discharge pipe, a separate non-corrosive, low resistance conductor from motor earth terminal to control panel earth terminal shall be provided for earthing.

3.7.4 A lightening arrestor shall be provided with every SPV Water Pumping System.

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 7.15 KWh / 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:

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- i) 110 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 meter (Suction head, if applicable, maximum of 7 meter) 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, up to a maximum of 7 meters) 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 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 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 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 and the shut off head being at least 150 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 given in the Annexure B.

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, maximum of 7 meters) 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, up to a maximum of 7 meters) 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 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 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 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 and the shut off head being at least 150 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 given in the Annexure C.

5. TESTS FOR HYDRAULIC AND ELECTRICAL PERFORMANCE OF PUMPSET

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

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

f) Leakage current test

5.2 Testing of SPV Water Pumping Systems shall be done as per 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/m² 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;
- 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)

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)

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 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 and 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. OTHER ACCESSORIES: DELETED

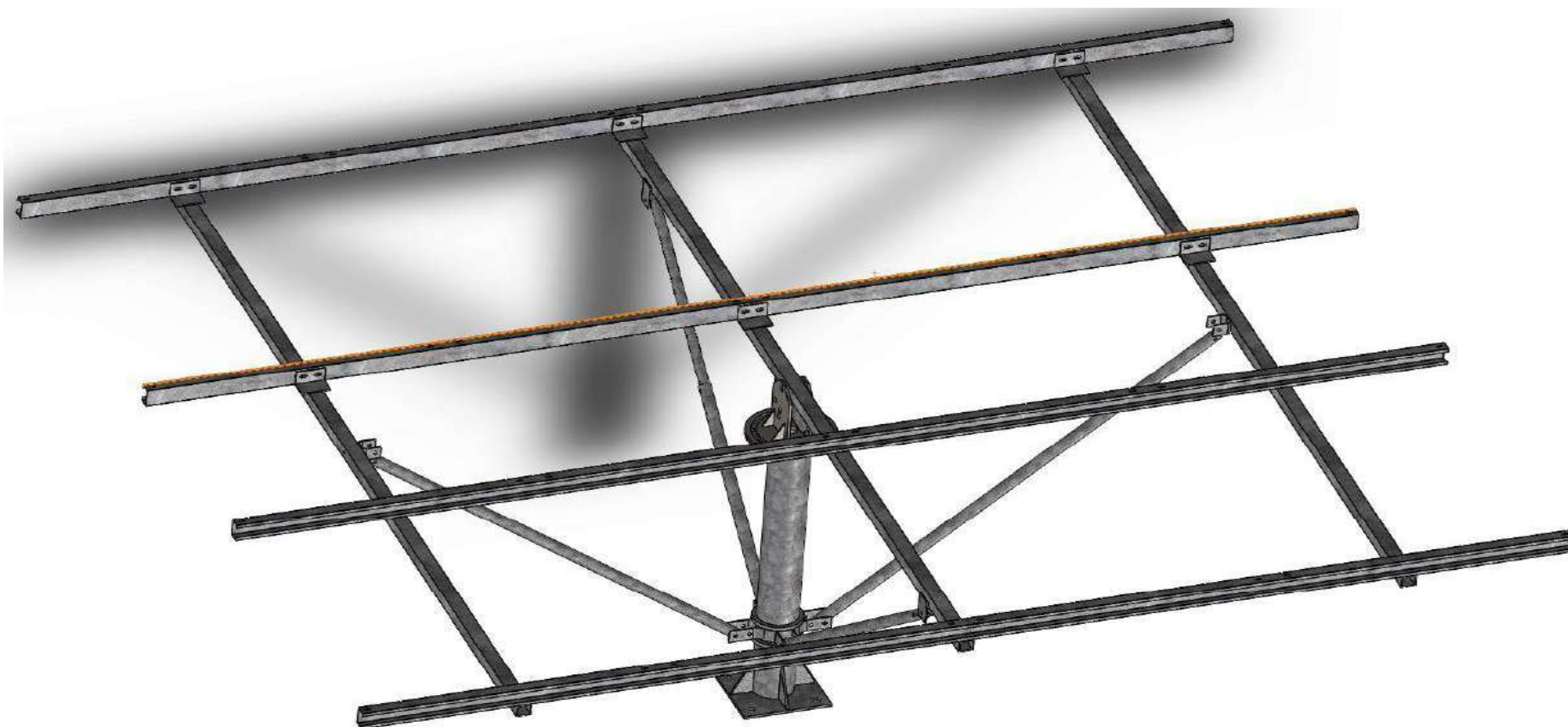
10.COMPREHENSIVE OPERATION AND MAINTENANCE

- 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 guarantee period.
- ii. AMC shall be in line with KUSUM guidelines and it's amendment (if any). The report has to be maintained. Apart from the monitoring, regular periodical maintenance of system has to be done. The report has to be maintained in a prescribed table format in a register maintained at the site which should contain Month, Inspection Date, Action taken against the Defects found in the System and Remarks of the representative of households along with signatures of both service Engineer and the farmer/ beneficiary.
- 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 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 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.**

Specifications for Dual Axis Manual Tracking
Type
Module Mounting Structure (MMS) for Solar Water Pumping
System



Standard MMS for 4, 6 and 8 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. Combination of standard MMS of 4 Modules and 6 Modules for 3 HP
4. Combination of two standard MMS of 8 Modules for 5 HP
5. Combination of three standard MMS of 8 Modules for 7.5 HP

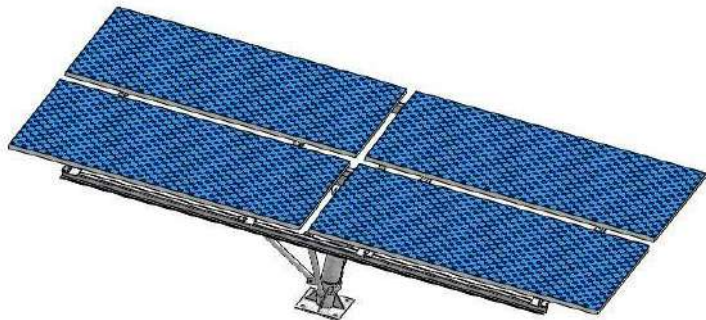
and so on....

Specifications of main parts used in MMS are given below:

1. Centre Shaft: - Centre shaft used in structure should be of minimum 139 OD with minimum thickness of 4 mm with base plate minimum 10 mm thickness if used and foundation hardware should be as per IS 5624. For system without base plate i.e. direct piling is should be as per the site condition based on the properties of Soil and refer (IS 6403 / 456 / 4091 / 875) for foundation design.
2. Rafters: - The Main and secondary rafter used in structure should be of either SHS & RHS pipe sections.
3. Purlin: - Mounting Purlins used in the structure should be made of Cold form steel section as per IS 1079 with minimum thickness of 2mm.

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 section to be provided to support the mounting structure.
5. Provision for Daily Tracking: - Provision for Daily tracking should be provided by the way of providing min. 8 mm thick metal sheet with precision cut grooves.
6. Module Locking System: - Modules should be locked with antitheft bolts of SS 304 Grade.
7. General Hardware for Structure Fitment: - Either SS 304 or 8.8 grade hardware should be used for fitment.
8. Hot Dip Galvanizing: - All structure parts should be hot dip galvanized according to IS 4759.
9. Tolerance for fabrication: - Tolerance for fabrication of steel structure should as per IS 7215.
10. Welding: - Welding should be done as per IS: - 822 & grade of welding wire should be (ER70S-6).

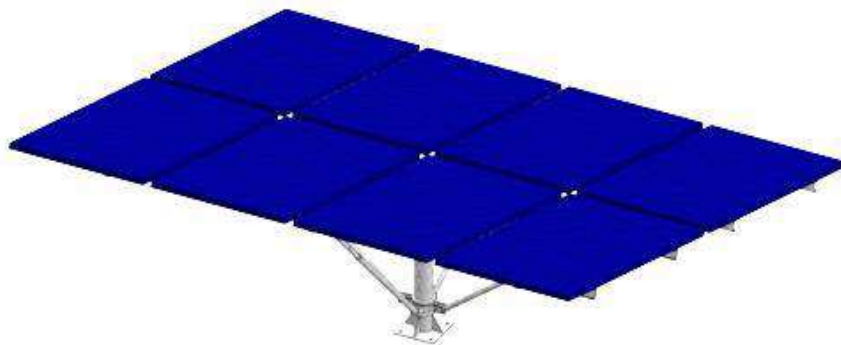
The MMS design specified by the MNRE in the Technical Specification issued in 2019 shall be followed. However, in case of any change in MMS design having improved design features than MNRE specified design, the vendor shall submit a certificate to this effect from recognized structural engineering institutions like IIT Roorkee, IIT Madras, etc.



4 Module MMS



6 Module MMS



8 Module MMS



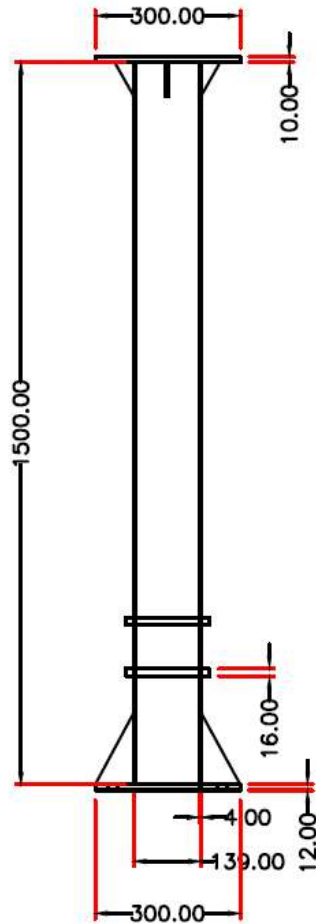
Side view

Raw material test certificates (MTC) of all types of raw material used in dual axis manual tracking type MMS as per appropriate IS code should be submitted along with dispatch documents.

Tests to be performed on Dual Axis Manual Tracking Type MMS for Solar Water Pumping System: -

1. For ascertaining proper welding of structure part following should be referred.
 - a. Weld wire grade should be of grade **(ER 70 S - 6)**
 - b. D.P. Test (Pin Hole / Crack) **(IS 822)**
2. For ascertaining hot dip galvanizing of fabricated structure following should be referred: -
 - a. Min coating required should be as per IS 4759.
 - b. Testing of galvanized material.
 - i. Preece Test (CuSO₄ Dip Test) **(IS 2633)**
 - ii. Mass of Zinc **(IS 6745)**
 - iii. Adhesion Test **(IS 2629)**

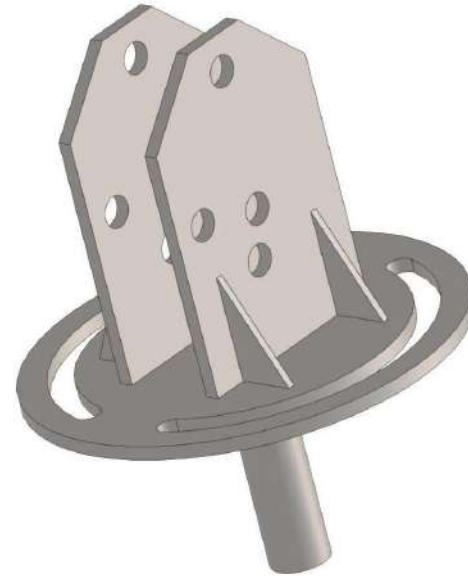
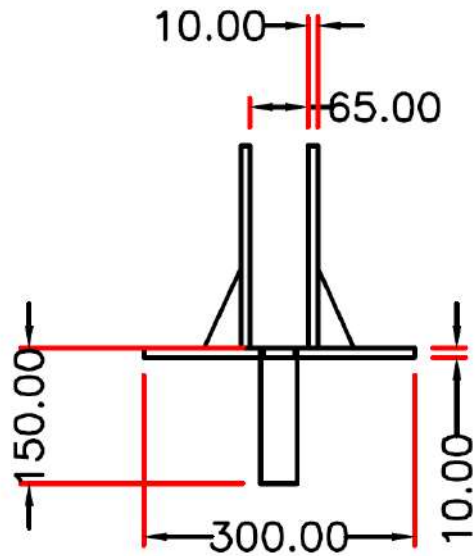
Part1 – Mail Column



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.

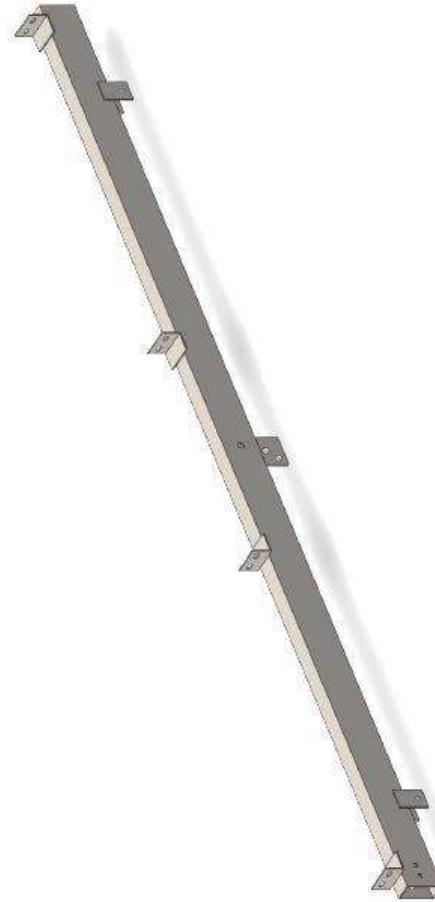
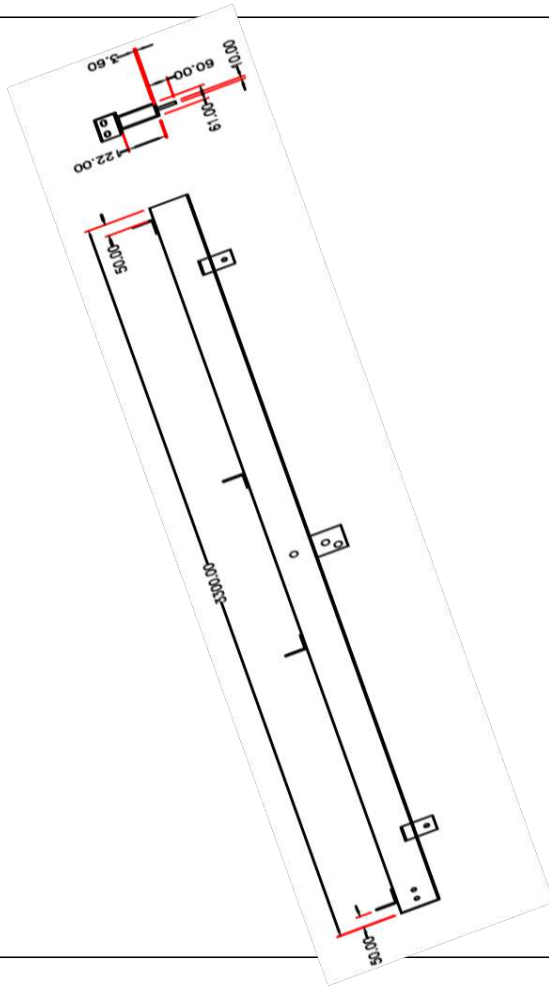
Part 2 – Top Plate



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.

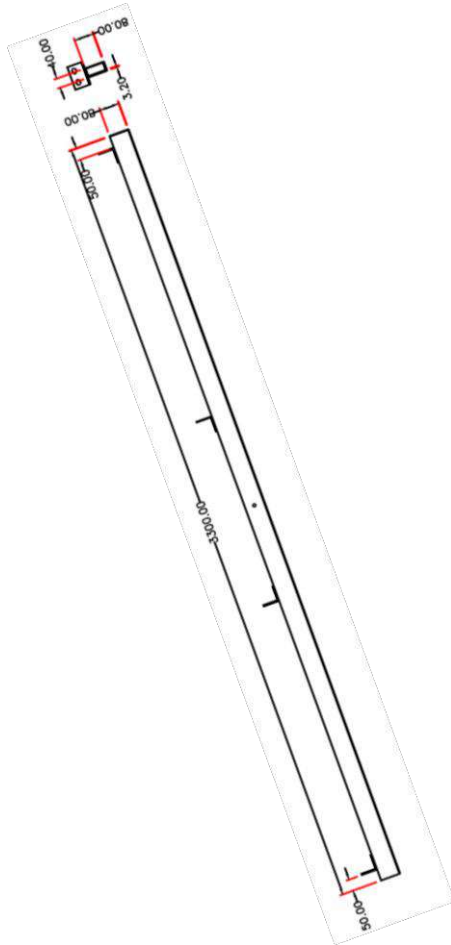
Part 3 – Main Tube



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



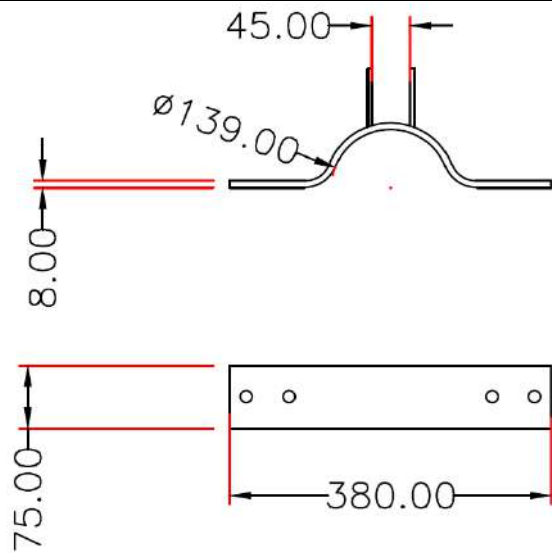
Notes: -

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	
Technical drawing of a purlin. The side view shows a long, narrow profile with a total length of 1150.00 mm. The end view shows a cross-section with a width of 15.00 mm and a height of 20.00 mm. The drawing includes dimension lines and numerical values for all key dimensions.	A 3D perspective rendering of a purlin, showing its elongated, slightly curved shape and textured surface.
Notes: - 1. All Dimensions are in mm. 2. Mounting Purlin material grade should be E250 as per: - IS: 1079 / 2062 & IS: 811.	

1. All Dimensions are in mm.
2. Mounting Purlin material grade should be E250 as per: - IS: 1079 / 2062 & IS: 811.

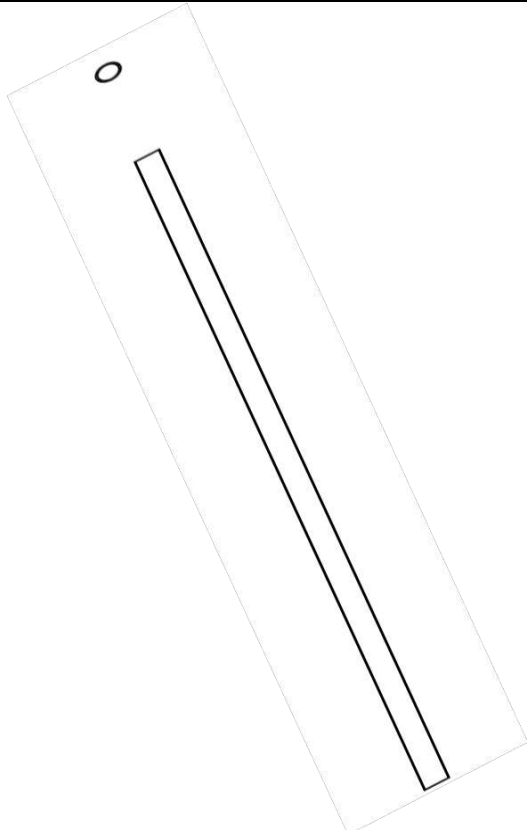
Part 6 - Clamp with Blade



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.

Bill of Quantity for main parts of MMS for Solar Water Pumping System

SR. NO.	PART NAME	CROSS SECTION DETAIL	LENGTH (MM)	QUANTITY PER SET
A	Common for MMS for 4, 6 and 8 Modules			
1.	MAIN POLE	139 OD	1500	1
2.	TOP PLATE	300 OD	--	1
3.	CLAMP WITH BLADE	75X8	380	2
4.	SUPPORTING PIPES	41 OD & 33 OD	--	6
B	Different for MMS for 4, 6 and 8 Modules			
5.	MAIN TUBE			
	4 and 6 Module	60X60X3.6	3300	1
	8 Modules	122X61X3.6	3300	1
6.	SIDE TUBE			
	4 and 6 Module	50X50X3.6	3300	2
	8 Modules	80X40X3.2	3300	2
7.	MOUNTING PURLIN			
	4 Module	80X50X15X2	2050	4
	6 Module	80X50X15X2	3100	4
	8 Modules	80X50X15X2	4150	4

