Madhya Pradesh Urja Vikas Nigam Limited

(A Govt. of MP Undertaking- lSO 9001:2008 Certified)

Invites

Request for Selection (RFS)

for

Empanelment of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of different capacities (HP) anywhere in Madhya Pradesh State, including complete system warranty, insurance and its repair and maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE

No. F/UVN/2024-25/SLP/02-72/ 1585 **Date: 05/08/ 2024**

Issued by:

Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL)
Urja Bhawan, Shivaji Nagar, Link Road No. 2, 5 No. Stop, Bhopal (M.P.)–462016
Telephone No.: +91-755-2556566, 2575670
www.mprenewable.nic.in
email: solarpump.mpuvnl@gmail.com

This page is intentionally left blank

Table of content

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 Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) immediately. If no intimation is received from any bidder till pre-bid meeting, it shall be considered that the document is complete in all respect and has been received/ acknowledged by the bidder(s).
2. Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) reserves the right to modify, amend or supplement this document.
3. This RFS document has been prepared in good faith, and on best endeavour basis. Neither MPUVNL nor their employees or advisors or consultants 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 by MPUVNL on the websites of MPUVNL and/or at MP E-Tenders Portal (URL: https://mptenders.gov.in/), documents at MP E-Tender portal will prevail.

Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL)
Urja Bhawan Link Road No. 2, Shivaji Nagar, Bhopal – 462016
Telephone No.: +91-755-2575670, 2556566, 2767270;
website: http://www.mprenewable.nic.in,
E mail: solarpump.mpuvnl@gmail.com

RFS No. F/UVN/2024-25/SLP/02-72/ 1585 **Date: 05/08/ 2024**

Notice inviting RFS

MPUVNL, invites Bids from the Bidders to participate through this Request for Selection (RFS) For Empanelment of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off-Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of different capacities (HP) anywhere in Madhya Pradesh State, including complete system warranty , Insurance and its repair and maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE.

Bid documents which include eligibility criteria, technical specifications, various conditions of agreements, formats etc. can be viewed from website of nodal agency (http://www.mprenewable.nic.in) website and can be downloaded from https://mptenders.gov.in/nicgep/app. The RFS document will be available from **11 September 2024**.

I/c Project KUSUM-B

BID Information sheet

(A)	**NAME OF WORK/ BRIEF SCOPE OF WORK/ JOB**	Empanelment of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of different capacities (HP) anywhere in Madhya Pradesh State, including complete system warranty, Insurance and its repair & maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE
(B)	**RfS NO. & DATE**	RFS No. F/UVN/2024-25/SLP/02-72/ 1585 Dated 05/08/ 2024
(C)	**TYPE OF BIDDING SYSTEM**	Two envelop BID System
(D)	**TYPE OF RfS/ TENDER**	E-Tender
(E)	**COMPLETION/ CONTRACT PERIOD**	As mentioned in RFS Document
(F)	**BID PROCESSING FEE**	Each Bidder shall pay RFS/Tender Fee of Rupees 15,000/-(Rupees Fifteen Thousand only) plus applicable GST through online mode at ***mptenders.gov.in.*** *MSME Bidders may refer clause 11 of this RFS for exemptions, if any, towards bid processing fees.* Above Tender Fee is exclusive of portal charges or payment gateway charges and applicable GST and additional charges (if any) beyond the Tender Fee, which shall also be borne by the Bidder.
(G)	**EARNEST MONEY DEPOSIT (EMD)**	Amount: As per clause 13 of section III of this RFS to be submitted in the form of Bank Guarantee along with the Response to RFS. *MSME Bidders may refer clause 13 of this RFS for exemptions, if any, towards bid processing fees.*

(H)	**PERFORMANCE BANK GUARANTEE**	Amount: As per clause 14 of section III of this RFS to be submitted in the form of Bank Guarantee, along with the Response to RFS.
(I)	**PRE-BID MEETING**	**Virtual / Physical mode,** **Date:** Refer Key dates and schedule **Time:** Refer Key dates and schedule Bidder has to mandatorily submit pre-bid queries in prescribed format as per excel sheet provided as per **Annexure-C** to following address: Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) Urja Bhawan, Shivaji Nagar, Link Road No. 2, 5 No. Stop, Bhopal (M.P.)–462016 Telephone No.: +91-755-2575670, 2556566 E Mail: solarpump.mpuvnl@gmail.com
(J)	**OFFLINE & ONLINE BID- SUBMISSION DEADLINE**	As per RfP and information in MP Tenders Portal (URL https://mptenders.gov.in/)
(K)	**TECHNO-COMMERCIAL BID OPENING**	As per information on MP Tenders Portal (URL https://mptenders.gov.in/)
(L)	**NAME, DESIGNATION, ADDRESS AND OTHER DETAILS**	I/c Project KUSUM-B, Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) Urja Bhawan, Shivaji Nagar, Link Road No. 2, 5 No. Stop, Bhopal (M.P.)–462016 Telephone No.: +91-755-2575670, 2556566 Mail- solarpump.mpuvnl@gmail.com

- Bids must be submitted strictly in accordance with Section-2 and 3 of the RfS.
- Bidders are required to quote strictly as per terms and conditions of the RfS documents 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 www.mprenewable.nic.in and at mptenders.gov.in. and submit their online Bid complete in all respect as per terms & conditions of RfS Document on or before the due date of bid submission. In case of any discrepancy in the documents uploaded by MPUVNL on the websites of MPUVNL

and/or at MP E-Tenders Portal (URL: https://mptenders.gov.in/), documents at MP E-Tender portal will prevail.

- Clarification(s)/ Corrigendum(s) if any shall also be available on the above referred websites.
- **VERY IMPORTANT INSTRUCTION TO BIDDERS (please read with extra care)**

  Irrespective of anything written elsewhere in this RFS and its amendments, following shall be noted and acted upon by Bidders:

  - MNRE guidelines for component-B of PM KUSUM scheme dated 17.01.2024 and amendments/ updates thereof till date of bid submission and/ or associated orders of MNRE (hereinafter, **"KUSUM-B Guidelines**") shall be binding on all concerned. Any difference between relevant aspects/ provisions written in this RFS and KUSUM-B Guidelines, the provisions or implications as per KUSUM-B Guidelines shall prevail. Therefore, Bidders are strongly advised to read provisions of this RFS in sync with KUSUM-B Guidelines and submit bid accordingly factoring all necessary techno-commercial elements as appropriate. In this respect, it is categorically and unequivocally stated that MPUVNL, its staff or its consultants shall not be accountable or responsible in any manner, whatsoever, for any implication on Bidder or the bid process itself.
  - Bidder are unequivocally recommended and categorically desired to follow latest specification, testing procedure and test report formats of the SPV Water Pumping system issued by MNRE vide OM dated 22.03.2023 and/or its amendments/ updates/ orders from time to time, as relevant as on date of bid submission (hereinafter, **"Technical Considerations"**). Any difference between relevant aspects/ provisions written in this RFS and Technical Considerations, the provisions or implications as per Technical Considerations shall prevail. Therefore, Bidders are strongly advised to read provisions of this RFS in sync the with above specifications, procedures and formats and submit bid accordingly factoring all necessary techno-commercial elements as appropriate. In this respect, it is categorically and unequivocally stated that MPUVNL, its staff or its consultants shall not be accountable or responsible in any manner, whatsoever, for any implication on Bidder or the bid process itself.
  - Notwithstanding anything written/ referred otherwise in RFS, latest **KUSUM-B Guidelines** and **Technical Considerations** issued by MNRE, as relevant and applicable as on date of bid submission, shall only be followed

and be binding on bidders/ selected vendors. Bidders shall be solely accountable and responsible to ensure their bid response is aligned accordingly, without any answerability of officers/ consultants/ staff of MPUVNL towards all/any implications on bidders/ selected vendors.

- Though Bidders shall be solely accountable and responsible to keep themselves updated in respect of KUSUM-B Guidelines as well all relevant orders and Technical Considerations, some relevant links are provided hereinbelow for ease of reference (https://pmkusum.mnre.gov.in/landing.html & https://mnre.gov.in). However, this does not absolve Bidders of their primary and sole accountability to follow correct and relevant sources of information pertaining to KUSUM-B Guidelines, MNRE orders and Technical Considerations issued by MNRE as on date of bid submission.

- **KEY DATES AND SCHEDULE OF TENDER**

  Unless modified through appropriate corrigendum or otherwise, bidders are advised to adhere to following dates and schedule. Also, bidders are advised to keep following **mptenders.gov.in** or/ and website of MPUVNL or any changes in key dates.

Sl. no.	Tender stage	Date	Time (Hrs.)
1.	Purchase of RFS start date	11.09.2024	17:00
2.	First Pre bid meeting @ RE Invest 2024 at Gandhinagar	16.09.2024	
3.	Last date of submission of comments/ clarifications on RFS and its annexures	21.09.2024	18:00
4.	Online pre bid meeting-II	24.09.2024	15:00
5.	Online bid submission start date	28.09.2024	18:00
6.	Online bid submission end date	14.10.2024	18:00
7.	Off-line submission of necessary documents as per RFS	16.10.2024	17:00
8.	Technical bid opening date	18.10.2024	11:00
9.	Financial bid opening date	24.10.2024	15:00

Bidders are requested to remain updated for any notices/ amendments/ clarifications etc. to the RfS document through the websites www.mprenewable.nic.in and/or at mptenders.gov.in. 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.mprenewable.nic.in and/or at mptenders.gov.in.

Section-1: Introduction and Invitation for BIDS

1. Background Information

1.1 About MPUVNL

Madhya Pradesh Urja Vikas Nigam Limited (hereinafter called "MPUVNL / MPUVN") is a State Nodal Agency (SIA) under Ministry of New and Renewable Energy, Govt. of India. As SIA, it functions under the guidelines of Ministry of New & Renewable Energy (MNRE). One of the main objectives of MPUVN is to discharge functions as implementing and facilitating arm for projects and schemes under ambit of MNRE and for development, promotion and commercialization of solar energy technologies in the state.

2. Invitation for Bids

1. 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.
2. Interested bidders have to necessarily register themselves on the portal https://www.mptenders.gov.in to participate in the bidding under this invitation for bids. It shall be the sole responsibility of the interested bidders to get themselves registered at the aforesaid portal to complete the registration formalities. All required documents and formalities for registering on MP tenders portal are mentioned in the subsequent RfS documents.
3. Interested bidders may obtain further information regarding this Invitation for Bids from https://www.mptenders.gov.in or www.mprenewable.nic.in.
4. For proper uploading of the bids on the MP tenders portal, shall be the sole responsibility of the bidders to apprise themselves adequately regarding all the relevant procedures and provisions as detailed in the portal. MPUVNL in no case shall be responsible for any issues related to timely or properly uploading/ submission of the bid in accordance with the relevant provisions of the Bidding Documents.
5. Bidders should submit their bid proposal complete in all aspect on or before last date and time of Bid Submission as mentioned in the Bid Information Sheet and Corrigendum (if any).
6. Bidder shall submit its proposal along with non-refundable Bid Processing Fees along with Earnest Money Deposit (EMD) complete in all respect as per

the Bid Information Sheet. Techno-Commercial bids will be opened as per the Bid Information Sheet 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) will be rejected out rightly. In the event of any date indicated being declared a holiday, the next working day shall become operative for the respective purpose mentioned herein.

7. RfS documents which include Eligibility Criteria, Technical Specifications, various Conditions of Contract, and Formats etc. can be downloaded from the MP Tenders Portal or MPUVNL's Website www.mprenewable.nic.in. It is mandatory to download official copy of the RfS Document from MP Tenders Portal to participate in the Tender. Any amendment(s) / corrigendum(s) / clarification(s) with respect to this RfS shall be uploaded on www.mprenewable.nic.in and at mptenders.gov.in. The Bidder should regularly check for any Amendment(s) / Corrigendum(s) / Clarification(s) on the above-mentioned website.
8. MPUVNL 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.

2.1 INTERPRETATIONS

1. Words comprising the singular shall include the plural & vice versa.
2. An applicable law shall be construed as reference to such applicable law including its amendments or re-enactments from time to time.
3. A time of day shall be same as otherwise provided in any agreement or document be construed as a reference to Indian Standard Time.
4. 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.
5. 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.
6. MD of MPUVNL will have authority to take appropriate decision in line with guidelines or directions of MNRE from time to time in matters pertaining to implementation of KUSUM-B scheme in Madhya Pradesh.

7. MD of MPUVNL will have authority to interpret and take appropriate decision in matters pertaining to timelines or situations posing challenge in execution of awarded Projects under KUSUM-B scheme in the State.

Section-2 Special Conditions of Contract

3. Scope of Work

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

3.1 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/beneficiary and making available necessary spare parts & tools in each operational region, to ensure timely maintenance of the systems, the vendor shall have one authorized service centre in each operational district region and a helpline in Hindi in State. Helpline number shall be indicated on the pump/ controller or at suitable location easily visible to the user.

b. Each pumping system should be marked with Toll Free No. of the installer/ vendor (Toll Free No. shall be affixed on controllers and shall be readable for 5 years) operating in English and Hindi or Regional language of state and specific pump number and same must have been captured by MPUVNL's web-based application (as per instruction of MPUVNL) at the time of installation at site.

c. Test reports can be submitted with the bids. However, the bidders can also submit a self-certificate with the bids in lieu of test reports affirming that the test certificates for all the models for which the bids are submitted will be provided by the bidder along with signing of agreement with MPUVNL, failing which the bidder will be liable for penalties including encashment of EMD for that size/ model of pump as prescribed in this RFS. Under discretionary power of MD, MPUVNL, test reports may be allowed to be submitted on extended date of maximum up to 30 days, subject to payment of penalty of 0.67% of value of penalty mentioned as per Cl. 30 (B) of RfP per day, subject to maximum of 20% of value of penalty mentioned in the table under the referred clause. MPUVNL shall recover above penalty through demand note in the name of selected

vendor, details of which shall be provided in LICA.

3.2 Installation and Commissioning

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

b. Selected vendors have to submit consent of beneficiaries in their favour to MPUVNL for which MPUVNL will issue Notice to Proceed (NTP) and for this, vendor shall complete the installation and commissioning of SPWPS within 120 days from date of issuance of NTP.

c. Selected Vendor should conduct site survey and submit Progress report on fortnight basis as per the requirement of MPUVNL /MNRE via Email & PM-KUSUM App released by MNRE.

d. Selected Vendor should submit an action plan to MPUVNL, which should include complete details of team, resources, and service centres within 30 days of acceptance of letter inviting consent for agreement (LICA) from MPUVNL. Issuance of NTP/ WO shall be contingent upon submission of above documents, failing which MPUVNL have the right to levy penalty in terms of Cl. 30(B) of RfP.

e. Vendors will have to submit installation reports as per given format on Monthly basis or as desired by MPUVNL. These reports can be also submitted through e-mail and/ or through any other means, including a Central/ State government based portal.

f. Vendor will have to submit the completion reports to MPUVNL within one week from 100% completion of work as per work order. These reports can be also submitted through e-mail, which will consists of following:

    i. For systems where RMS is working, RMS data self certified by vendor and beneficiary shall be submitted. Authorized representative of MPUVNL shall inspect the system within 30 days of such submission. If any discrepancy in system is not highlighted in such inspection, date submission of RMS based self certificate shall be treated as commissioning date. Else, date of rectification, of issues highlighted during inspection, duly certified by authorized representative of MPUVNL shall be treated as commissioning date.

    ii. For systems where RMS working is a challenge due to

unavailability of internet, Authorized representative of MPUVNL shall inspect the system within 30 days of information of completion intimated by selected vendor in prescribed format counter signed by beneficiary. If any discrepancy in system is not highlighted in such inspection, date of certification of data logger and system shall be treated as commissioning date. Else, date of inspection and certification by authorized representative after necessary rectification shall be treated as commissioning date.

g. Selected Vendor shall submit monthly and quarterly progress reports to. MPUVNL.

h. Selected vendor should finalize sub-contractor (where ever necessary) and issue purchase order for all materials such as PV Modules, Structure, Pump, Controllers, etc. within 30 days from date of NTP and unpriced copy of such award letter/Purchase order will be submitted within 30 days from date of issuance of NTP. (Not applicable for item(s) if vendor itself is manufacturing – Self certificate in this regard to be submitted within 30 days from the date of NTP)

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

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. These reports can be also submitted through email/web- portal/mobile application.

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

m. Read with Cl. 3.2(f) above, 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 MPUVNL.

3.3 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 issued vide MNRE /OM /F.No. 41/3/2018-SPV Division/Dt. 22-03-2023 or/and its amendment/ replacement as relevant. Any reference to Annexure-A in RFS or tender formats shall carry same meaning and import as relevant everywhere.

b. Only indigenously manufactured solar panels with indigenous solar cells and modules are to be used in this tender. Further, the motor-pump-set, controller and balance of system should also be manufactured indigenously.

c. In case of any ambiguity in interpretation of any of the provisions of **KUSUM-B Guidelines** and **Technical Considerations** (as defined above) the decision of the MNRE shall be final. However, in other matters related to RFS, interpretation and decision of MPUVNL shall be final and binding.

d. Systems installed under this programme should follow OM-F.No.283/22/2019- GRID SOLAR of MNRE, Govt. of India dated 09.02.2021 or its updates/ amendments as relevant.

e. It will be mandatory to use indigenously manufactured solar modules with indigenous 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 manufacturing of solar water pumping system.

3.4 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 centre) at each operational district service centre and should ensure proper maintenance of SPWPS up to 5 years from date of installation of each SPWPS. Vendor should also ensure to provide training to local persons regarding proper maintenance of SPWPS.

b. Any complaint registered/service calls received should be attended at the earliest and the system should be repaired/restored/replaced within 3 days from date of complaint received/informed to the vendor, failing which, penalty would be applied in terms of Cl. 30 (B).

c. MNRE officials, MPUVNL or its designated agency may inspect the systems during the installation, operational or contractual phase. In case the installed systems are not as per the standards / found non-functional on account of poor quality of installation or maintenance / not in-compliance with the KUSUM-B

Guidelines, Technical Considerations, specification and/or tender terms & conditions, MPUVNL can reject the system and vendor will have to meet all the expenses towards removing / rectification of the same. Further, if vendor does not perform the corrective action in stipulated time frame, MPUVNL also reserves the right to encash the PBG and/or blacklist the vendor.

d. In Case, if any vendor,

   i. Declared as L1, after issuance of LICA, does not go forward for signing of agreement with MPUVNL

      And / Or

   ii. Does not take up execution of work after the issuance of NTP(s), the EMD would be encashed. Further, the vendor may be blacklisted by MPUVNL.

e. Vendor must submit O&M manual in both English and Hindi to each beneficiary of SPWPS. Vendor must submit a soft copy of the same to MPUVN. 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. Description of frequent faults of PV module and pump and its remedies

   xiii. Minimum 10 hard copies in booklet form should be kept in service

centres and also be provided to MPUVNL as and when required.

f. The O&M (CMC) cost for 5 years should be inbuilt with system cost / bid value.

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, till 5 years from the date of installation (i.e., till CMC period).

h. Vendors have to provide the Remote Monitoring System (RMS) as per Annexure-B (RMS Communication and Security Architecture- PM KUSUM National Portal) of the RfS with all the SPWPS installed under the scheme. Further, vendor has to maintain the RMS in working condition for the period of 5 years and RMS systems shall push the accurate data of the parameters as specified in the specification and guidelines of the scheme as per Annexure-B (RMS Communication and Security Architecture- PM KUSUM National Portal), failing which the installation of the system will not be accepted by MPUVNL.

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

4. Selection of Beneficiary: -

The implementation of Scheme is demand based and selection of beneficiaries would be undertaken by MPUVNL. The following shall be ensured before inclusion of a beneficiary under the Scheme:

1. Installation of the new pumps not allowed in the notified areas issued by the Central Ground Water Board.
2. Priority to be given to small and marginal farmers.
3. Preference be given to the farmers using Micro irrigation systems or covered under Micro irrigation schemes or who opt for micro irrigation system.

Selected vendor would take an undertaking from concerned beneficiaries at the time of survey that Beneficiary does not have an electricity connection at the farm khasara no.:

5. Total quantity and types of Pumps allowed

The tentative cumulative quantities envisaged under this tender for Standalone Solar Pumps under PM-KUSUM is around 52,000 SPWPS. The following types of pump manufacturers are planned for empanelment under the RfS:

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

6. Maximum Eligibility for Tendered Capacity Allocation for a Bidder

Following conditions shall be applicable to the Bidders for submission of bids against this RfS (A Bidder shall submit bid offering rates for desired category/ies of pumps).

6.1 Empanelment of Vendors shall be aligned to amendments to Para (5) of II(a) of KUSUM-B Guidelines issued vide MNRE OM no. 32/645/2017-SPV Division 19 August 2019 and its further amendments, if any relevant, at the time of bid submission date, which shall be as following:

> *All eligible bidders shortlisted on the basis of technical and financial criteria stipulated in bidding document and under the price bracket of (L1+10% of L1) will be empanelled on acceptance of L1 price and have equal opportunity to work in market mode. However, in case the number of such bidders empanelled within price bracket of (L1+10% of L1) are less than 5, the price bracket shall extended to (L1+15% of L1), so that enough number of bidders are empanelled for better competition. The selection of beneficiaries and implementation of scheme would be the responsibility of the MPUVNL.*

6.2 The evaluation of bids shall be carried out as described in Section-5 of the RfS. The

methodology for work order / NTP of SPWPS is elaborated in Section-5 of the RfS.

7. SPWPS Locations

This scheme proposes to install Solar Photovoltaic Water Pumping systems across the Madhya Pradesh State.

8. 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 and 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 State portal maintained by MPUVNL 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.

9. Commissioning of Projects

Selected vendors must submit consent of beneficiaries in their favours to MPUVNL for which MPUVNL will give notice to proceed (NTP) and for this selected vendor shall complete the installation and commissioning of allocated SPWPS within 120 days from issuance of notice to proceed.

9.1 Commissioning of the SPWPS shall be carried out by the vendor in line with the detailed procedure as per clause 3.2 of section II of this RfS. MPUVNL may authorize any individual or committee or organization to witness and validate the installation/commissioning on site(s).

Section-3 Standard Conditions of Contract

10. Obtaining RfS Documents

Interested bidders must download the official copy of RfS & other documents after login into the mptenders.gov.in portal by using the Login ID & Password provided by tender portal during registration (Refer the RfS). The bidder shall be eligible to submit/upload the bid document only after logging into the mptenders.gov.in and downloading the official copy of RfS.

11. 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.

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

MSMEs Bidders registered as MSMEs (Micro, Small and Medium Enterprises) under NSIC/DIC/Udyog Aadhaar Only are exempted from submission of Bid Processing Fee. In this regard, the Bidder will have to furnish MSME Registration certificate issued by the appropriate authority (as applicable). Further, submission of MSME certificates issued in the name of Affiliate / Promoter/ Company will not be considered However, upon empanelment under this RfS, selected MSMEs must submit Performance Bank Guarantee as per clause 14 of section III of RfS

12. Scope of Work and Other Conditions of the Contract

Refer Clause 3 and its sub-clauses of the RfS.

13. Bank Guarantee against Earnest Money Deposit (EMD)

13.1 Bidder shall submit Earnest Money Deposit (EMD) in the form of Bank Guarantee for 1000 SPWPS as tabulated below. Bidders have to submit EMD according to Format 7.3A/ Format 7.3B and valid for 12 months from the last date of bid submission along with the bid, failing which the bid shall be summarily rejected. Save for Cl. 13.6 below, EMD validity to be extended by such other period, prior to 15 days to expiry, as MPUVNL may request for the purpose of evaluation and conclusion of bid. In case of failure, it may lead to encashment of EMD & blacklisting of Firm/Members for period of 5 years from the date of issue of notice of blacklisting. 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.

Total SWPs Quantity (Nos.)	EMD requirement in lakh INR (i.e. 1000 pumps)
52000*	53..40

***Note:** Total quantity of SWPS is tentative as it is rate contract, and it may increase or decrease, subject to availability of fund & requirement of MPUVNL

13.2 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.

The EMD shall be valid as per the timelines stipulated above. 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.

13.3 MPUVNL 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 MPUVNL in terms of the guarantee as in the case of appropriation of the cash deposit lying with MPUVNL.

13.4 The Bank Guarantee (BG) or amendment to be submitted against EMD shall be effective only when the BG issuance message is transmitted by the issuing bank through SFMS. The Bank Guarantee must include SFMS (Structural Financial Management System) as per MPUNL Bank Details which is as follows:

(a)	Account Name holder	:	M P Urja Vikas Nigam Ltd.
(b)	Bank Name	:	ICICI Bank Ltd.
(c)	Branch	:	Urja Bhawan, Shivaji Nagar Bhopal
(d)	Account No	:	656501700049
(e)	IFSC code	:	ICIC0006565
(f)	MICR Code	:	462229012

13.5 Forfeiture of EMD:

The BG towards EMD shall be encashed by MPUVNL in 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, MPUVN issues NTP 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 NTP);
c. If after empanelment of vendors or after issuance of LICA by MPUVN, it is found that the documents furnished by the Bidder as part of response to RfS are misleading or misrepresented in any way.

13.6 EMD of Selected Vendor shall be released after submission of PBG. The submission of PBG of prescribed value, as informed by MPUVNL, shall have to be done before issuance of first NTP.

Alternately, Selected Vendor will have option to give PBG for minimum 250 pumps before first NTP and get EMD released. In this case, calculation of PBG shall be done at the rate of discovered price for 5 HP DC pumps.

13.7 The BG(s) against EMD submitted by bidders, in case the bidder is not empanelled or does not qualify, shall be returned within 15 days of empanelment.

13.8 MSMEs Bidders registered as MSMEs (Micro, Small and Medium Enterprises) under NSIC/DIC/Udyog Aadhaar Only are exempted from submission of EMD. In this regard, the Bidder will have to furnish MSME Registration certificate issued by the appropriate authority (as applicable). Further, submission of MSME certificates issued in the name of Affiliate / Promoter/ Company will not be considered However, upon empanelment under this RfS, selected MSMEs must submit Performance Bank Guarantee as per clause 14 of section III of RfS

14. Performance Bank Guarantee (PBG)

Bidders selected by MPUVNL based on this RfS shall submit to the MPUVNL, a Performance Guarantee for a value @ 3% of the amount of each work order / NTP of SPWPS (Refer Point 13.6 above for details). 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 24 months from placement of NTP by MPUVNL. Validity of PBG shall be extended by the vendor for every year for the first five years**,** with 1 year grace period, from the date of commissioning**.** Further, MPUVNL 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.

Note: For the purpose of this RFS, NTP and work order shall be read/ treated interchangeably.

14.1 PBG(s) shall be submitted by selected vendors to MPUVNL within 15 days from issuance of NTP.

14.2 Subject to Cl. 13.6 above, all Performance Bank Guarantees (PBGs) shall be submitted separately for each work order/NTP. The PBGs will be issued in favour of MPUVNL.

14.3 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.

14.4 The Bank Guarantees must be executed as per Stamp Act relevant to the place of execution.

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

15. 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.

15.1 The implementation work should start within 15 days from the date of Notice to Proceed from MPUVNL.

15.2 Successful vendor shall submit the unpriced purchase order copies of solar pump sets, controllers and solar PV modules to MPUVNL within 30 days from the date of notification of NTP (Not applicable for item(s) if vendor itself is manufacturing – Self certificate in this regard to be submitted within 30 days from the date of notification of NTP). In case unpriced purchase order copies are not submitted within stipulated time (within 30 days) to MPUVNL, MPUVNL may cancel the contract and award the same quantity to another empanelled vendor.

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

15.4 Notwithstanding the transfer of ownership of the plant and equipment the responsibility of care and custody thereof together with the risk of loss or damage thereto shall remain with the Vendor pursuant to GCC hereof until completion of facilities in which such plant and equipment are incorporated.

16. Payment Terms

MPUVNL, as implementing agency, shall claim CFA from MNRE as per Cl. 5.3.4 of guidelines for component-B of PM KUSUM scheme dated 17.01.2024, as amended. Payment milestones of vendors shall be as provided below but adherence to the same shall be subject to availability of financial assistance from GoI and State Government:

Stage-1: 90 % of the value of SPWPS installed at site based on:

- Submission of detailed work plan (Project Execution Plan) with timeline for the lot supplied duly approved by the MPUVNL's representative**.**
- Self-certification by vendor of fulfilling following conditions:
    - RMS data report for systems where RMS is working as per Cl. 3.2 (f), showing performance for at least 1 week.
    - Data logger report for 3 days, certified by beneficiary for systems where RMS data is a challenge due to internet unavailability
    - SPWPS is able to withstand wind speed of 150 km/hr in all weather conditions
    - To ensure compliance of all applicable electrical safety standards. All liabilities accruing from default shall be attributed to the vendor and not to MPUVNL
- Geo tagged photographs of pump and site (minimum 5 photographs clearly capturing beneficiary along with water discharging pump, solar panels mounted on structures, lightning arrester and display board/ name plate etc. from different angles) submitted along with Invoices uploaded on portal (In case of internet unavailability self-certified photographs shall be submitted).
- Inspection report of authorized representative of MPUVNL as per Cl. 3.2(f)
- Submission of Original Supply invoices/bills:
    - Invoice will be submitted as per applicable GST norms and payment of invoices shall be made only after invoice reflected on GST portal of MPUVNL.
    - Payment of invoices shall be made after all statutory deductions as applicable.
    - All the relevant warranty and quality (Performance Test Reports) of the lot to be submitted.

Stage-II: Balance 10% on completion of 30 days from date of commissioning

- Payment will be made to vendor within 30 days after commissioning.

- This payment is subject to the availability of the accurate performance data / parameter of SPWPS through RMS on State portal and central portal of PM-KUSUM (SEDM) for 30 days post commissioning. Where RMS data is not available due to internet unavailability, self-certificate of beneficiary and vendor would be submitted for 30 days' performance data of data logger. MPUVNL reserves right to verify data submitted as above.

**If the invoices are incomplete in any respect or in case on non-compliance with terms and conditions of Notice to Proceed (NTP), the payment due date shall start from the submission of all necessary documents.*

***MPUVNL has the right to seek any additional documents /certificates /information it deems fit prior to release of any payment.*

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

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

18. 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 as provided in RFS. Submission of bid proposals by Bidders in response to RfS shall be in the manner described below:

i. Covering Letter as per Format 7.1.

ii. 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 7.2.

iii. Bank Guarantee-against Earnest Money Deposit (EMD) as per Format 7.3 A/7.3 B.

iv. 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:

   a. 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.

b. 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

c. 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.

v. 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.

vi. 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.

vii. Undertaking regarding no wilful default and no major litigation pending as per Format 7.7.

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

ix. Signed Integrity Pact between MPUVNL and the Bidding Company as per Format 7.9.

x. Covering letter for the financial bid as per Format 7.10.

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

xii. Declaration for the local content as per Format 7.12.

xiii. Declaration for using same make of equipment's as per the test certificate as per Format 7.13

xiv. Declaration for submitting the test certificate as per MNRE technical specifications for solar water pump sets issued in 2023 as per Format 7.14 and/or its subsequent amendments.

xv. Certificate regarding compliance of MeitY notification vide file no. 1(10)/2017-CLES dt. 02.07.18 as per Format 7.15 and/or its subsequent amendments.

xvi. Attachments

1. 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.
    - If the selected vendor wishes to execute the project through a Special Purpose Vehicle (SPV), the MoA/ AoA of the SPV highlighting 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 has to be submitted.

2. Certificate of Incorporation of Bidding Company/ all member companies of Bidding Consortium.

3. 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. MPUVNL 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.

4. Certified copies of annual audited accounts for any three financial years out of the last five financial years, i.e., 2022-23 , 2021-22 , 2020-21, 2019-20 and 2018-19 along with certified copies of Balance Sheet, Profit & Loss Account, Schedules and Cash Flow Statement, supported with bank statement as on the date at least 7 days prior to the due date of bid submission (if applicable), shall be required to be submitted. In case of audited annual accounts for 2023-24 are available, above requirements shall be for 2023-24, 2022-23 , 2021-22 , 2020-21 and 2019-20.

5. Details of all types of securities/instruments which are pending conversion into equity whether optionally or mandatorily.
6. In case of LLP as bidder or member of a consortium, an LLP registration certificate issued by Registrar of Companies shall also be submitted.
7. In addition, PAN Card and GST registration certificate shall also be submitted.
8. In support of technical QR criteria, work order copies/Invoices and Completion Certificates shall also be submitted.
9. Bidders must submit following documentary evidence that components/SPWPS systems will be manufactured indigenously
    a. Declaration as per format 7.12.
    b. List and pictures of manufacturing and testing facilities.
    c. Undertaking that if details provided by bidders are in deviation with provisions of PM-KUSUM Scheme, which may lead to disqualification of bidder.
    d. At the time of payment post installation of systems, Vendors must submit copy of excise invoice(s) of the manufacturing unit(s) of Solar PV Module, Pumps, and Controllers.

19. Important Notes and Instructions to Bidders

19.1 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.

19.2 The Bidders shall be shortlisted based on the information /declarations made by them in relevant schedules of RfS.

19.3 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, MPUVNL reserves the right to reject such response to RfS and/or cancel the LoA/ Agreement/ NTP, if issued, and the Bank Guarantee 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.

19.4 Response submitted by the Bidder shall become the property of the MPUVNL and MPUVNL shall have no obligation to return the same to the Bidder.

19.5 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.

19.6 The response to RfS shall be submitted as mentioned in Clause 18 & 21 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, MPUVNL reserves the right to seek additional information from the Bidders, if found necessary, during the course of evaluation of the response to RfS. Such information shall be considered as a part of the response to RfS.

19.7 All the information should be submitted in English language only.

19.8 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. In case of any changes in above, formal prior intimation to MPUVNL shall be ensured by such entities.

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

19.10 Response to RfS not submitted in the specified formats will be liable for rejection by MPUVNL.

19.11 Bidders delaying submission of additional information or clarifications sought will be liable for rejection.

19.12 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 MPUVNL of the obligation of the Bidder to furnish the said data/information unless the waiver is in writing.

19.13 Only Bhopal Courts shall have exclusive jurisdiction in all matters pertaining to this RfS.

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

20. Non-Responsive Bid

The response to RfS submitted by the bidder along with the documents submitted online to MPUVNL 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":

a. Non-submission of the requisite Bid Processing Fee & EMD as mentioned in the Bid Information Sheet.
b. Response to RfS not received by the due date and time of bid submission.
c. Incomplete response / documents received against this RFS.
d. Any indication of price in any part of response to the RfS, other than in the financial bid.
e. Data filled in the Electronic Form of Financial Bid (Second Envelope), not in line with the instructions mentioned in the same electronic form.
f. 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.

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

21.1 Documents to be Submitted Online/Offline

The bidder has to mandatorily submit a copy of all necessary formats/ documents/ experience proof/ certificates as relevant and desired under this RFS online. Additionally, original of following documents shall be submitted offline:

i. Bank Guarantee towards EMD as mentioned in the Bid Information Sheet (as per Format 7.3A/ 7.3B). (In Original)

ii. Receipt of Bid Processing Fees

iii. Offline submission of hard copies, of power of attorney (authorised signatory), power of attorney (for lead member), consortium agreement (as applicable) is required in original.

No documents will be accepted after the due date and time of bid submission. Copy of Bank Guarantee(s) against EMD needs to be submitted in online and original copy to be mandatorily submitted offline mode.

The bidders will be required to submit the bank guarantee against EMD either in person or through post, at the office of MPUVNL on or before the closing date of bid submission.

Note: In all cases, the Bank Guarantee against EMD 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 Empenelment of Vendors for Design, Manufacture, Supply, Transport,Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of different capacities (HP) anywhere in Madhya Pradesh State, including complete system warranty , insurance and its repair and maintenance for 5Years under Component-B of PM-KUSUM scheme of MNRE	
Cumulative Capacity of the projects applied for	*Nos.*
No. of Projects Bid for	
RfS Reference No.	MPUVNL/_____ dated _____
Submitted by	*(Enter Full name and address of the Bidder)*
Organization ID (OID) on e- procurement portal	*(Enter the OID through which the Bid has been submitted online on e-procurement portal)*
Authorized Signatory	*(Signature of the Authorized Signatory) (Name of the Authorized Signatory)* *(Stamp of the Bidder)*
Bid Submitted to	**I/c Project KUSUM-B** Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL),Urja Bhawan, Shivaji Nagar, Link Road No. 2, 5 No. Stop, Bhopal (M.P.)–462016

21.2 Documents to be Submitted Online

Detailed instructions to be followed by the Bidders for online submission of response to RfS as stated at Clause 51 of this 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 its bid online and fails to submit the Bank Guarantee for requisite amount offline before the due date and time of bid submission, then the same shall be treated as an incomplete bid, Cost of RfS document and Processing fee submitted at this stage will be confiscated and the EMD(s) shall be returned and the submitted bid will stand cancelled.

All documents of the response to RfS submitted online must be digitally signed and

uploaded on the website, https://mptenders.gov.in. which should contain the following:

I. 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.

a. Formats - 7.1, 7.2 (if applicable), 7.3 A/7.3 B, 7.4, 7.5 (if applicable), 7.6, 7.7,7.8/7.8A and 7.9, 7.11, 7.12, 7.13, 7.14, 7.15, 7.18 and 7.19 as elaborated in Clause 18 of the RfS.
b. All attachments elaborated in Clause 18 of the RfS,: Attachments, with proper file names.
c. All supporting documents regarding meeting the eligibility criteria.
d. Scanned Copies of NEFT/RTGS details towards Bid Processing Fee & Bank Guarantee towards EMD as mentioned in Bid Information Sheet.

The Bidder will have to fill the Electronic Form provided at the mp tenders portal as part of Technical Bid.

II. Financial Bid (Second Envelope) – To be Submitted Online Only

a) Bidders shall submit the single Financial Bid containing the scanned copy of following document(s):
   i. Covering letter as per **Format 7.10** of the RfS
   ii. Duly signed and stamped strictly as per price bid **Format 7.16** of the RfS.

b) Bidding Parameter:

i. A single fixed price per line item as a bidding parameter: Under this RfS, the bidding parameter shall be the Price quoted by the Bidder i.e., a fixed price per line item (inclusive of all , duties, insurance and other taxes Except 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-CMC), (inclusive of all, duties, insurance and any other taxes Except GST)
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 inclusive of all, duties, insurance and any other taxes, except GST . 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 filled online in the Electronic Form provided at the MPTenders 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. Important Note:

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 mp tender portal within the bid submission deadlines and fails to submit the offline documents in the office of MPUVNL within the bid submission deadlines, the online bid of the Bidder shall not be opened and appropriate process of mp tenders shall be followed in such matters. Similarly, bids submitted offline but without any online submission on mp tender portal shall not be opened and the EMD shall be returned to the respective bidder.

22. Validity of the Response to RfS

The Bidder shall submit the response to RfS which shall remain valid up to 6 months from the last date of bid submission ("Bid Validity"). MPUVNL reserves the right to reject any response to RfS which does not meet the afore mentioned validity requirement.

23. 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. MPUVNL shall not be responsible in any way for such costs, regardless of the conduct or outcome of the bid process.

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

24.1 Clarifications/ Doubts, if any, on RfS document may be emailed and/ or through mptenders portal. The format for submission of clarifications is

available on the portal.

24.2 MPUVNL 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 MPUVNL's response will be uploaded in the http://mptenders.gov.in and www.mprenewable.gov.in If necessary, amendments, clarifications, elaborations shall be issued by MPUVNL which will be notified on above web sites. No separate reply/intimation will be given for the above, elsewhere.

24.3 A Pre-Bid Meeting shall be held as mentioned in the Bid Information Sheet (link / Venue to be notified later on MPUVNL's website).

24.4 Enquiries/ Clarifications up to pre-bid meeting may be sought by the Bidder from following point of contacts in MPUVNL.

Name of the Authorized Person of MPUVNL:	Contact Details:
Mrs Vandana Chatterjee	Email: solarpump.mpuvnl@gmail.com Mobile: 9425020851
Shri Kamlesh Gehlot	Email: solarpump.mpuvnl@gmail.com Mobile: 9179185394

25. Right of MPUVNL to Reject a Bid

MPUVNL 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 EMD submitted by the Bidders shall be returned to the respective Bidders.

26. Post Award Compliances

Timely completion of all the milestones will be the sole responsibility of Vendor. MPUVNL 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 MPUVNL 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.

27. Dispute resolution

27.1 Amicable settlement

MPUVNL and concerned Bidder(s) shall preferably endeavour to settle any issues amicably, where decision of Managing Director, MPUVNL shall be final and binding. In case amicable settlement is not arrived at, the matter shall be referred to arbitration.

27.2 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 Bhopal shall have exclusive jurisdiction in all matters arising under the contract.

28. Force Majeure

28.1 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.

28.2 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 28 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 MPUVNL shall not be excused from making any payments and paying any unpaid amounts due in respect of Vendor to MPUVNL prior to the Force Majeure Event performance interruption.

28.3 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 MPUVNL 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).

29. Vendor's Indemnity

The Vendor agrees that it shall indemnify and hold harmless MPUVNL and its members, officers, employees, students, casual laborers, persons permitted to run any business or service, such as canteens, stores, photocopy units, banks, post office, courier service, hospital and to any lawful visitors (collectively, the "MPUVNL Indemnified Parties") from and against any and all Losses incurred by the MPUVNL 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 wilful misconduct. The Vendor shall not, however, be required to reimburse or indemnify any MPUVNL Indemnified Party for any Loss to the extent such Loss is due to the negligence or wilful misconduct of any MPUVNL Indemnified Party.

30. Insurance and Penalties

A. 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 insurance of Solar Photo Voltaic Water Pumping System shall be provided for natural calamities, theft during 5 years warranty period. The

empanelled bidder shall file insurance claim and shall be responsible to bring the insurance claim to a final settlement. The farmer and the empanelled bidder shall be jointly responsible for collection and submission of documents for the processing of the insurance claim. The insurance policy taken for the individual farmer shall be handed over to the beneficiary under intimation to MPUVNL at the time of processing of payment for the completed installations. The empanelled company shall do renewal of insurance certificate every year up to 5 years as per insurance clause.

In case of an incident covered under insurance, bidder must replace the lost/damaged part within 7 days from the date of intimation, failing which the rectification/replacement (keeping the same configuration in consideration) may be done by MPUVNL at the risk and cost of bidder after rectification/ replacement the warranty clause will remain compliable as per tender conditions.

B. Penalty

S. No.	**Default**	**Penalty**
1.	Failure to Accept Letter of Award (LoA)	EMD shall be encashed. Further, bidder may be blacklisted for 5 years.
2.	2.1Failure to sign the Agreement (In case of L1 Bidder) and/ or, 2.2 submission of the PBG (Applicable for empaneled bidders) .	EMD shall be encashed. Further, bidder may be blacklisted for 5 years.
3.	In case of any non-execution or delay in the execution of the work order / NTP or delay in maintenance beyond the stipulated time schedule decided including any extension permitted in writing.	MPUVNL 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/ maintenance under CMC for each week of the delay and part thereof subject to a maximum of 10 % of the total value of the work order / NTP. The amount will be recovered by MPUVNL in release of payment to the concerned vendor and from the PBG amount. Further, MPUVNL may also

<table>
<tr><td></td><td></td><td>blacklist the Empanelled Vendor for 5 years.</td></tr>
<tr><td>4.</td><td>In case of failure to present test certificate/ report against any model of a particular category/ pump size</td><td><table><tr><th>Pump size (HP)</th><th>Penalty (INR lakh)</th></tr><tr><td>1</td><td>0.75</td></tr><tr><td>2</td><td>5.05</td></tr><tr><td>3</td><td>22.74</td></tr><tr><td>5</td><td>22.97</td></tr><tr><td>7.5</td><td>1.89</td></tr></table></td></tr>
</table>

31. 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 MP, 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 MPUVN shall be the sole judge, MPUVNL 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. MPUVNL 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.

32. 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, MPUVNL'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 10 % of the total value of the work order / NTP.

Alternatively, MPUVNL'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 MPUVNL 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 MPUVNL's due to delay in work completion by the party beyond the completion time as per NTP/LOA, the same shall be recovered from the party's Invoice/BG/PBG etc.

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

33. 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'.

34. Warranty and Maintenance

The complete Solar Photovoltaic Water Pumping System and display board / Name Plate (MPUVNL will provide the details) 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/ NTP is placed, is to ensure all safety guidelines, rules and regulations, labour laws, etc. Successful bidder indemnifies MPUVNL 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.

Vendor shall submit name of O&M staff and list of training centres and distribution of O&M Manual to beneficiary printed in both English and Hindi.

35. 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.

36. Role of MPUVNL

Apart from discovery of rates, role of MPUVNL under this RfS is Empanelment of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of different capacities (HP) in Madhya Pradesh State, including complete system warranty and its repair and maintenance for 5 Years under Component-B of PM-KUSUM scheme of MNRE.

37. Price basis

Price basis of the price quoted shall be on F.O.R (Freight on Road) destination basis for site and inclusive of All, duties, insurance and any other taxes except GST. Price mentioned in the quotation must be firm. Hence prices in Letter of Award/ Agreement/ NTP 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/ NTP.

i. An Abnormally Low/ high Bid is one where the Bid price, in combination with other elements of the Bid, appears so low/ high that it raises material concerns as to the capability of the Bidder to perform the Contract for the offered Bid Price.

ii. In the event of identification of a potentially Abnormally Low/ high Bid, MPUVNL shall seek written clarifications from the Bidder, including detailed price analyses of its Bid price in correlation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the bidding document.

iii. After evaluation of the price analyses, in the event that MPUVNL determines that the Bidder has failed to demonstrate its reasonable capability to deliver the contract for the offered tender price, MPUVNL shall reject the Bid and forfeit the EMD.

38. Roles and Responsibilities of Implementation Agency

The Implementing Agencies will be responsible for the following activities:

i. Demand aggregation for solar Agriculture pumps through online portal or offline application.

ii. Prepare proposal and submit to MNRE for sanction.

iii. Oversee installation of systems.

iv. 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.

v. Submission of utilization certificates and audited statement of expenditure through EAT module and disbursement of MNRE CFA.

vi. Online submission of monthly and quarterly progress reports.

vii. Ensure project completion within the given timelines and compliance of MNRE Guidelines and Standards.

viii. Online and offline maintenance for records.

ix. Real time monitoring through dedicated web-portal which will be maintained by MPUVNL.

x. Performance monitoring of installed system through third party

xi. Ensure compliance of CMC and training of identified individuals from local area by the vendors as resource persons.

xii. 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.

xiii. Any other activity to ensure successful implementation of the programme.

Section-4 Qualification Requirement for Bidders

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

39. General Eligibility Criteria

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

39.1 The Bidder shall be a Company / Partnership firm/ Registered Proprietorship firms/ Limited Liability Partnership as defined.

39.2 Bidding Consortium of two entities with one of the entities as the Lead Member as per Consortium Agreement (Format 7.5) can submit bids under this RfS.

39.3 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, 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:

i.

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

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

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

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

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

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

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

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

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

i. 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.

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

39.5 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. However, allowing any additional time period for formation of SPV will be at sole discretion of competent authority of MPUVNL on merit of a case.

39.6 Any consortium, if selected as Selected Vendor for the purpose of supply of SWPS to MPUVNL, may incorporate a Project company with equity participation of at least 51% by the Members of the consortium, and that the equity participation of each Member of the consortium agreement in the Project company should not be any lower than 51% of that provided in consortium agreement (to be submitted along with the response to RfS). However, allowing any additional time period for formation of SPV will be at sole discretion of competent authority of MPUVNL on merit of a case.

39.7 The Bidder or any of its Affiliates should not be a wilful 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.

40. Technical Eligibility Criteria

40.1 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.

40.2 The following categories of bidders, subject to meeting the technical and financial requirement of the tender, are allowed to participate in the tendering:

i. System Integrators/ Aggregators/ Any other entities having supplied and installed 1000 number of solar pumps.

or

ii. Any manufacturer of solar PV modules having manufactured and supplied modules aggregating to 4800 kWp or manufacturer of solar pumps having manufactured and supplied 1000 solar pumps or manufacturer of solar pump controllers having manufactured and supplied controllers for 1000 solar pumps.

or

iii. Joint venture of any of manufacturers mentioned at (ii) above with system integrators/aggregators. In this case, JV would meet eligibility criteria of either integrator/ aggregator as defined at (i) above or any of manufacturers as defined at (ii) above.

iv. Above experience should be with any Govt. Dept./PSU/SNA of any state or Central Govt. in India in last 5 years from the last date of bid submission.

v. In case Bidder wishes to participate in as a Joint Venture, following conditions are additionally applicable: -

1. The term Bidder used hereinafter would therefore apply to both a single entity and a Consortium/ Joint Venture.
2. A consortium/ JV of maximum two (02) members is allowed in this RfS including one as lead bidder.
3. Lead Bidder accepts primary responsibility for providing a robust and quality product meeting technical specifications of tender. Declaration regarding the lead member shall be provided in the Format 7.5 However, both the members of the Joint Venture shall be jointly and severally liable for compliance of the conditions of the tender and the PM-KUSUM Guidelines including amendments and other Orders/ directions issued by MNRE related to implementation of the Scheme.
4. Any member of the Consortium/Joint Venture participating in the tender shall not be permitted to participate either in individual capacity or as a member of any other Consortium/Joint Venture in the same tender. Submission or participation in more than one bid will cause disqualification of all the proposals submitted by the bidder.
5. All formalities in respect of submission of tender shall be done only in the name of 'Lead Member' and not in the name of Joint Venture. However, name & other details of both the members of Consortium/

Joint Venture Firm should be clearly mentioned in the Bid/Response.

6. A copy of Memorandum of Understanding (MOU) executed between the members of Joint Venture shall be submitted along with the tender. The complete details of the members of the Joint Venture Firm, their share and responsibility in the Joint Venture etc. particularly with reference to financial, technical and other obligations shall be furnished in the MOU.
7. Once the offer/ bid is submitted, the bid shall not be modified / altered/ terminated. During the period of execution including any extension thereafter by MPUVNL or validity of any LOA/NTP awarded to the said Consortium/Joint Venture Firm. In case, the tenderer fails to observe/comply with this stipulation, the full Security Deposit/ Performance Bank Guarantee (PBG) shall be liable to be forfeited.
8. A duly notarized agreement of Joint Venture Firm shall be executed between the 'Lead Member' and Consortium/Joint Venture Partner. This Agreement should be submitted in original with offer/ bid.
9. Authorized Member of Joint Venture Firm: 'Lead Member' shall be authorized on behalf of Joint Venture Firm to deal with the tender/MPUVNL, sign the agreement or enter into contract in respect of the said tender, to receive payment and such activities in respect of the said tender/ contract. All notices/ correspondences with respect to the contract would be sent only to this 'Lead Member' of Joint Venture Firm.
10. Required processing fee shall be submitted by the 'Lead Member'. Submission of processing fee by the 'Lead Member' it should be deemed as processing fee submitted by the Joint Venture Firm.
11. Duration of work and Joint Venture Agreement shall be valid during the entire execution period/ validity of LoA/NTP and any extension thereafter/ currency of the contract including the period of extension, if any and 5-year maintenance contract.
12. Any change in constitution of Joint Venture Firm shall not be allowed, till 5 years CMC period.
13. On award of any contract to the Joint Venture Firm, a single Performa, i.e., Bank Guarantee shall be submitted by the lead bidder as per tender conditions. All the Guarantees like Security Deposit, Earnest

money Deposit, Performance Guarantee and Bank Guarantee etc. shall be accepted only in the name of 'Lead Member' and splitting of guarantees among the members of Joint Venture shall not be permitted.

14. Members of the Joint Venture Firm shall be jointly and severally liable to the MPUVNL for execution of the project/ Work/ Assignment etc. The Joint Venture members shall also be liable jointly and severally for the loss, damages caused to the MPUVNL during the course of execution of any awarded contract or due to non-execution of the contract or part thereof. Governing Laws for Consortium/ Joint Venture Firm: The Joint Venture Agreement in all respect be governed by and interpreted in accordance with Indian Laws.

15. All correspondence by MPUVNL will be done with 'Lead member' only.

40.3 Detailed technical parameters of the SWPS 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.

40.4 Copy of Factory License Indian Factories Act, 1948 or any document to establish factory in running operations under the and GST registration Certificate, supporting the fact of the bidder being engaged in the business field mentioned shall be submitted. If factory license does not specify that business field, a separate Government issued document shall be submitted in support of the bidder being engaged in the business field mentioned.

41. Financial Eligibility Criteria

41.1 Net-Worth

i. The Net Worth of the Bidder should as per the table below, as on the last date of previous Financial Year, i.e., FY 2022-23 or FY 2023-24 (if audited annual accounts of 2023-24 available)

ii. The net worth to be considered for the above purpose will be the cumulative net-worth of the Bidding Company 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

41.2 Minimum Average Annual Turnover

The Bidder shall demonstrate a Minimum Average Annual Turnover (MAAT) as per the table below, during any three financial years out of the last five financial years, i.e., 2022-23 2021-22, 2020-21, 2019-20 and 2018-19. 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. If audited annual accounts of 2023-24 are available, the above requirement shall be for 2023-24, 2022-23 2021-22, 2020-21 and 2019-20.

Name of State	**SWPs Quantity (Nos.)**	**MAAT/ Annual Turn Over Requirement (in lakhs INR) in last three years**	**Profitability**	**Net Worth**
Madhya Pradesh	52000*	26.70	Profitable in at least two of the last four Years	Not less than paid up capital in last FY 2022-23/ 2023-24 (if available).

41.3 The Bidder, while bidding as sole entity or as consortium/ JV, may seek qualification on the basis of financial capability of its Affiliate(s) for the purpose of meeting the qualification requirements as per Clauses 41.1, 41.2 and above.. 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/POI 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.

41.4 For the purposes of meeting financial requirements, unconsolidated audited annual accounts for any three financial years out of the last five financial years 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.

41.5 A Company/Consortium would be required to submit annual audited accounts for the last FY, 2022-23/ FY 2023-24 (if available) , 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 fulfilment 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.

41.6 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 41.6 above.

41.7 In case the response to RfS is submitted by a Consortium/Joint Venture, then the financial requirement is required to be met by the Consortium/Joint Venture members on an aggregate basis.

41.8 **Note:** Wherever applicable, audited accounts for the latest FY, 2022-23/ FY 2023-24 (if available) will be required to be submitted for meeting the qualification requirements.

Section-5 Bid Evaluation and Selection of Projects

42. 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.

43. Techno-Commercial Evaluation of Bidders (Step 1)

43.1 Bid opening (online) and evaluation will be done only after the deadline as per key dates mentioned in RFS. In case of the above deadline being a holiday, the bids will be opened on the next working day.

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

43.3 Subject to Clause 18 of the RfS, MPUVNL 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, MPUVNL 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. All correspondence in this regard shall be made through email/mp tender 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. Bidders shall be required to respond to any clarifications/additional documents sought by MPUVNL within 07 (seven) days from the date of such intimation from MPUVNL. 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. MPUVNL shall not be responsible for rejection of any bid on account of the above. Such information shall be considered as a part of the response to RfS.

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

44. Financial Bid Evaluation (Step 2)

44.1 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., type of pump) as per price bid format 7.16 to the RfS (i.e., type of pump) in the Electronic Form of Financial Bid (online only).

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

44.3 For each line item (i.e., type of pump) the Bidder will have to submit a single bid (single application) quoting a Fixed Price in Indian Rupee for each line item 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 47,800.459, then it shall be considered as INR 47,800.45).

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

44.5 Madhya Pradesh State has following types of pumps as per table below:

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

44.6 On completion of Techno-Commercial bid evaluation, if it is found that for a certain Category of pump, only one or two Bidder(s) is/are eligible for the next stage, opening of the financial bid of the Bidder(s) will be at the discretion of MPUVNL. Thereafter, MPUVNL will take appropriate action as deemed fit.

44.7 Bidder has an option to quote for all SWPs category for the ones they wish to quote for. Bidder has to mandatorily submit declaration for pump category they wish to quote for (i.e., Format 7.1), subject to fulfilment of cumulative qualifying requirements of quoted pump category.

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

If the fixed price (inclusive of all duties, insurance and any other taxes but excluding GST) 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.

45. L-1 Matching and Selection of Selected Vendors

45.1 All eligible bidders shortlisted on the basis of technical and financial criteria stipulated in bidding document and under the price bracket of (L1+10% of L1) will be empanelled on acceptance of L1 price and have equal opportunity to work in market mode. However, in case the number of such bidders empanelled within price bracket of (L1+10% of L1) are less than 5, the price bracket shall extended to (L1+15% of L1), so that enough number of bidders are empanelled for better competition. The selection of beneficiaries and implementation of scheme would be the responsibility of the MPUVNL

Note: In all cases, matching of Prices will be on individual line items (for a particular category) within the price bid table on total cost (on F.O.R basis, exclusive of GST) for complete scope of work.

45.2 MPUVNL reserves the right for the variation of allocated SWPs quantity.

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

46. Validity of discovered prices for each category

In order to allow Vendors sufficient time to implement SPWPS based on the prices

discovered under this tender, all prices discovered under this tender will remain valid for 15 months from the date of opening the price bids, which will be announced by MPUVNL. Within this 15-month period, empanelled vendors have no right of refusal to complete the allocated work. This validity may further be extended by MPUVNL on same terms and conditions, if mutually agreed, for 6 months at a time, subject to maximum two such extensions.

47. Recommendation and Issuance of LICAs

At the end of selection process, MPUVNL will issue the announcement of prices discovered and empanelment of Vendors after submission of desired documents against LICA. The LoAs will be issued to the Selected Vendors, identified by MPUVNL (*definition of Selected Vendor- one who accepts LICA and submits consent with all desired documents, including test reports, and declared eligible by MPUVNL*).

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

Each Selected Vendor shall acknowledge the LoA and return duplicate copy with signature of the authorized signatory of the Selected Vendor to MPUVNL 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, except those not within reasonable control of such Selected Bidders, specified in Bid document, then MPUVNL 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 any other action as necessary.

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

48. Inspection and Audit by the Government/MPUVNL

All materials/equipment's manufactured by the bidder/consortium of bidders against the LoA/NTP shall be subject to inspection, check and/or test by the MPUVNL/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 MPUVNL. However, the bidders can also submit a self-certificate with the bids in lieu of test reports affirming that the test certificates for all the models for which the bids are submitted will be provided by the bidder

before signing of agreement with the SIAs, failing which the bidder will be liable for penalties as per Cl. 30(B) of RfP, including encashment of EMD. Also, MPUVNL may blacklist such entities.

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 MPUVNL 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.

49. Debarment from Participating in MPUVNL's Future Tenders

49.1 MPUVNL 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 MPUVNL's any future tender for a period as decided by the competent authority of MPUVNL.

Section-6 Definitions of Terms

50. Definitions of Terms

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

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

50.2 **"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 as defined in Cl. 50.11.

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

50.4 "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 as part of its response to the RfS issued by MPUVNL.

50.5 "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.

50.6 "BIDDING CONSORTIUM" or "CONSORTIUM" shall refer to a group of entities (two maximum) that collectively submit the response in accordance with the provisions of this RfS under a Consortium Agreement.

50.7 "CEA" shall mean Central Electricity Authority.

50.8 "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.

50.9 "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.

50.10 "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.

50.11 "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.

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

50.13 "DAY" shall mean calendar day.

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

50.15 "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.

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

50.17 51.17 "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).

50.18 "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.

50.19 "LETTER OF AWARD" or "LoA" shall mean the letter issued by State Implementing Agency (MPUVNL) to the Selected Vendor for award (consent from beneficiaries) of the SPWPS.

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

50.21 "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.

50.22 "MONTH" shall mean calendar month.

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

50.24 "O&M/AMC" shall mean Operation & Maintenance/ Annual Maintenance Contract of the supplied equipment's.

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

50.26 "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.

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

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

50.29 "RfS" or "RfS DOCUMENT" or "BIDDING DOCUMENT(S)" or "TENDER DOCUMENTS" shall mean this "Request for Selection" document issued by MPUVNL along with subsequent clarifications and amendments thereof.

50.30 "MPUVNL" shall mean Madhya Pradesh Urja Vikas Nigam Limited.

50.31 "TOE" shall mean Tender Opening Event.

50.32 "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.

50.33 "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 one who accepts LICA and submits consent with all desired documents, including test reports, and declared eligible by MPUVNL .

50.34 "WEEK" shall mean calendar week.

51. Important instructions to Bidders:

51.1 Instructions to the bidder on e-tendering portal:

a) For participation in e-tendering module, it is mandatory for Bidders to enrol on the e-Procurement module of the MP Tenders Portal (URL: https://mptenders.gov.in/nicgep/app) by clicking on the link "Online bidder Enrolment" on the MP TENDERS Portal. Cost of Enrolment and renewal is dependent on the Government Order (GO) prevailing at that period of time.

b) As part of the enrolment process, the Bidders will be required to choose a unique username and assign a password for their accounts.

c) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the MP Tenders Portal.

d) Upon enrolment, the Bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with signing key usage) issued

by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.), with their profile.

e) Only one valid DSC should be registered by a Bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse

f) Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / e-Token.

g) For further information regarding issue of Digital Signature Certificate, the Bidders are requested to visit MP tenders website (https://mptenders.gov.in/nicgep/app.). Please note that it may take up to 3 to 5 working days for issue of Digital Signature Certificate. Nodal Agency will not be responsible for delay in issue of Digital Signature Certificate.

h) Tender documents can be downloaded from website free of cost. Bidders need to submit the Bid Processing Fee at the time of online submission of the bid.

i) Service and gateway charges shall be borne by the Bidders.

j) The Browser should be Java enabled. Java Runtime Environment (JRE) should be installed in the client system. This can be downloaded from the download links of the eProcurement System.

k) If Bidder is participating for the first time in e- tendering, then it is advised to fulfil all formalities, such as registration, obtaining Digital Signature Certificate, etc. well in advance.

l) For further information regarding issue of Digital Signature Certificate, the Bidders are requested to visit website https://mptenders.gov.in/nicgep/app. Please note that it may take up to 3 to 5 working Days for issue of Digital Signature Certificate. Nodal Agency will not be responsible for delay in issue of Digital Signature Certificate.

m) Bidders are requested to regularly visit MP tenders-tendering website for any clarification and / or extension of due date.

n) Bidder must positively complete online e-tendering procedure at https://mptenders.gov.in/nicgep/app.

o) Nodal Agency shall not be responsible in any way for delay /difficulties /inaccessibility of the downloading facility from the website for any reason whatever.

p) Whosoever on behalf of the Bidder is submitting the tender by his Digital Signature Certificate, shall invariably upload the scanned copy of the

authority letter, as well as submit the copy of the same in physical form with the offer of particular Bid.

q) Bid Security/EMD Payment:
   - Token Bid Security/EMD Payment should be paid online through MP Tenders portal Only.

r) After the final submission of bid, Bidder should ensure that he has received the acknowledgment slip and should keep this slip until opening of the Bid. If acknowledgment slip is not generated, it means the Bid is not submitted.

s) The Bidders shall have to submit their Financial Bid and other required relevant documents/ certificates, if any, online only (duly encrypted bids) as per time schedule (Key dates) as mentioned in this RfP. The Technical Bid should be submitted online and shall contain signed copy of RFS along with Annexures, formats, relevant document/ certificates etc. duly sealed and signed and uploaded.

t) For any type of clarification, Bidders can visit https://mptenders.gov.in/nicgep/app and can call at 24*7 help desk contact no. 0120-4001 002/005 which is also mentioned in the website. Bidder can also send email to "support-eproc@nic.in".

u) A Bidder shall not have a conflict of interest. Bidder(s) shall be disqualified in the Category (ies) where it has conflict of interest. In a particular Category, the Bidder may be considered to have conflict of interest with one or more parties in this bidding process, if:

   - A Bidder submits more than one Bid in the bidding process, either individually [including bid submitted as authorised representative on behalf of one or more Bidder(s)] or as Member of consortium.

   - They have a relationship with each other, directly or through common third parties, that puts them in position to have access to information about or influence on the Bid of another Bidder or influence the decisions of Nodal Agency regarding this bidding process.

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.

52. ALL FORMANTS FOR BID SUBMISSION

Format 7.1: Covering letter

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

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 to RfS 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 whichever not applicable}.

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	
System integrator/ aggregator/ other entities	
Joint Venture	

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

We are submitting application for the installation of SPWPS(s) in following SWPs Category: -

S. No.	Category of Pump Quoted for	Controller Type	Participation (Yes/No) No/Blank cell will be assumed as No Only
1.	1 HP DC Surface	Normal (Without USPC)	
2.	1 HP DC Submersible	Normal (Without USPC)	
3.	2 HP DC Surface	Normal (Without USPC)	
4.	2 HP DC Submersible	Normal (Without USPC)	
5.	3 HP DC Submersible	Normal (Without USPC)	
6.	3 HP DC Submersible	with USPC	
7.	5 HP DC Submersible	Normal (Without USPC)	
8.	5 HP DC Submersible	with USPC	
9.	7.5 HP AC Submersible	Normal (Without USPC)	
10.	7.5 HP DC Submersible	Normal (Without USPC)	
11.	7.5 HP AC Submersible	with USPC	
12.	7.5 HP DC Submersible	with USPC	

1. We give our unconditional acceptance to the RfS, dated *[Insert date in dd/mm/yyyy]*, issued by MPUVNL. In token of our acceptance to the RfS along with the amendments and clarifications issued by MPUVNL, 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): - (Please read Clause 13 carefully before filling)

We have enclosed EMD of INR ……. (Insert Amount), in the form of Bank Guarantee no. ……. [Insert bank guarantee] 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 13 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 13 & 14 of this RfS, MPUVNL shall have the right to encash the EMD submitted by us.

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 MPUVNL 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 MPUVNL 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 our selection 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 you in 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 MPUVNL

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 6 months from the last date of submission of response to RfS].

12. **Contact Person**

Details of the representative to be contacted by MPUVNL 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 7.2: Power of Attorney

FORMAT FOR POWER OF ATTORNEY

(Applicable Only in case of Consortiums)

(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 if finalized) (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 called as Lead Member) to exercise all or any of the powers for and on behalf of the Consortium in 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 above response to RfS Bid.

It is expressly understood that in the event of the Consortium being selected as Selected Vendor, this Power of Attorney shall remain valid, binding and irrevocable until 05 years from installation.

We as the Member of the Consortium agree and undertake to ratify and confirm all whatsoever the 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 Common Seal of our company.

For and on behalf of Consortium Member

M/s…….

---------- (Signature of person authorized by the board)

(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 Company as defined in Section-6, Definition of Terms of the RfS.

Format 7.3A: BG for EMD

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: …….
List No.: .....…
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 pump category declared in Format 7.1, in response to the RfS No._____dated issued by Madhya Pradesh Urja Vikas Nigam Limited (hereinafter referred to as MPUVNL) and MPUVNL 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 MPUVNL at [*Insert Name of the Place from the address of MPUVNL*] forthwith without demur on demand in writing from MPUVNL or any Officer authorized by it in this behalf, any amount upto and not exceeding Rupees[*Insert amount not less than that derived on the basis of 2% of the amount equivalent to the 6% of the value of total pump allocation or 25 nos. of SPWPS, whichever is higher*], 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 13 of this RfS*] and shall not be terminable by notice or 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 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 _____[*insert date of validity in accordance with Clause 13 of this RfS*]. MPUVNL shall be entitled to invoke this Guarantee till_____[*insert date of validity in accordance with Clause 13 of this RfS*].

The Guarantor Bank hereby agrees and acknowledges that the MPUVNL 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 MPUVNL, made in any format, raised at the above-mentioned address of the Guarantor Bank, in order to make the said payment to MPUVNL.

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 MPUVNL to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against MPUVNL in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts at Bhopal 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 MPUVNL shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the Bidder, to make any claim against or any demand on the Bidder or to give any notice to the Bidder or to enforce any security held by MPUVNL 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 message is transmitted by the issuing Bank through SFMS and a confirmation in this regard is received by MPUVNL.

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 11 of this RfS*].

We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if MPUVNL 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: Not used

Not Used

Format 7.3 C: PBG format

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 the category of SWPs declared in Format 7.1, in response to the RfS dated…… issued by Madhya Pradesh Urja Vikas Nigam Limited (hereinafter referred to as MPUVNL) and MPUVNL 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 Letter of 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 MPUVNL at_____[*Insert Name of the Place from the address of the MPUVNL*] forthwith on demand in writing from MPUVNL or any Officer authorised by it in this behalf, 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 contract or 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……. MPUVNL shall be entitled to invoke this Guarantee till …….

The Guarantor Bank hereby agrees and acknowledges that MPUVNL 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 MPUVNL, made in any format, raised at the above-mentioned address of the Guarantor Bank, to make the said payment to MPUVNL.

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 MPUVNL to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against MPUVNL 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 MPUVNL 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 MPUVNL or to exercise, levy or enforce any distress, diligence or other process against the selected Vendor.

Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to INR_____(Indian Rupees_____Only) and it shall remain in force until We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if MPUVNL 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.

Format 7.4: Board resolution

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 response to RfS vide RfS No._____for_____(insert title of the RfS), including signing and submission of all documents and providing information/ response to RfS to Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL), representing us in all matters before MPUVNL, and generally dealing with MPUVNL in all matters in connection with our bid for the said Project. (***To be 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 the terms 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***]

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: Consortium agreement

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), [*The Bidding Consortium should list the details of all the Consortium Members*] for the purpose of submitting response to RfS and **execution of contact agreement with MPUVNL** (in case of award), against RfS No._____dated_____issued by Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) a Company incorporated under the Companies Act, 2013, and having its Registered Office at Madhya Pradesh Urja Vikas Nigam Ltd Shivaji Nagar, 5 No Stop, Link Rd 2 Bhopal 462016

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

WHEREAS, MPUVNL 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 enforceable Consortium Agreement in a format specified by MPUVNL wherein the Consortium Members have to 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, 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 **will be as under**

Name	Percentage
Member 1	---
Member 2	---
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 Bhopal 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 MPUVNL 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 MPUVNL.

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 MPUVNL.

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 MPUVNL.

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----------
Name:

Addre

ss:

2) Signature ----------
-
Name:

Addre

ss:

For M/s_____[Member 2]

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

Witnesses:

1) Signature ----------
Name:

Addre

ss:

2) Signature ----------
-
Name:

Addre

ss:

Signature and stamp of Notary of the place of execution

Format 7.6: Financial requirement

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

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 2022-23/ 2023-24 (if available).

This Net Worth has been calculated in accordance with instructions provided in Clause 41.1 of the RfS.

Exhibit (i): Applicable in case of Bidding Company

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

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

**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 Consortium and/ or its Affiliate(s) per following details:

Name of Bidding Company/ 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)
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 Annual Turnover Criteria, by demonstrating a MAAT of INR_____(_____in words) for the last three Financial Years, namely_____,_____and_____. (As per Cl. 41 of RfP)

Exhibit (i): Applicable in case of Bidding Company

For the above calculations, we have considered the MAAT by Bidding Company and/ or its Affiliate(s) as per following details (as per Cl. 41 of RfP):

Name of Bidding Company/ of Affiliate(s) whose MAAT is to be considered	Relationship with Bidding Company	MAAT (in Rs. Crore) FY -1	MAAT (in Rs. Crore) FY -2	MAAT (in Rs. Crore) FY -3

	*			
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*]

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 Consortium and/ or its Affiliate(s) as per following details:

Name of Bidder/ Affiliate (s) whose MAAT is to be considere d	**Relationship with Bidding Company* (If Any)**	**MAAT (in Rs. Crore) FY 1**	**MAAT (in Rs. Crore) FY 2**	**MAAT (in Rs. Crore) FY 3**	**Equity Commitment (in %age) in Bidding Consortium**	**Proportionate MAAT (in Rs. Crore)**
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 Turnover duly 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 7.7: No litigation undertaking

UNDERTAKING

(To be submitted on the letterhead of the Bidder)

We, hereby provide this undertaking to Madhya Pradesh Urja Vikas Nigam Limited, 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 nature that 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: Disclosure by bidder/ members of consortium

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

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 for the RfS No._____dated and that our Parent, Affiliate or Ultimate Parent or any Group Company 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 stage it 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 our Parent, Ultimate Parent, and our Affiliates shall be suspended/debarred from participating in any of the upcoming tenders issued by MPUVNL for a period of 5 years from the date of default as notified by MPUVNL.

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 39.3 of the RfS, and are complying with 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 compliance under the RfS. We understand that in case of us being selected under this RfS, any of the above certificates is found false, MPUVNL 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 the OM, issued by MNRE on 10th March, 2021 will be updated by MNRE from time to time. We also understand that the Modules to be procured for this project, shall be from the List-I of the ALMM 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 not complying 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 of Attorney/ Board Resolution/ Declaration.

Format 7.8 A: Disclosure for shareholding

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

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 in other Companies which may participate in this RfS, i.e., RfS No._____.

We undertake that M/s_____(enter name of the above common shareholder) is not a 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 stage it 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 our Parent, Ultimate Parent, and our Affiliates shall be suspended/debarred from participating in

any of the upcoming tenders issued by MPUVNL for a period of 5 years from the date of default as notified by MPUVNL.

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 37 of the RfS, and are complying with the requirements as per the referred OM dated 23.07.2020 except Sl. 11 of the OM, including subsequent amendments and clarifications and/ or replacements thereto. Accordingly, we are also enclosing necessary certificates (Annexure to this format) in support of the above compliance under the RfS. We understand that in case of us being selected under this RfS, any of the above certificates is found false, MPUVNL 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 the OM, issued by MNRE on 10th March, 2021 will be updated by MNRE from time to time. We also understand that the Modules to be procured for this project, shall be from the List-I of the ALMM 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 not complying 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 of Attorney/ 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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

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 issued by 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 which shares a land border with India; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder 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 stage it 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 7.9: Integrity pact

(On Stamp Paper ----------)

INTEGRITY PACT

Between

Madhya Pradesh Urja Vikas Nigam Limited
hereinafter referred to as

"MPUVNL",

and

_____

[Insert the name of the Sole Bidder/all members of the of Joint Venture/Consortium]

having its Registered Office at _____

(Insert full Address/Lead member address in case of Joint Venture/Consortium)

_____

and

_____

[*Insert the name of all members of the Joint Venture/Consortium, as applicable]*

having its Registered Office at _____

(Insert full Address/ Lead member address in case of Joint Venture/Consortium)

_____

hereinafter referred to as

"The Bidder/Contractor"

Preamble

MPUVNL intends to award, under laid-down organizational procedures, contract(s) for _____*[Insert the name of the tender/package]*_____
Package and NIB Number_____MPUVNL values full compliance with all *[Insert Specification Number of the package]* relevant laws and regulations, and the principles of economical use of resources, and of fairness and transparency in its relations with

its Bidders/ Contractors.

In order to achieve these goals, MPUVNL and the above-named Bidder/Contractor enter into this agreement called '**Integrity Pact**' which will form an integral part of the bid.

It is hereby agreed by and between the parties as under:

Section I - Commitments of MPUVNL

(1) MPUVNL commits itself to take all measures necessary to prevent corruption and to observethe following principles:

a) No employee of MPUVNL, personally or through family members, will in connection with the tender, or the execution of the contract, demand, take a promise for or accept, for him/herself or third person, any material or other benefit which he/she is not legally entitled to.

b) MPUVNL will, during the tender process treat all Bidder(s) with equity and fairness. MPUVNL will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

(a) MPUVNL will exclude from evaluation of Bids its such employee(s) who has any personal interest in the Companies/Agencies participating in the Bidding/Tendering process

(2) If Managing Director obtains information on the conduct of any employee of MPUVNL which is a criminal offence under the relevant Anti-Corruption Laws of India, or if there be a substantive suspicion in this regard, he will inform its Chief Vigilance Officer and in addition can initiate disciplinary actions under its Rules.

Section II - Commitments of the Bidder/Contractor

(1) The Bidder/Contractor commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution:

a) The Bidder/Contractor will not, directly or through any other person or firm, offer, promise or give to MPUVNL, or to any of MPUVNL's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange an advantage during the tender process or the execution of the contract.

b) The Bidder/Contractor shall not enter into any agreement/ arrangement/ understanding/ action in concert, whether or not the same is formal or in writing with other Bidders/Contractors. This applies in particular to agreements pertaining to prices, territorial or geographical allocations of market, specifications, certifications, subsidiary contracts, submission or non-submission of bids, bid rigging or other actions restricting competitiveness or

leading to cartelization in the bidding process or amounting to any other violation under the Competition Laws for the time being in force.

c) The Bidder/Contractor will not commit any criminal offence under the relevant Anti-Corruption Laws of India; further, the Bidder/Contractor will not use for illegitimate purposes or for purposes of restrictive competition or personal gain, or pass on to others, any information provided by MPUVNL as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

d) Bidders will not pass any information provided by Principal as part of business relationship to others and not to commit any offence under PC/ IPC Act

e) The Bidder/Contractor of Indian Nationality shall furnish the name and address of the foreign principals, if any, involved directly or indirectly in the Bidding.

f) The Bidder/Contractor will, when presenting his bid, disclose any and all payments he has made, or committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and/or with the execution of the contract.

g) The Bidder/Contractor will not misrepresent facts or furnish false/forged documents/information in order to influence the bidding process or the execution of the contract to the detriment of MPUVNL.

(2) The Bidder/Contractor will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section III- Disqualification from tender process and exclusion from future contracts

(1) If the Bidder, before contract award, has committed a serious transgression through a violation of Section II or in any other form such as to put his reliability or credibility as Bidder into question, MPUVNL may disqualify the Bidder from the tender process or terminate the contract, if already signed, for such reason.

(2) If the Bidder/Contractor has committed a serious transgression through a violation of Section II such as to put his reliability or credibility into question, MPUVNL may after following due procedures also exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressors within the company hierarchy of the Bidder/Contractor and the amount of the damage. The exclusion will be imposed for a minimum of 12 months and maximum of 36 months.

(3) If the Bidder/Contractor can prove that he has restored/recouped the damage caused by him and has installed a suitable corruption prevention system, MPUVNL may revoke the exclusion prematurely. However, decision of MPUVNL in this regard shall be final and binding on the bidder/Contractor.

Section IV - Liability for violation of Integrity Pact

(1) If MPUVNL has disqualified the Bidder from the tender process prior to the award under Section III, MPUVNL may forfeit the applicable Bid Security/Earnest Money Deposit underthe Bid.

(2) If MPUVNL has terminated the contract under Section III, MPUVNL may forfeit the Contract Performance Security of this contract besides resorting to other remedies under the contract.

Section V- Previous Transgression

(1) The Bidder shall declare in his Bid that no previous transgressions occurred in the last 3 years with any other Public Sector Undertaking or Government Department that could justify his exclusion from the tender process.

(2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section VI - Equal treatment to all Bidders / Contractors

(1) MPUVNL will enter into agreements with identical conditions as this one with all Bidders.

(2) MPUVNL will disqualify from the tender process any bidder who does not sign this Pact orviolate its provisions.

Section VII - Punitive Action against violating Bidders / Contractors

If MPUVNL obtains knowledge of conduct of a Bidder or a Contractor or his subcontractor or of anemployee or a representative or an associate of a Bidder or Contractor or his Subcontractor which constitutes corruption, or if MPUVNL has substantive suspicion in this regard, MPUVNL will inform the Chief Vigilance Officer (CVO).

Nothing mentioned hereinabove may deem to restrict the right of MPUVNL, in case of a suspected violation of Section II, Clause (1) (b) by the Bidders/ contractors to initiate necessary action under the Competition Laws for the time being in force.

(*) **Section VIII - Independent External Monitor/Monitors**

(1) MPUVNL has appointed a panel of Independent External Monitors (IEMs) for this Pact with the approval of Central Vigilance Commission (CVC), Government of India, details ofwhich has been indicated in the tender document.

(2) The IEM is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement. He has right of access to all project documentation. The IEM may examine any complaint received by him and submit a report to Managing Director, MPUVNL, at the earliest. He may also submit a report directly to the CVO and the CVC, in case of suspicion of serious irregularities attracting the provisions of the PC Act. However, for ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter shall be referred to the full panel of IEMs, who would examine the records,

conduct the investigations and submit report to Managing Director, MPUVNL, giving jointfindings.

(3) The IEM is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the Managing Director, MPUVNL.

(4) The Bidder(s)/Contractor(s) accepts that the IEM has the right to access without restriction to all documentation of MPUVNL related to this contract including that provided by the Contractor/Bidder. The Bidder/Contractor will also grant the IEM, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his documentation. The same is applicable to Subcontractors. The IEM is under contractual obligation to treat the information and documents of the Bidder(s)/Contractor(s)/Subcontractor(s) with confidentiality.

(5) MPUVNL will provide to the IEM information as sought by him which could have an impact on the contractual relations between MPUVNL and the Bidder/Contractor related to this contract.

(6) As soon as the IEM notices, or believes to notice, a violation of this agreement, he will so inform the Managing Director, MPUVNL and request the Managing Director, MPUVNL to discontinue or take corrective action, or to take other relevant action. The IEM can in this regard submit non-binding recommendations. Beyond this, the IEM has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action. However, the IEM shall give an opportunity to MPUVNL and the Bidder/Contractor, as deemed fit, to present its case before making its recommendations to MPUVNL.

(7) The IEM will submit a written report to the Managing Director, MPUVNL within 8 to 10 weeks from the date of reference or intimation to him by MPUVNL and, should the occasion arise, submit proposals for correcting problematic situations.

(8) If the IEM has reported to the Managing Director, MPUVNL, a substantiated suspicion of an offence under relevant Anti-Corruption Laws of India, and the Managing Director, MPUVNL has not, within the reasonable time taken visible action to proceed against such offence or reported it to the CVO, the Monitor may also transmit this information directly to the CVC, Government of India.

(9) The word '**IEM**' would include both singular and plural.

(*) This Section shall be applicable for only those packages wherein the IEMs have been identified in Section – I: Invitation for Bids and/or Clause ITB … in Section – III: Bid Data Sheets of Conditions of Contract, Section-3 of the RfS.

(10) A bidder/Contractor signing the IP shall not approach the Courts while representing the matters to IEMs and he will await till their decision in the matter.

Section IX - Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contractor after the closure of the contract and for all other Bidder's six month after the contract has been awarded.

Section X - Other Provisions

(1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the establishment of MPUVNL.

(2) Changes and supplements as well as termination notices need to be made in writing.

(3) If the Contractor is a partnership firm or a consortium or Joint Venture, this agreement must be signed by all partners, consortium members and Joint Venture partners.

(4) Nothing in this agreement shall affect the rights of the parties available under the General Conditions of Contract (GCC) and Special Conditions of Contract (SCC) which are part of the Bidding Document.

(5) Views expressed or suggestions/submissions made by the parties and the recommendations of the ***CVO/***IEM[#] in respect of the violation of this agreement, shall not be relied on or introduced as evidence in the arbitral or judicial proceedings (arising out of the arbitral proceedings) by the parties in connection with the disputes/differences arising out of the subject contract.

 # CVO shall be applicable for packages wherein IEM are not identified in the bidding document IEM shall be applicable for packages wherein IEM are identified in the bidding document.

(6) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(Signature)	(Signature) _____
_____	
(For & On behalf of MPUVNL)	**(For & On behalf of Bidder/ Partner(s) of Joint Venture/Consortium/ Contractor)**
(Office Seal)	(Office Seal)
Name:	Name:_____
_____	
Designation:	Designation:_____
_____	
Witness 1 :	Witness 1 :
_____	_____
(Name & Address)	(Name & Address) _____
_____	
_____	_____
_____	_____

Wit

_____

(Name & Ad

_____

Witness 2 :_____

(Name & Address) __

_____ _____

_____ _____

Format 7.10: Cover letter for financial bid

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

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 the SWPs Category declared in Format 7.1, as Bidder for the above.

I/We have applied for SPWPS to be set up in Madhya Pradesh State under this RfS.

I/We agree that this offer shall remain valid for a period upto the date as on 6 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 of Attorney/ Board Resolution/ Declaration.

Notes:

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

2. *If the bidder submits the financial bid in the Electronic Form at mp tenders 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: No banning declaration

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

We hereby confirm that we are not on the Banning List by MPUVNL or Public Sector Project Management 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 of MPUVNL or the Ministry of New & Renewable Energy.

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

In case it comes to the notice of MPUVNL that we have given wrong declaration in this regard, the same shall be dealt as Fraudulent Practices and we shall be banned by MPUVNL for a period which shall be decided by MPUVNL 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 MPUVNL by us.

Format 7.12: Local content declaration

DECLARATION FOR THE LOCAL CONTENT

(To be submitted on the Letter Head of the Bidder/Lead member)

Ref. No._____ Date: _____

From:_____*(Insert name and address of Bidder)*
Tel.#:
Fax#:
E-mail address#

To
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

Sub: Response to RfS No._____dated_____for_____.

Dear Sir/ Madam,

We declare that we will be using indigenously manufactured solar panels with indigenous solar cells and modules. Further, we are agreeing to accept and follow Guidelines for the implementation of PM- KUSUM scheme issued by MNRE on 17-01-2024 and its subsequent amendment(s).

We are aware that in accordance with order no. F. No. 283/22/2019-GRID SOLAR dated 09.02.2021 issued by MNRE, only class-I Local Suppliers' are eligible to bid under this RfS. Also, we have carefully gone through the above mentioned order to understand the whole process and definitions of various terms (Class-I Local Supplier, Local Content etc.) pertaining to above referred order and its supporting appendix and annexures as amended till date.

Further, we hereby undertake that I/We certify that we/our Collaborator/JV Partner are/is are 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.

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

S. No.	Item Imported

(Name and Signature of the Authorized Signatory of the bidder/lead member)

Format 7.13: Same make as test certificate

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

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/controller for which the test report is to be submitted to the Implementing agency, as per **MNRE's latest revised solar pump testing procedure issued in 2023** and amendments thereof, will be supplied by us.

In case, if some different make of solar panels, pumps, VFD/inverter/controller will be supplied during 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: Test certificate as per MNRE specifications

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

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's revised** technical specifications and testing procedures issued in **2023(latest)** and amendments thereof, will be submitted by us as per RFS conditions. In failure of which our empanelment will stand cancelled, without any prior intimation. These certificates shall be submitted either in original form or attested copy by the issuing test lab.

(Name and Signature of the Authorized Signatory)

Format 7.15: MeitY compliance

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
The Managing Director,
Madhya Pradesh Urja Vikas Nigam Ltd
Shivaji Nagar, 5 No Stop, Link Rd 2
Bhopal 462016

Sub: Response to RfS No._____dated_____for_____.

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 File no. 1(10)/2017−CLES dt. 02.07.18 and amendments thereof and the bidder shall strictly abide by all provisions of the subject notification.

(Name and Signature of the Authorized Signatory)

Format 7.16: Price bid

FORMAT FOR SUBMISSION OF PRICE BID

Price bid shall be submitted as per format/ template provided at **mptenders.gov.in** portal. Any price bid or pricing information submitted in hard copy or with technical bid shall be summarily rejected.

Important Notes:

1. *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 filled online in the Electronic Form provided at the Madhya Pradesh E Tender 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

S. No.	Category of Pump Quoted for	Controller Type	Unit Rate (In Rs) (inclusive of all , duties, insurance and any other taxes Except GST)
1.	1 HP DC Surface	Normal (Without USPC)	***Sample*** ***(To be Filled Online Only)***
2.	1 HP DC Submersible	Normal (Without USPC)	
3.	2 HP DC Surface	Normal (Without USPC)	
4.	2 HP DC Submersible	Normal (Without USPC)	
5.	3 HP DC Submersible	Normal (Without USPC)	
6.	3 HP DC Submersible	with USPC	
7.	5 HP DC Submersible	Normal (Without USPC)	
8.	5 HP DC Submersible	with USPC	
9.	7.5 HP AC Submersible	Normal (Without USPC)	
10.	7.5 HP DC Submersible	Normal (Without USPC)	
11.	7.5 HP AC Submersible	with USPC	
12.	7.5 HP DC Submersible	with USPC	

Format 7.17: Preliminary cost estimate

PRELIMINARY ESTIMATE OF COST OF SPWPS

(To be submitted by all the empanelled bidders before signing of Contract Agreement with MPUVNL)

Bidder Name: …….

State Name: ……...

Capacity (HP): ……...

Type (AC/DC): …….

Category (Surface/Submersible): …….

Controller (without USPC/With USPC): ……

Module Type (with DCR Cell/Non-DCR Cell): ……

S. No.	Particulars	Estimated Cost (In Lakhs INR) (exclusive of GST)
1.	System Cost	
i.	*Module*	***Sample*** ***Not to be Submitted with response to bid.*** ***To be submitted by all the empanelled bidders before signing of Contract Agreement with MPUVNL***
ii.	*Pump*	
iii.	*Controller*	
iv.	*Module Mounting Structure (MMS)*	
v.	*Balance of System (BoS)*	
2.	Transportation Cost	
3.	Installation Cost	
4.	5-year EMC Cost	
5.	5-year Insurance Cost	
6.	Others (if any)	

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 7.18: Self certificate for test reports

DECLARATION (Self - Certification) REGARDING THE DIFFERENT MODELS OF SOLAR WATER PUMPING SYSTEMS SPECIFIED IN THE MNRE SPECIFICATION FOR THE PARTICULAR CATEGORY/TYPE OF THE PUMPS

*(To be provided on the letter head of the **bidder or lead member at the time of bid submission)***

Ref No._____ Date: _____

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

_____

_____

Tel.#:

Fax#:

E-mail address#

To

The Managing Director,

Madhya Pradesh Urja Vikas Nigam Ltd Shivaji Nagar, 5 No Stop, Link Rd 2 Bhopal 462016

Sub: Response to RfS No. dated for .

Vide this declaration this is to certify that that M/s……. (Name of the Bidder) has all the models*(e.g. Model-3, Model-4 & Model-5, it is mentioned w.r.t. 3HP-DC-Submersible pump)* of the Solar Water Pumping System as specified in the table, category/type-wise of the pumps as per the MNRE revised specifications issued in 2023 (latest)**,** for which the firm is participating in the bid for the various categories, ***and will furnish the required test reports and details of the models specified: Shut Off-Head (meters), Dynamic-Head (meters),Water output (Liters per day), No. of stages in the model, diameter of each stage of the respective model, Diameter of the discharge pipe (in inches) to MPUVNL at the time of signing of agreement with MPUVNL for supply of such pumps.***

Table

The details of the different models which are to be supplied by the firm:

S. No.	Type /Category of Pump	Controller Type	Model No. as per MNRE specification to be supplied by the firm	Participation (Yes/No) No/Blank cell will be assumed as No Only
1.	1 HP DC Surface	Normal (Without USPC)	Model -1 Shallow Well (Surface) with DC motor pump set (Brushless)	
2.	1 HP DC Submersible	Normal (Without USPC)	Model – 1 Solar Deep Well (Submersible) with DC motor pump set	
3.	2 HP DC Surface	Normal (Without USPC)	Model -2 Shallow Well (Surface) with DC motor pump set	
4.	2 HP DC Submersible	Normal	Model – 2	

		(Without USPC)	Solar Deep Well (Submersible) with DC motor pump set	
5.	3 HP DC Submersible	Normal (Without USPC)	Model – 3 , 4 & 5 Solar Deep Well (Submersible) with DC motor pump set	
6.	3 HP DC Submersible	with USPC	As per MNRE Specifications (Latest) issued in 2023	
7.	5 HP DC Submersible	Normal (Without USPC)	Model – 6 , 7 & 8 Solar Deep Well (Submersible) with DC motor pump set	
8.	5 HP DC Submersible	with USPC	As per MNRE Specifications (Latest) issued in 2023	
9.	7.5 HP AC Submersible	Normal (Without USPC)	Model – 9 , 10 & 11 Solar Deep Well (Submersible) with AC Induction Motor Pump Set	
10.	7.5 HP DC Submersible	Normal (Without USPC)	Model – 9 , 10 & 11 Solar Deep Well (Submersible) with DC motor pump set	
11.	7.5 HP AC Submersible	with USPC	As per MNRE Specifications (Latest) issued in 2023	
12.	7.5 HP DC Submersible	with USPC	As per MNRE Specifications (Latest) issued in 2023	

I, ……., on behalf of M/s……. (Name of the Bidder) am aware, without any doubt, that any deviation of the above information with the information provided to MPUVNL, at the time of signing of agreement would invite penalties such as forfeiture of EMD by MPUVNL and/or blacklisting of firm for the period of 5 years from the date of the issue of the Notice for the blacklisting.

Thanking you,

We
remain,
Yours
faithfully,

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

Format 7.19: Contract agreement

DRAFT OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT is made the _____ day of _____, 20 __.
BETWEEN
(1) Madhya Pradesh Urja Vikas Nigam Ltd., (M.P.) having its registered office at Urja Bhawan, Link No.02, Shivaji Nagar, Bhopal 462016 (hereinafter called "the Employer"),
and
(2) _____, a company/ LLP firm/ partnership firm/ sole proprietor incorporated under the laws of India and having its registered office at _____, being lead member of JV/ consortium (if applicable) (hereinafter called "the Contractor").

WHEREAS the Employer desire to engage the contractor for Design, Manufacture, Supply, Erection, Testing and Commissioning of Stand-alone Off Grid Solar Photovoltaic Water Pumping Systems of 1-7.5 HP in Madhya Pradesh including complete system warranty, insurance and its repair and maintenance for 5 Years as per MNRE guidelines, specifications and applicable BIS standards.

NOW IT IS HEREBY AGREED as follows:

Article Documents 1

1.1 Contract

The following contract documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

1. Employer RFS No. _____
2. Pre-Bid meeting held on _____ at Employer Corporate Office
3. Employer Amendment/Clarification No. 1 dated _____
4. Contractor technical offer no. _____ opened on _____
5. Contractor acceptance on price no. _____ dated _____
6. Employer LICA No…….dated……

1.2 Order of Precedence

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 Definitions

Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of the Contract.

Article 2. Contract Price and Payment

2.1 Contract Price

The Employer hereby agrees to pay to the Contract Price as tabulated below:

S. No.	Category of Pump Quoted for	Controller Type	Contract Price, inclusive of all cess, duties, charges, other taxes excluding GST (INR/ pump)
1.	1 HP DC Surface	Normal (Without USPC)	
2.	1 HP DC Submersible	Normal (Without USPC)	
3.	2 HP DC Surface	Normal (Without USPC)	
4.	2 HP DC Submersible	Normal (Without USPC)	
5.	3 HP DC Submersible	Normal (Without USPC)	
6.	3 HP DC Submersible	with USPC	
7.	5 HP DC Submersible	Normal (Without USPC)	
8.	5 HP DC Submersible	with USPC	
9.	7.5 HP AC Submersible	Normal (Without USPC)	
10.	7.5 HP DC Submersible	Normal (Without USPC)	
11.	7.5 HP AC Submersible	with USPC	
12.	7.5 HP DC Submersible	with USPC	

(for which you have qualified) Order inclusive of all inland transportation including loading, unloading, transfer of site, P & F charges insurance and other costs incidental to delivery and execution of work as per RFS/ LICA/ LOA/ NTP etc. and exclusive of GST only. Billing to be done from Madhya Pradesh State with local GST.

2.2 Terms of Payment

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in RFS no ……..

Article 3 Effective Date for Determining Time for Completion

3.1 Effective Date

Following conditions shall be fulfilled within a period of 30 days from the date of said LICA:

(a) This Contract Agreement has been duly executed for and on behalf of the Employer and the Contractor;

(b) Test report has been submitted as per RFS.

(c) Any other documents as desired in LICA

Each party shall use its best efforts to fulfill the above conditions for which it is responsible as soon as practicable.

3.2 If the conditions listed under 3.1 are not fulfilled within 30 days from the date of LICA because of reasons attributable to the Employer, the Contract would become effective only from the date of fulfillment of all the above mentioned conditions and, the Time for Completion and/or other relevant conditions of the Contract.

3.3 However, if any of the conditions listed under 3.1 above are not fulfilled ____ days from the date of LICA because of reasons attributable to the Contractor, the Contract will be effective from the date of LICA. In this case, Contract price and/or time for completion shall not be adjusted.

Article 4.

It is expressly understood and agreed by and between the Contractor and Employer that the Employer is entering into this Agreement solely on its own behalf and not on behalf of any other person or entity. In particular it is expressly understood and agreed that the Govt. of India is not a party to this Agreement and has no liabilities, obligations or rights hereunder. It is expressly understood and agreed that the Employer is an Independent legal entity with power and authority to enter to contracts solely on its own behalf under the applicable laws of India and the general principles of Contract Law. The Contractor expressly agrees, acknowledges and understands that the Employer is not an Agent, Representative or Delegate of the Govt. of India. It is further understood and agreed that the Govt. of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the Contract. Accordingly, the Contractor expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Govt. of India arising out of this contract and covenants not to sue the Govt. of India as to any manner, claim, cause of action or thing what so-ever arising of or under this Agreement.

Article 5.

Appendices

The Appendices listed in the attached list of Appendices shall be deemed to form and integral part of this Contract Agreement.

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to the duly executed by their duly authorized representatives the day and year first above written.

Signed by for and on behalf of the Employer	Signed by for and on behalf of the Contractor (To be signed only by the authorized signatory to whom authorization is given in Power of Attorney)
Name and Signature of Witness	Name and Signature of Witness
Signature:	Signature:
Designation:	Designation:
Address:	Address:

CONTRACT AGREEMENT

dated the _____ day of _____, 20___.

BETWEEN

["Madhya Pradesh Urja Vikas Nigam Ltd., (M.P.) having its registered office at Urja Bhawan, Link No.02, Shivaji Nagar, Bhopal 462016 (M.P.)"]

and

_____.

["the Contractor"]

APPENDICES

Appendix 1: Term and Procedures of Payment- AS PER RFS NO. -_____ dated _____

Appendix 2: Bidder's response to RFS no. _____, including all amendments and submissions

Appendix 3: Insurance – ON VENDOR's ACCOUNT

Appendix 4: Time Schedule – AS PER RFS NO._____ - _____ dated_____.

Appendix 5: Bidder's acceptance to RFS and its amendments

Appendix 6: Scope of Works and Services – AS PER LOA/ NTP NO. _____-_____dated _____.

Appendix 7: List of Documents for Approval or Review – AS PER LICA/ LOA No. _____ dated _____.

Appendix 8: Functional Guarantees: AS PER RFS/ NTP No._____ dated_____.

Format 7.20: Power of Attorney

POWER OF ATTORNEY

(To be stamped in accordance with Stamp Act)

(*Power of Attorney to be provided by the Bidder in favor of its representative as evidence of Authorized signatory's authority*)

Know all men by these presents, We (*name and address of the registered office of the Bidder as applicable*) do hereby constitute, appoint and authorize Mr./Ms. (*name & residential address*) who is presently employed with us and holding the position of…….as our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid for Empanelment of Vendors for Design, Manufacture, Supply, Transport, Installation, Testing and Commissioning of Off - Grid Solar Photovoltaic Water Pumping Systems (SPWPS) of different capacities (HP) anywhere in Madhya Pradesh State, including complete system warranty, insurance and its repair and maintenance for 5 Years under Component-B of PM - KUSUM scheme of MNRE in response to the RfP No: _____, dated: _____, issued by Nodal Agency including signing and submission of the Bid and all other documents related to the Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which the Nodal Agency may require us to submit. The aforesaid Attorney is further authorized for making representations to the Madhya Pradesh Urja Vikas Nigam Limited and providing information / responses to Nodal Agency representing us in all matters before Nodal Agency and generally dealing with Nodal Agency in all matters in connection with Bid till the completion of the bidding process as per the terms of the above mentioned in RFP.

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

All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP.

Signed by the within named

(Insert the name of the executants company)

through the hand

of Mr._____

duly authorized by the Board to issue such Power of

Attorney Dated this_____day of_

Accepted

_____

Signature of Attorney

(Name, designation and address of the

Attorney) Attested

_____

(Signature of the executant)

(Name, designation and address of the executant)

_____

Signature and stamp of Notary of the place of execution

Common seal of_____has been affixed in my/our presence pursuant to Board of Director's Resolution dated

WITNESS

_____

(Signature)

Name_____

Designation _____

_____

(Signature)

Name _____

Designation_____

Annexure – A: Technical specifications as per MNRE

TECHNICAL SPECIFICATIONS OF SOLAR WATER PUMPING SYSTEM

Attached separately to the RfS

Annexure – B: RMS specifications

RMS SPECIFICATIONS OF SOLAR WATER PUMPING SYSTEM

Attached separately to the RfS

Annexure – C: MNRE Guidelines

MNRE Guidelines for KUSUM-B dated 17.01.2024

Attached separately to the RfS

Page left intentionally blank

F. No. 41/3/2018-SPV Division
Government of India / भारत सरकार
Ministry of New & Renewable Energy / नवीन एवं नवीकरणीय ऊर्जा मंत्रालय
*****

Atal Akshay Urja Bhawan (AAUB),
Lodhi Road, Near CGO Complex
New Delhi –110003
Date: 02-02-2023

Office Memorandum

Subject: Updated Specification and Testing Procedures for the Solar Photovoltaic (SPV) Water Pumping System and Universal Solar Pump Controller (USPC).

Ministry has issued specifications and testing procedure for the solar PV water pumping systems and USPC to be used in the agriculture sector on 17.07.2019. So far, the specifications for the solar PV water pumping systems had been issued for a capacity upto 10 HP. Requests have been received from various stakeholders for providing specifications for pumps of capacity more than 10 HP. Further, based on implementation in the field certain feedbacks were received and clarification on some of the issues from the stakeholders. Accordingly, Ministry has prepared specifications for Solar PV water pumping systems for capacity up to 25 HP alongwith the testing procedure and updated the existing specifications and testing procedures including that of USPC to provide more clarity during implementation. These specifications and testing procedures are hereby issued for the information of all concerned and are attached as various Annexures as under:

i) Specification for the SPV water pumping system. (Annexure-A)
ii) Testing procedure for the SPV water pumping system. (Annexure-B)
iii) USPC specification and testing procedure. (Annexure-C)

(J K Jethani)
Scientist-F/Sr. Director

To:
All concern.

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 Potential-Induced 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.

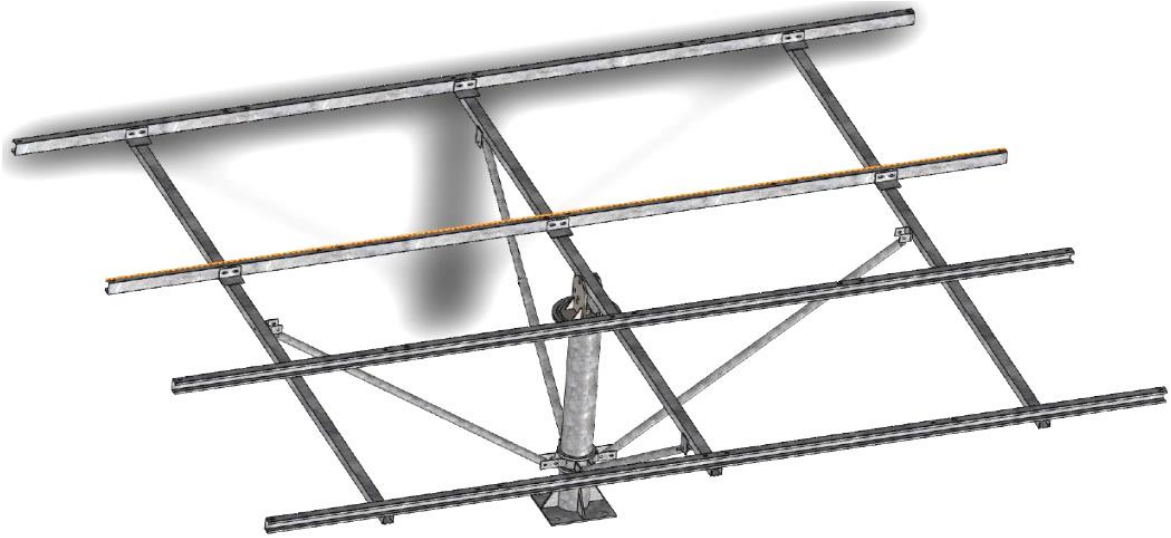
RMS should be connected to the Solar Energy Data Management Platform of the implementing Agency.

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.

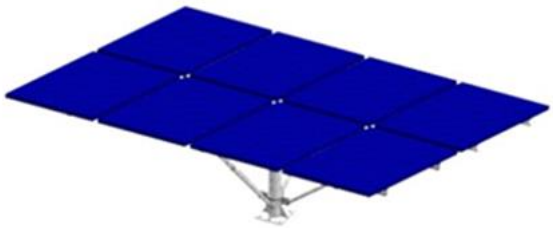
Annexure-II

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.

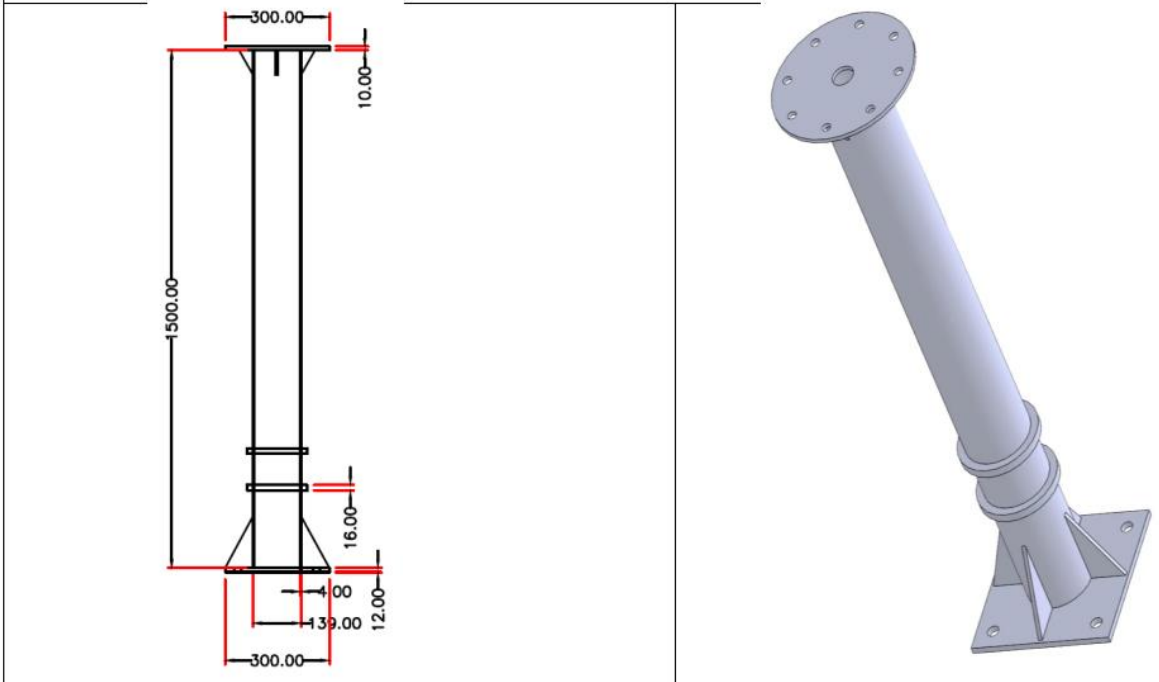
c) PREECE Test (CuSO4 Dip Test) **(IS 2633)**

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.

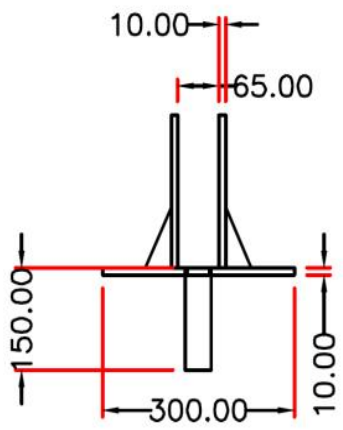
Part1 – Mail Column

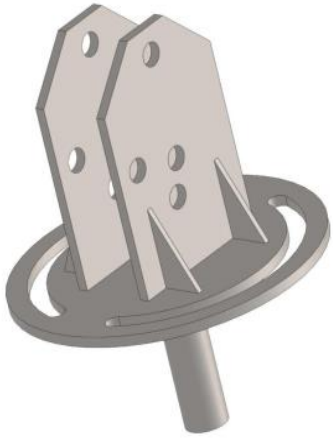


Notes: -

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

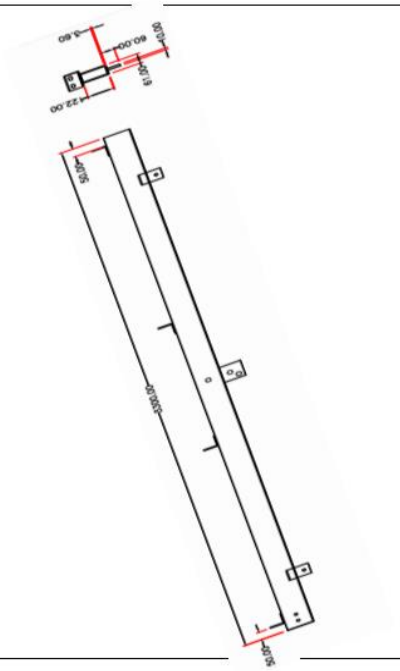




Notes: -

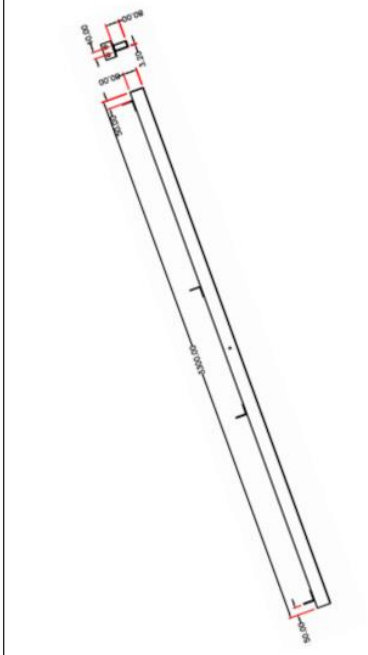
1. All Dimensions are in mm.
2. Top Plate material grade should be YST - 240 as per: -IS: 1161 / 1239 & E250 as per: - IS: 1079 / 2062.

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: -

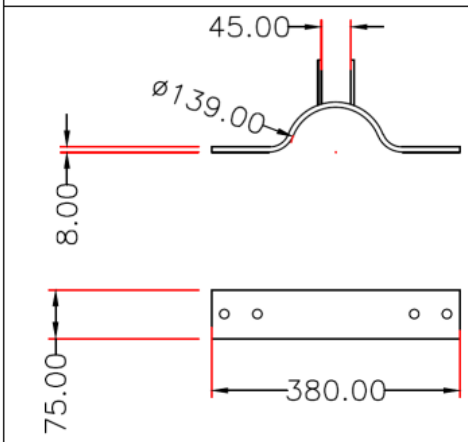
1. All Dimensions are in mm.
2. Side Tube material grade should be YST - 240 as per: -IS: 1161 / 1239 & E250 as per: - IS: 1079 / 2062.

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.

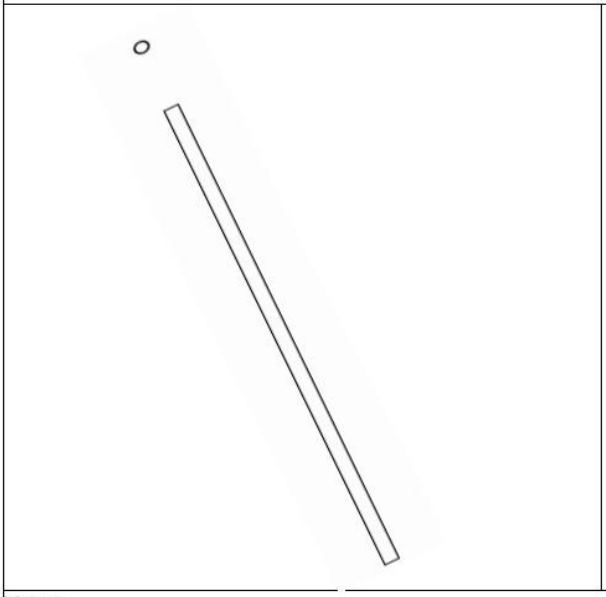
Part 6 – Clamp with Blade



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.

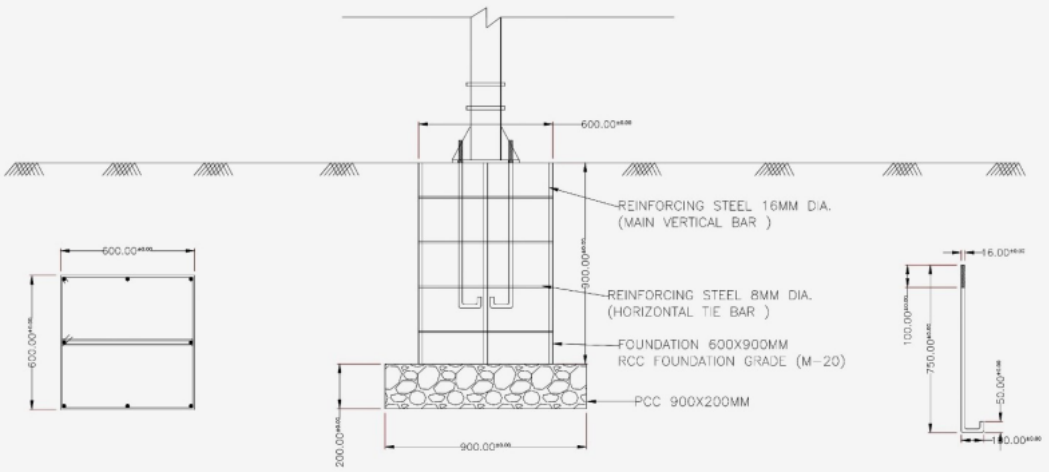
Main Parts of MMS for Solar Water Pumping System

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

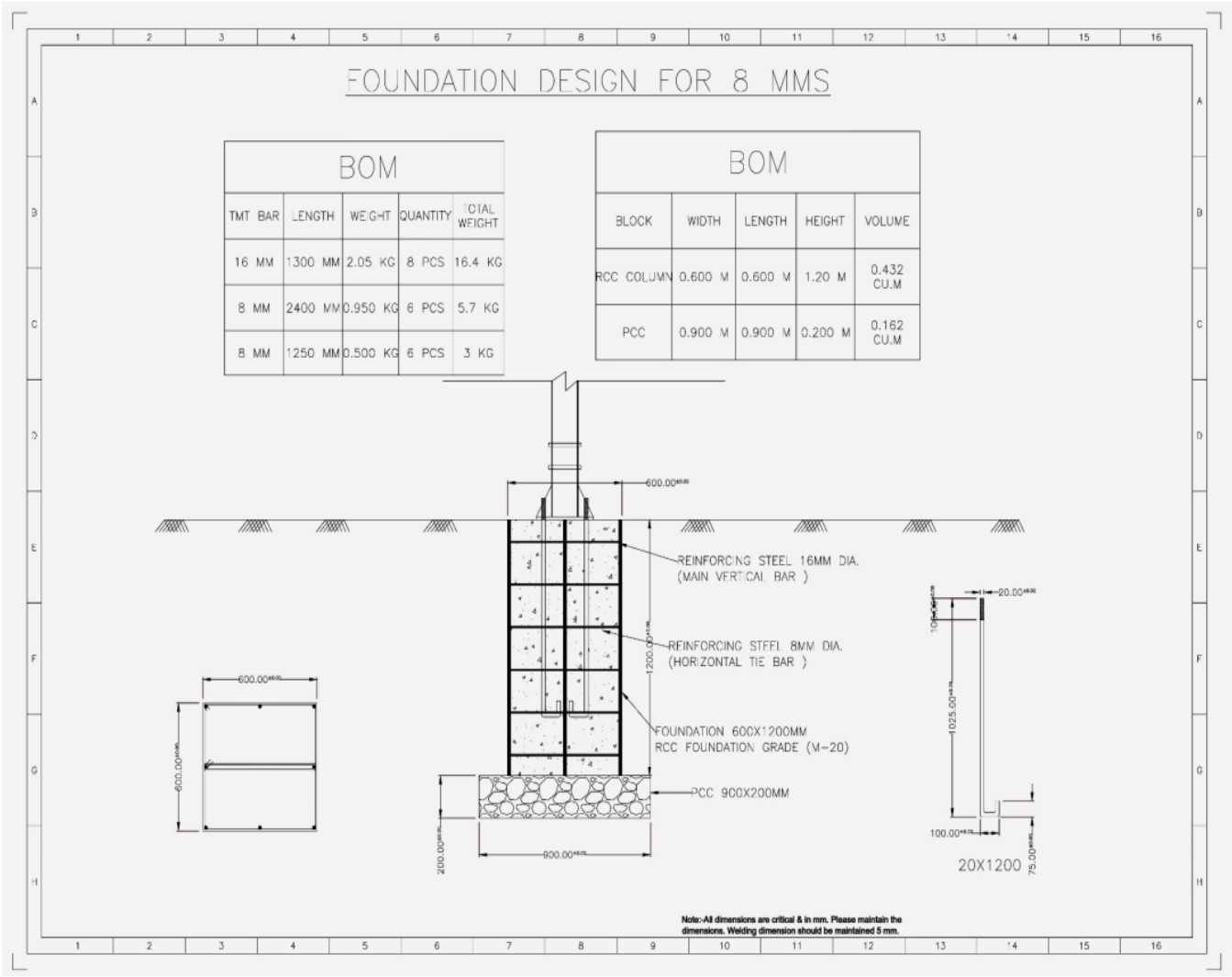
FOUNDATION DESIGN FOR 4/6 MMS

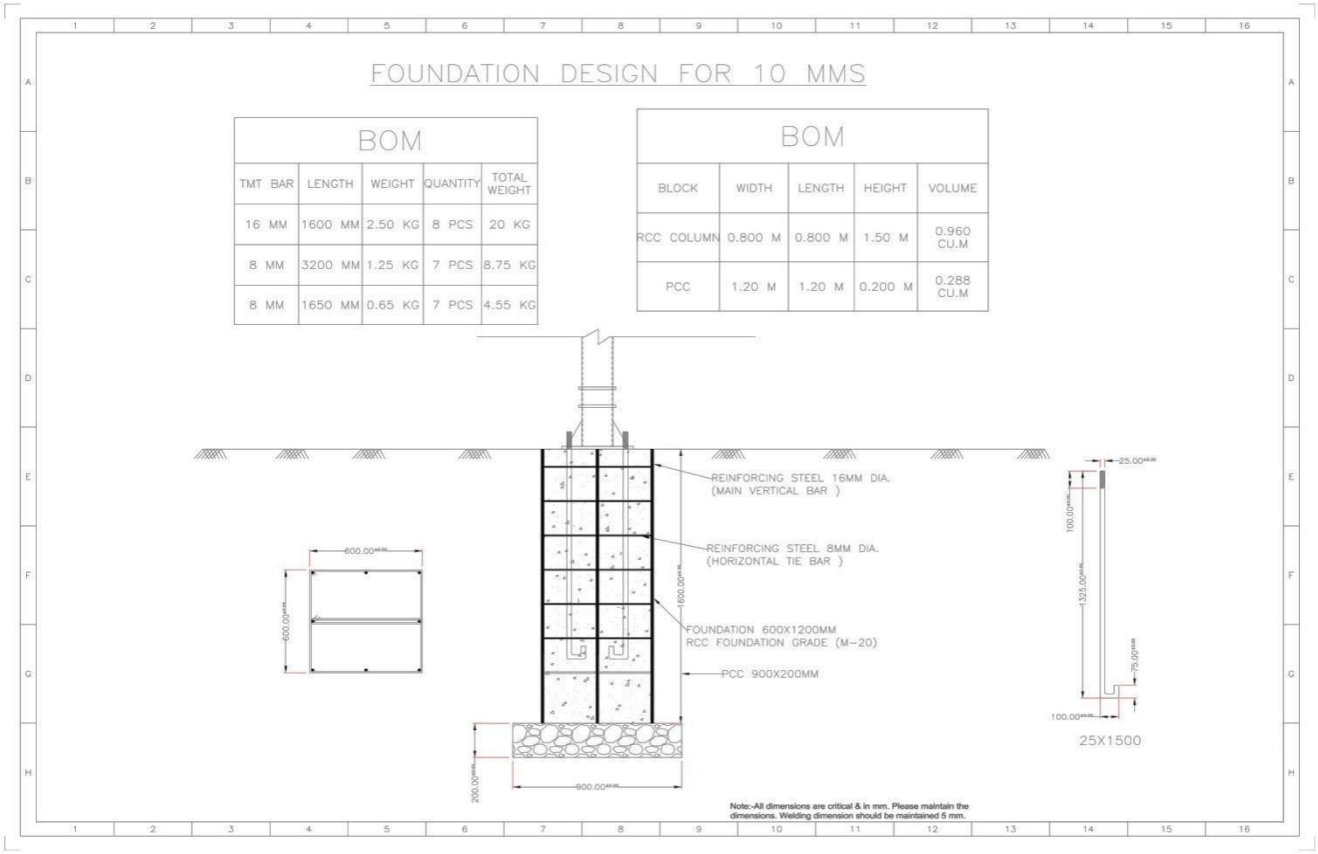
BOM				
TMT BAR	LENGTH	WEIGHT	QUANTITY	TOTAL WEIGHT
16 MM	1000 MM	1.578 KG	8 PCS	12.6 KG
8 MM	2400 MM	0.950 KG	4 PCS	3.8 KG
8 MM	1250 MM	0.500 KG	4 PCS	2 KG

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
600.00
600.00
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	**Model-14**	**Model-15**	**Model-16**	**Model-17**	**Model-18**	**Model-19**	**Model-20**	**Model-21**	**Model-22**	**Model-23**	**Model-24**	**Model-25**	**Model-26**
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	**Model-27**	**Model-28**	**Model-29**	**Model-30**	**Model-31**	**Model-32**	**Model-33**	**Model-34**
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**	**Model-10**	**Model-11**	**Model-12**	**Model-13**	**Model-14**
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	**Model-15**	**Model-16**	**Model-17**	**Model-18**	**Model-19**	**Model-20**	**Model-21**	**Model-22**	**Model-23**	**Model-24**	**Model-25**	**Model-26**	**Model-27**	**Model-28**
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	**Model-29**	**Model-30**	**Model-31**	**Model-32**	**Model-33**	**Model-34**	**Model-35**	**Model-36**	**Model-37**	**Model-38**	**Model-39**
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	**Model-14**	**Model-15**	**Model-16**	**Model-17**	**Model-18**	**Model-19**	**Model-20**	**Model-21**	**Model-22**	**Model-23**	**Model-24**	**Model-25**	**Model-26**
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	**Model-27**	**Model-28**	**Model-29**	**Model-30**	**Model-31**	**Model-32**	**Model-33**	**Model-34**
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**	**Model-10**	**Model-11**	**Model-12**	**Model-13**	**Model-14**
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	**Model-15**	**Model-16**	**Model-17**	**Model-18**	**Model-19**	**Model-20**	**Model-21**	**Model-22**	**Model-23**	**Model-24**	**Model-25**	**Model-26**	**Model-27**	**Model-28**
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.)

Indicative Technical Specifications of Solar Deep well (submersible) Pumping Systems with A.C. Induction Motor Pump Set

Description	**Model-29**	**Model-30**	**Model-31**	**Model-32**	**Model-33**	**Model-34**	**Model-35**	**Model-36**	**Model-37**	**Model-38**	**Model-39**
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

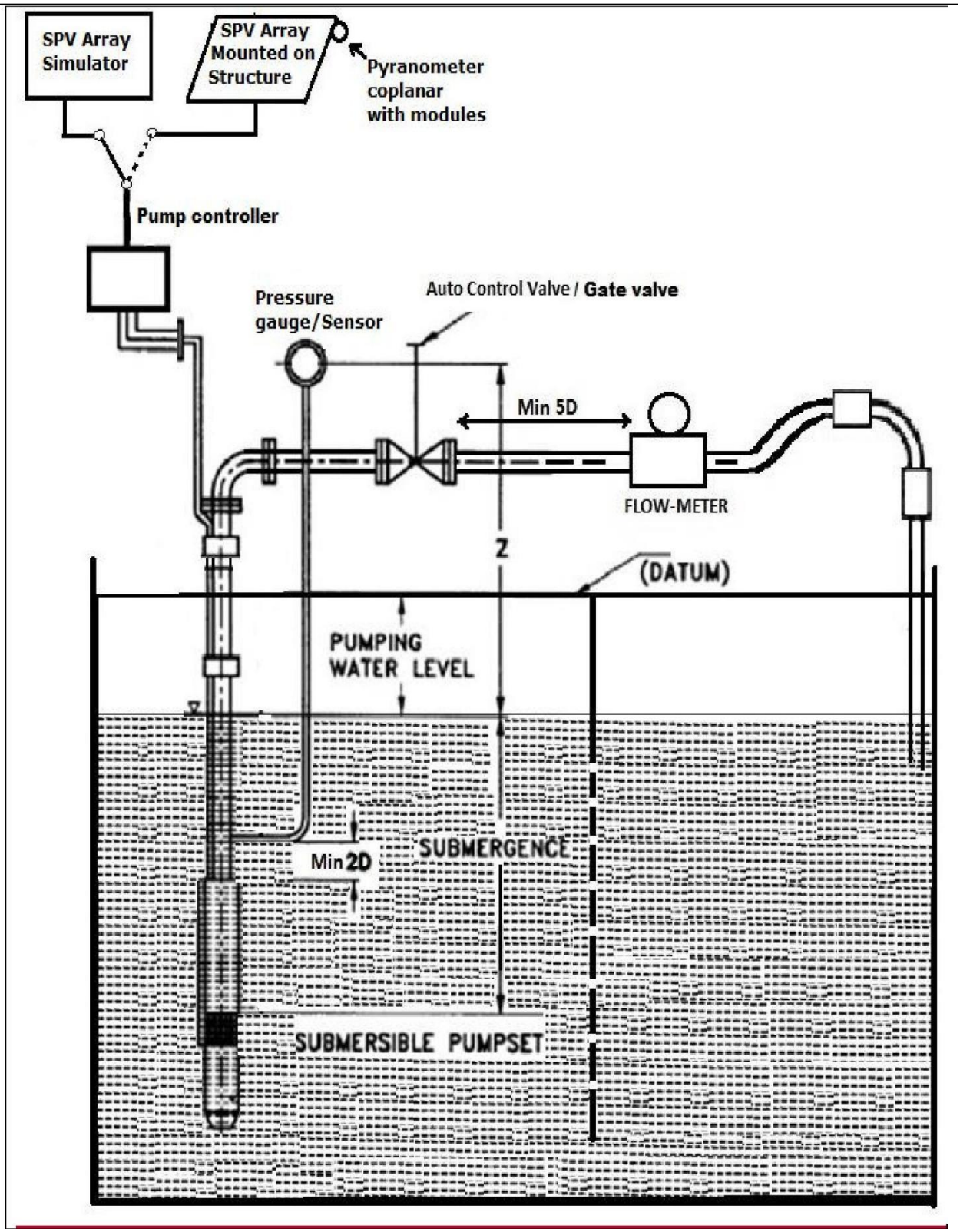


FIGURE 1 TYPICAL TEST SET-UP FOR SUBMERSIBLE SPV WATER PUMP-SET

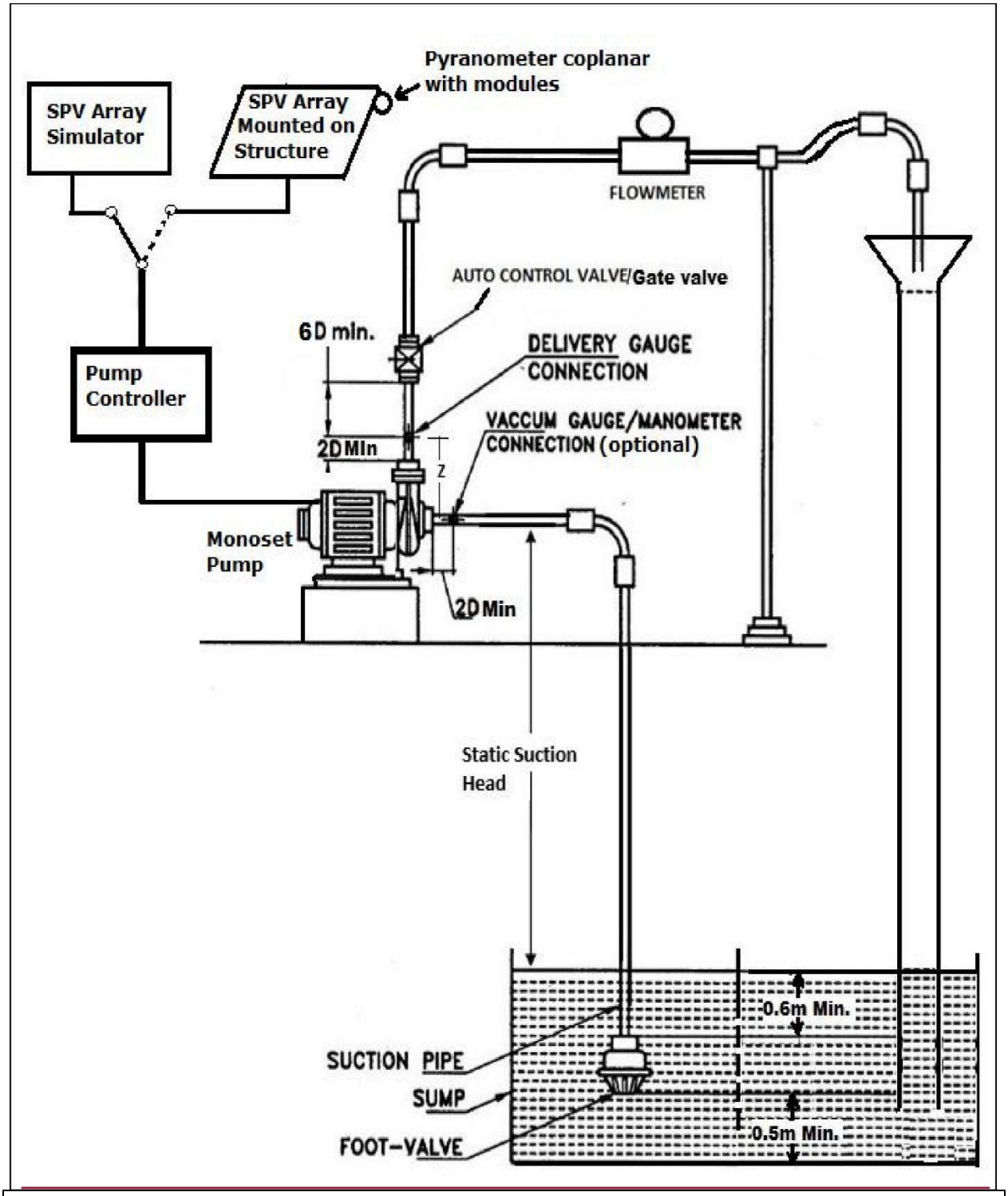


FIGURE 2 . TYPICAL TEST SET-UP FOR SPV SURFACE/MONO-BLOCK WATER PUMP SET

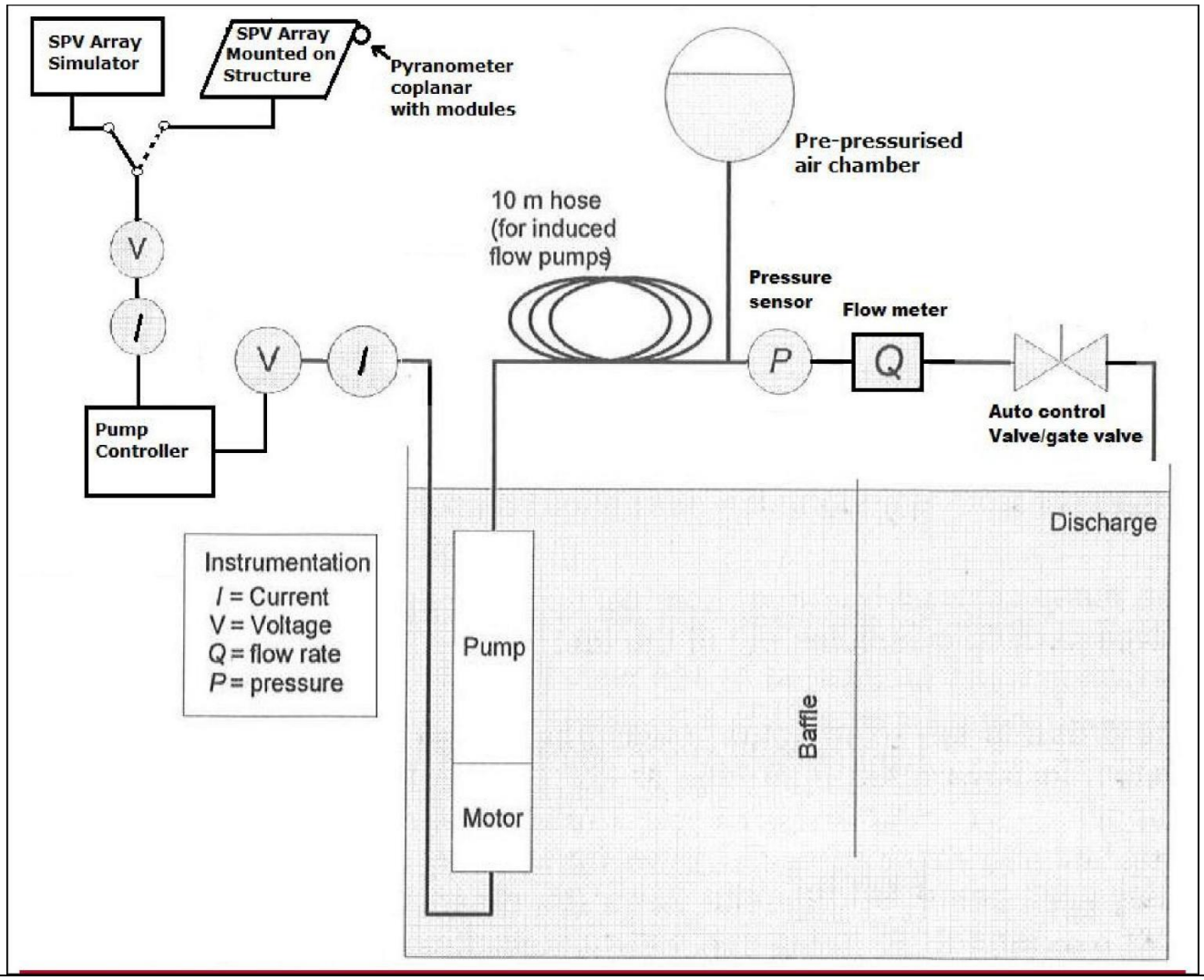


FIGURE 3 . BLOCK DIAGRAM OF TEST SETUP FOR SUBMERSIBLE PUMP-SET

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.

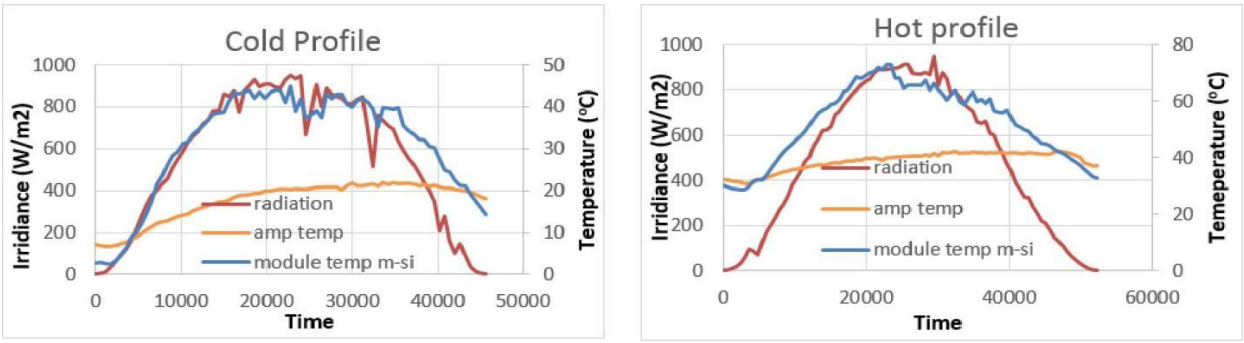
The performance testing of the SPV Pumping System for the three procedures are discussed in the following sections:

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 Motor-pump 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

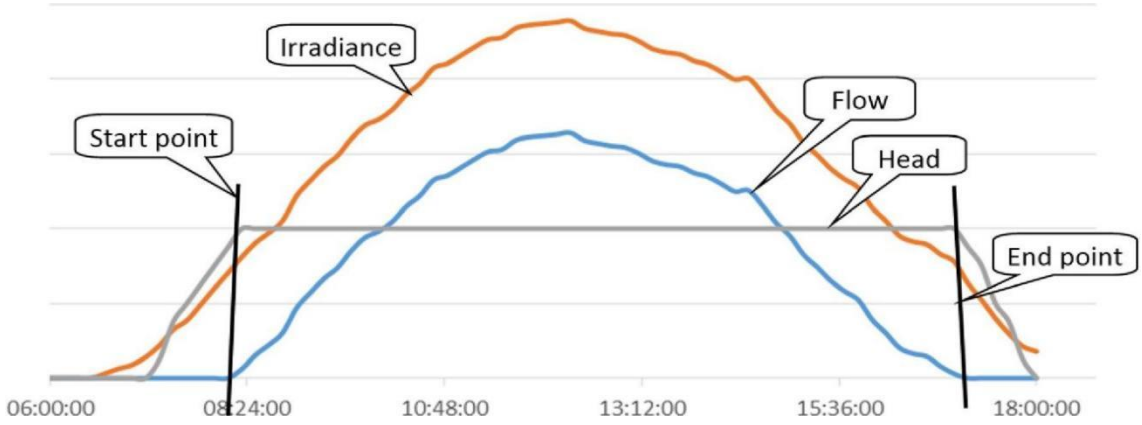


FIGURE 5- TYPICAL GRAPH FOR UNDERSTANDING CALCULATION

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 1-1 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 61000-6-3:2006	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 61800-3:2017	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
IEC 62109-1:2010	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
IEC 62305-3:2010	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, deep-fridger / 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	Output voltage low, Output frequency low/high, Low irradiance/PV power, Current overload, Peak Torque

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.

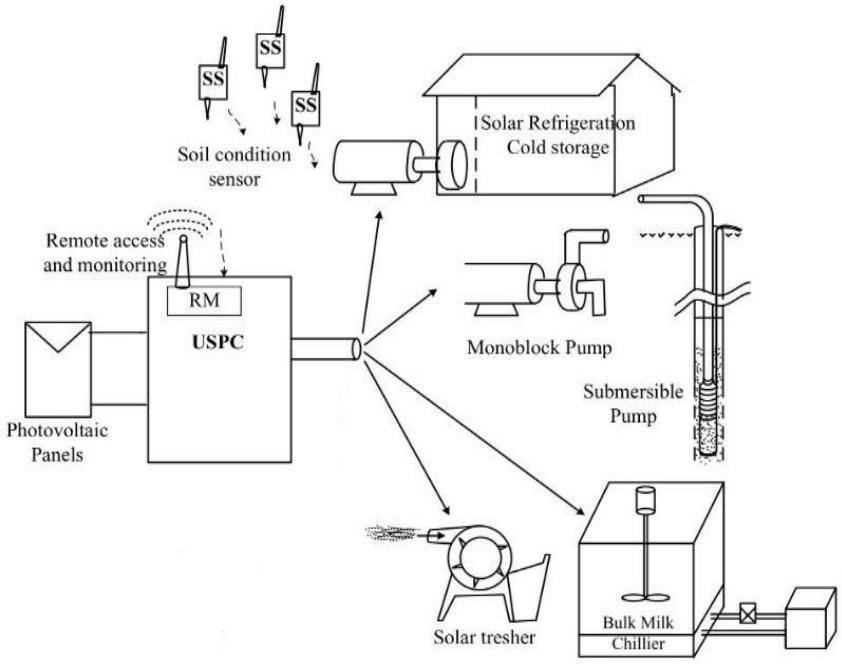


Fig. 1. USPC operation schematic diagram.

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 rowspan="22">5</td><td rowspan="22">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><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>
<tr><td>8</td><td>Operation at different output from array with all four load types (Array wattage as per MNRE model:</td><td colspan="2">Above.....Watt DC output Should not stop functioning at any load condition. Observation should be recorded.</td><td>Power value should be recorded by the lab with all agrarian load</td><td>Motor current should be recorded (for torque behavior) It must be almost constant</td></tr>
</table>

	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.

PSR PROGRAMME | Supporting Structural Reforms in the Indian Power Sector

RMS Communication and Security Architecture- PM KUSUM National Portal

Supporting Structural Reforms in the Indian Power Sector

Date: 26/09/2022

Disclaimer

- This report has been prepared on the basis set out in KPMG's contract for 'Service Provider for Supporting Structural Reforms in the Indian Power Sector' with the Secretary of State for International Development at the Department for International Development ("the Client").
- Nothing in this report constitutes a valuation or legal advice.
- KPMG has not verified the reliability or accuracy of any information obtained in the course of its work, other than in the limited circumstances set out in the Services Contract.
- In connection with the report or any part thereof, KPMG does not owe duty of care (whether in contract or in tort or under statute or otherwise) to any person or party to whom the report is circulated to and KPMG shall not be liable to any party who uses or relies on this report. KPMG thus disclaims all responsibility or liability for any costs, damages, losses, liabilities, expenses incurred by such third party arising out of or in connection with the report or any part thereof.

Contents

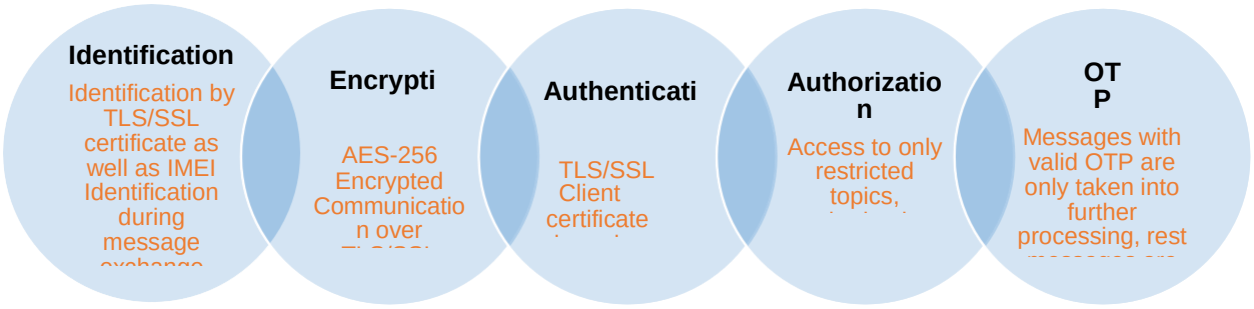
RMS Communication & Security Architecture

1. Security Architecture (with reference to EESL Tender Annexure 8 – clause 4.d)
2. RMS Registration (with reference to EESL Tender Annexure 8 – clause 4.d)
3. MQTT Topic Structure (with reference to EESL Tender Annexure 8 – clause 4.b,4.c)
4. MQTT Message Structure (with reference to EESL Tender Annexure 8 – clause 4.e,4.f)
5. Annexure: JSON Formats with parameter keywords, sample values and description
    a. Annexure: Pump Controller
    b. Annexure: Energy Meter
    c. Annexure: Inverter
    d. Annexure: String Combiner Box (SJB)
    e. Annexure: Heartbeat
    f. Annexure: DAQ

1. Security Architecture

This section highlights the communication security architecture between RMS/DCU and State SWPS IoT Platform. With this security, architecture, third parties are unable to intercept or “sniff” the encrypted data. This stops ISPs, employers, local network administrators and cybercriminals from being able to perform “packet sniffing” to access what the traffic contains. It also protects against man in the middle (MitM) attacks. This implements Private TLS/SSL VPN to ensure highest level of security.

In additional to this, use of OTP in every message exchange shall help restrict spammers and Bots. Such OTP based mechanism will provide transaction level security which is required for remote operations.



2. RMS Registration

This section details how individual RMS/DCU shall be registered and communicate securely with State SWPS IoT Platform.

- Every supplier/vendor must Register all unique IMEI (International Mobile Equipment Identity) of RMS/DCU with State SWPS
- State SWPS will generate individual client certificate for RMS/DCU against unique IMEI registered and share with supplier/vendor through secured web API interface.
- Every supplier/vendor shall be able to access web API with unique credentials shared with them.
- Web API shall return individual client certificate, Device Broker url and "info" topic.
- After installation of client certificate relevant to IMEI of RMS/DCU, RMS/DCU will connect to Device Broker and get authenticated using client certificate and further shall be able to receive additional configuration details such as FTP credential, Message Topic structure etc. after subscribing to default topic.
- After client certificate expiry, RMS will connect to FTP using available credentials and download the renewed certificate

3. MQTT Topic Structure

This section defines the different topic structure for communication between RMS/DCU and State SWPS through Device Broker.

RMS/DCU will publish and subscribe to their respective topics only, authorization of topic shall be done against unique credentials.

Application Version	Solution	IMEI	Message Type	Publish/Subscribe
IIOT-1	Standalonesolarpump	{IMEI}	Info	Subscribe
	Gridconnectedsolarpump		OTP	Subscribe
	SolarMW		Heartbeat	Publish
	Ongridrooftop		Data	Publish
	Offgridrooftop		Ondemand	Subscribe
			Config	Subscribe

Sample Topic structure for Stand-alone Solar Pump shall be: **IIOT-1/Standalonesolarpump/{IMEI}/info**

Multiple sub-topics will be formed for communication between RMS/DCU and sate SWPS IoT Platform

- **Info:** Default Topic To exchange RMS/DCU configuration details
- **OTP:** To exchange OTP at every interval of 15/30/60 minutes
- **Heartbeat:** To update RMS/DCU health indicators at frequent configurable intervals.
- **Data:** To exchange data related to RMS/DCU Monitoring parameters in "**push mode**"
    - Push data Periodically
    - Push data on Event/Notification
    - History Missing Data Push Mode: History data will be identified against **"index"**

- **Ondemand:** To exchange data between RMS/DCU and Server in "**Command on Demand**" Mode
    - Each "On Demand" message will have two transactions: Commands, Response.
    - On demand command and response will be tracked against a common **"MSGID".**
    - On demand message can be used to read and write with two command types
        - Command: **"Read"** - In json received from server replace each key with value from RMS/DCU and send the updated json back to server.
        - Command: **"Write"** - After executing the command based on key-value pair received in json, send the updated json back to server on successful execution.
        - Note: handshaking parameters such as msgid, etc. has to send back to server as is, without modification
- **Config:** To update configurable parameters of Device, which is similar to Ondemand but will be used only for configurable parameters of Device, this implements "**Configuration over the air**"
        - Command: **"Read"** - In json received from server replace each key with value from RMS/DCU and send the updated json back to server.
        - Command: **"Write"** - After executing the command based on key-value pair received in json, send the updated json back to server on successful execution.
        - Note: handshaking parameters such as msgid, etc. has to send back to server as is, without modification

4. Communication Modes

- **Push on Periodic Interval:** In this mode deployed RMS shall transmit data of Multiple devices and sensors on different configurable time intervals such as Inverter or pump controller data at every 5 minutes, Energy Meter data at every 15 minutes, String Combiner Box data at every 10 minutes
- **Push on Event:** RMS shall detect various configurable alarm or event conditions such as Pump On / Off Status, Inverter On/Off Status, Low Water Flow Rate, Fault or Trip status etc. and It shall transmit data immediately to the server
- **On Demand Read:** In this mode, User will send command to RMS to get data as and when required and RMS will send the required data to server immediately
- **On Demand Write:** In case of Remote Operations, Farmer / Consumer shall send On Demand Write Command to the RMS and RMS will send back the acknowledgement with change in parameters after operation is completed
- **Configuration read/write:** Using this mode, user will be able to read and change configurable parameters remotely such as updating periodic interval, alarm limits, server parameters etc.

5. Communication Protocols

- **Field Device Communication:** RMS to Field Devices communication such as Inverter, Pump Controller, Drive, String Combiner box, MFT/MFM, Data Acquisition System shall be established using **MODBUS RTU protocol** supported by all leading manufacturers globally

- **Energy Meter Communication:** RMS to Energy Meter communication such as Bidirectional (Revenue) Meter, Solar Generation (Audit) Meter shall be established using **DLMS/Modbus protocol** supported by all leading meter manufacturers in India
- **RMS to Server Communication - Industrial IoT MQTT Protocol:** RMS to Server Communication shall be established using MQTT protocol which is well accepted IoT protocol across the globe and supported by all leading IT as well as OT companies for Smart Grid, Smart RE and Smart City Applications

6. MQTT Message Structure

This section details message structure exchanged between RMS/DCU and state SWPS IoT Platform through Device Broker

keyword	Description	Sample Value
IMEI	Unique Identification of RMS/DCU – required to ensure registered source of data	863287049443888
VD	Virtual device/group – required for grouping parameters based on update interval/subsystems such as inverter/pump controller/meter/string combiner box etc.	2
MSGID	Message Transaction Id - required for “Ondemand”/”Config” message type, request/response/acknowledgement/feedback	123456789
COMMAND	Read/Write - Applicable only in case of “Ondemand”/”Config” message Type	Read
TIMESTAMP	RTC timestamp of RMS/DCU against all parameters of vd/group (YYYY-MM-DD HH:mm:SS)	2019-08-20 20:15:08
STINTERVAL	Periodic interval at which RMS shall store and transmit data to server. (in minutes)	15
DATE	local storage date – required as a reference to fetch data from local storage (YYYY-MM-DD)	2020-06-15
INDEX	Local storage Index – required as a reference to fetch data from local storage	5
MAXINDEX	Local storage maximum index of local storage date – required to calculate missing index	96
LOAD	Local storage retrieval command & status	0
POTP	Previous One Time Password	12345678
COTP	Current One Time Password, State SWPS Broker will update OTP at interval of 30/60 minutes	12345678
Parameter-1 **Parameter-2** **Parameter-3** **Parameter-1** **……..** **Parameter-n**	Equipment wise Keywords for multiple Parameters.	

Communication Format Annexure

Annexure - 1 (Revision – B) Pump Controller

Message Name : Periodic Push Pump Controller (1)
Message Format : JSON
Message Type : Data
Message Command Flow : Not Applicable for Data periodic Push
Message response Flow : RMS -> State SWPS IoT Platform
Message Medium : GPRS

Command Message	
Not Applicable	

Response Message		
Message	**Description**	**Unit**
{		
"VD":1	Virtual Device Index/Group	-
"TIMESTAMP":"2020-05-18 17:58:00",	RTC timestamp of RMS/DCU against all parameters of vd/group	-
“MAXINDEX”:96	maximum index of local storage date	-
"INDEX":7,	reference of local storage	-
"LOAD":0,	Local storage retrieval command & status	-
"STINTERVAL":15,	Periodic interval at which RMS shall store and transmit data to server. (in minutes)	-
"MSGID":"",	Message Transaction Id - required for “Ondemand”/”Config” message type, request/response/acknowledgement/feedback	-
"DATE":200518,	local storage date	YYMMDD
"IMEI":"1234561234561234",	IMEI No. of First Sim to be considered always for unique identity of DCU	-
"ASN_11":"34123450",	**Pump Controller Serial No.** RMS: 0 DAQ: 1-9 Pump Controller: 11-19 Meter: 21-29 Inverter: 31-39 String Combiner Box: 41-49	-
"POTP":"341234",	**Previous One Time Password**	-
"COTP":"341234",	**Current One Time Password**	-
"PMAXFREQ1":"50.00",	**Maximum Frequency**	Hz
"PFREQLSP1":"50.00",	**Lower Limit Frequency**	Hz
"PFREQHSP1":"50.00",	**Upper Limit Frequency**	Hz

"PCNTRMODE1":"1",		**Solar Pump Controller Control Mode Status**	-
0	Variable Frequency Control Mode		
1	CVT Mode for Solar		
2	MPPT mode for Solar		
"PRUNST1":"2",		**Solar Pump Controller Run Status**	-
0	Stop		
1	Running		
2	Sleep		
3	Low Speed Protection		
4	Dry Run Protection		
5	Over Current Protection		
6	Minimum Power Protection		
"PREFFREQ1":"50.00",		**Solar Pump Controller Reference Frequency**	Hz
"POPFREQ1":"50.00",		**Solar Pump Controller Output Frequency**	Hz
"POPI1":"20.00",		**Output Current**	A
"POPV1":"230.00",		**Output Voltage**	V
"POPKW1":"45.00",		**Output Active Power**	KW
"PDC1V1":"550.00",		**DC Input Voltage**	DC V
"PDC1I1":"50.00",		**DC Current**	DC I
"PDCVOC1":"650.00",		**DC Open Circuit Voltage**	DC V
"PDKWH1":"35.00",		**Today Generated Energy**	KWH
"PTOTKWH1":"120.00",		**Cumulative Generated Energy**	KWH
"POPFLW1":"2",		**Flow Speed**	LPM
"POPDWD1":"120",		**Daily Water Discharge**	Litres
"POPTOTWD1":"220",		**Total Water Discharge**	Litres
"PMAXDCV1":"750.00",		**Max DC Voltage**	DC V
"PMAXDCI1":"40.00",		**Max DC Current**	DC I
"PMAXKW1":"650.00",		**Max Output Active Power**	DC KW
"PMAXFLW1":"650 ",		**Max Flow Speed**	LPM
"PDHR1":"8.00",		**Pump Day Run Hours**	Hrs
"PTOTHR1":"8.00",		**Pump Cumulative Run Hours**	Hrs
}			

Reaction
Not Applicable

Communication Format Annexure

Annexure - 2 Energy Meter

Message Name	: Periodic Push Meter (1)
Message Format	: JSON
Message Type	: Data
Message Command Flow	: Not Applicable for Data periodic Push
Message response Flow	: RMS -> State SWPS IoT Platform
Message Medium	: GPRS

Command Message	
Not Applicable	

Response Message	
Message	**Description**
{	
"VD":2	Virtual Device Index/Group
"TIMESTAMP":"2020-05-18 17:58:00",	RTC timestamp of RMS/DCU against all parameters of vd/group
“MAXINDEX”:96	maximum index of local storage date
"INDEX":7,	reference of local storage
"LOAD":0,	Local storage retrieval command & status
"STINTERVAL":15,	Periodic interval at which RMS shall store and transmit data to server. (in minutes)
"MSGID":"",	Message Transaction Id - required for “Ondemand”/”Config” message type, request/response/acknowledgement/feedback
"DATE":200518,	local storage date
"IMEI":"1234561234561234",	IMEI No. of First Sim to be considered always for unique identity of DCU
"ASN_21":12345678,	Asset Serial Number RMS: 0 DAQ: 1-9 Pump Controller: 11-19 Meter: 21-29 Inverter: 31-39 String Combiner Box: 41-49
"MTDET1":30012302,	Meter Detail
"POTP":"34123450",	**Previous One Time Password**
"COTP":"34123450",	**Current One Time Password**
"MTBLDATE1":18,	Billing Date for meter 1
"DATE1":180606,	Present date for meter1
"TIME1":105400,	Present time for meter1
"IR1":20.58,	R Phase Current in Amps
"IY1":20.65,	Y Phase Current in Amps
"IB1":20.12,	B Phase Current in Amps
"VRN1":240.12,	R Phase to Neutral Voltage in Volts

"VYN1":242.13,	Y Phase to Neutral Voltage in Volts
"VBN1":243.55,	B Phase to Neutral Voltage in Volts
"VRY1":420.18,	Phase to Phase Voltage(R-Y) in Volts
"VYB1":419.38,	Phase to Phase Voltage(Y-B) in Volts
"VBR1": 421.5,	Phase to Phase Voltage(B-R) in Volts
"PFR1":0.98,	R Phase Power Factor
"PFY1":0.97,	Y Phase Power Factor
"PFB1":0.96,	B Phase Power Factor
"FRQ1":50.05,	Grid Frequency
"POWR1":42.578,	R Phase Active Power in KW
"POWY1":42.156,	Y Phase Active Power in KW
"POWB1":42.354,	B Phase Active Power in KW
"POW1":42.185,	Total Active Power in KW
"RPOWR1":22.123,	R Phase Reactive Power in KVAR
"RPOWY1":20.110,	Y Phase Reactive Power in KVAR
"RPOWB1":22.310,	B Phase Reactive Power in KVAR
"RPOW1":65.610,	Total Reactive Power in KVAR
"APOWR1":55.610,	R Phase Apparent Power in KVA
"APOWY1":52.910,	Y Phase Apparent Power in KVA
"APOWB1":53.911,	B Phase Apparent Power in KVA
"APOW1":14.198,	Total Apparent Power in KVA
"KWHNET1":98561.4,	Cumulative Net Energy in KWH
"KWHIMP1":98561.4,	Cumulative Import Energy in KWH
"KWHEXP1":98561.2,	Cumulative Export Energy in KWH
"KVAHNET1":99100.3,	Cumulative Net Energy in KVAH
"KVAHIMP1":99105.1,	Cumulative Import Energy in KWH
"KVAHEXP1":98999.1,	Cumulative Export Energy in KWH
"MDKWIMP1":100.3,	Rising Demand (Import) in KW
"MDKWEXP1":98.6,	Rising Demand (Export) in KW
"POFF1":1020,	Grid Power Failure in Minutes
"TC1":100,	Total Tamper Counts
"PF1":0.99,	Average PF
"LBKWHNET1":98561,	Last Billing Cycle Net Energy in KWH
"LBKWHIMP1":98561,	Last Billing Cycle Import Energy in KWH
"LBKWHEXP1":98561,	Last Billing Cycle Export Energy in KWH
"PMDKVAIMP1":22.50,	Present MD KVA Import
"PMDKVAEXP1":0.00,	Present MD KVA Import
"LBMDKWIMP1":7.07,	Last Billing MD KW Import
"LBMDKWEXP1":0.00,	Last Billing MD KW Export
"LBMDKVAIMP1":7.07,	Last Billing MD KVA Import
"LBMDKVAEXP1":0.00,	Last Billing MD KVA Export
"MDRSTC1":4	MD Reset Count
}	

Reaction	
Not Applicable	

Communication Format Annexure

Annexure – 3 Inverter

Message Name : Inverter Periodic Push (INVERTER-1)
Message Format : JSON
Message Type : Data
Message Command Flow : Not Applicable for Data periodic Push
Message response Flow : RMS -> State SWPS IoT Platform
Message Medium : GPRS

Command Message	
Not Applicable	

Response Message	
Message	**Description**
{	
"VD":5	Virtual Device Index/Group
"TIMESTAMP":"2020-05-18 17:58:00",	RTC timestamp of RMS/DCU against all parameters of vd/group
"MAXINDEX":96	maximum index of local storage date
"INDEX":7,	reference of local storage
"LOAD":0,	Local storage retrieval command & status
"STINTERVAL":15,	Periodic interval at which RMS shall store and transmit data to server. (in minutes)
"MSGID":"",	Message Transaction Id - required for "Ondemand"/"Config" message type, request/response/acknowledgement/feedback
"DATE":200518,	local storage date
"IMEI":"1234561234561234",	IMEI No. of First Sim to be considered always for unique identity of DCU
"ASN_31":"34123450",	**Inverter Serial No.** RMS: 0 DAQ: 1-9 Pump Controller: 11-19 Meter: 21-29 Inverter: 31-39 String Combiner Box: 41-49
"POTP":"34123450",	**Previous One Time Password**
"COTP":"34123450",	**Current One Time Password**
"IST1":1,	**Inverter Status**
"IFREQ1":40,	**Frequency**
"IPF1":0.8,	**Power Factor**
"IDC1V1":500,	**DC-1 Voltage**
"IDC1I1":200,	**DC-1 Current**
"IDC1KW1":200,	**DC-1 Power**
"IDC2V1":243.55,	**DC-2 Voltage**

"IDC2I1":420.18,	DC-2 Current
"IDC2KW1":200,	DC-2 Power
"IDC3V1":419.38,	DC-3 Voltage
"IDC3I1":421.8,	DC-3 Current
"IDC3KW1":200,	DC-3 Power
"IDC4V1":0.98,	DC-4 Voltage
"IDC4I1":0.97,	DC-4 Current
"IDC4KW1":200,	DC-4 Power
"IRPHV1":0.96,	R phase voltage
"IRPHI1":50.05,	R phase current
"IRPHKW1":50.05,	R phase Active Power
"IYPHV1":42.578,	Y phase voltage
"IYPHI1":42.156,	Y phase current
"IYPHKW1":50.05,	Y phase Active Power
"IBPHV1":42.354,	B phase voltage
"IBPHI1":42.185,	B phase current
"IBPHKW1":50.05,	B phase Active Power
"IKW1":22.123,	Active Power
"ITKWH1":20.110,	Today Generated Energy
"ITON1":22.310,	Today On Time of Inverter
"ILKWH1":65.610,	Life time Generated Energy
"ILON1":55.610,	Life time running hours
"ITEMP1":52.910,	Inverter Temperature
"IFT11":53.911,	Fault-1
"IFT21":14.198,	Fault-2
"IFT31":98561.4,	Fault-3
"IFT41":98561.4,	Fault-4
"IFT51":98561.2,	Fault-5
"IKVA1":99100.3,	Apparent power
"IKVAR1":99105.1	Reactive power
}	

Reaction	
Not Applicable	

Communication Format Annexure

Annexure - 4 String Combiner Box

Message Name : Periodic Push String Combiner Box
Message Format : JSON
Message Type : Data
Message Command Flow : Not Applicable for Data periodic Push
Message response Flow : RMS -> State SWPS IoT Platform
Message Medium : GPRS

Command Message	
Not Applicable	

Response Message	
Message	**Description**
{	
"VD":9	Virtual Device Index/Group
"TIMESTAMP":"2020-05-18 17:58:00",	RTC timestamp of RMS/DCU against all parameters of vd/group
“MAXINDEX”:96	maximum index of local storage date
"INDEX":7,	reference of local storage
"LOAD":0,	Local storage retrieval command & status
"STINTERVAL":15,	Periodic interval at which RMS shall store and transmit data to server. (in minutes)
"MSGID":"",	Message Transaction Id - required for “Ondemand”/”Config” message type, request/response/acknowledgement/feedback
"DATE":200518,	local storage date
"IMEI":"1234561234561234",	IMEI No. of First Sim to be considered always for unique identity of DCU
"ASN_41":"34123450",	**SJB Serial no** RMS: 0 DAQ: 1-9 Pump Controller: 11-19 Meter: 21-29 Inverter: 31-39 String Combiner Box: 41-49
"POTP":"34123450",	**Previous One Time Password**
"COTP":"34123450",	**Current One Time Password**
"SI11":"3.00",	**SJB1, Channel1 Current**
"SI21":"5.00",	**SJB1, Channel2 Current**
"SI31":"5.00",	**SJB1, Channel3 Current**
"SI41":"5.00",	**SJB1, Channel4 Current**
"SI51":"5.00",	**SJB1, Channel5 Current**

"SI61":"5.00",	SJB1, Channel6 Current
"SI71":"5.00",	SJB1, Channel7 Current
"SI81":"5.00",	SJB1, Channel8 Current
"SI91":"5.00",	SJB1, Channel9 Current
"SI101":"5.00",	SJB1, Channel10 Current
"SI111":"5.00",	SJB1, Channel11 Current
"SI121":"5.00",	SJB1, Channel12 Current
"SI131":"5.00",	SJB1, Channel13 Current
"SI141":"5.00",	SJB1, Channel14 Current
"SI151":"5.00",	SJB1, Channel15 Current
"SI161":"5.00",	SJB1, Channel16 Current
"SI171":"5.00",	SJB1, Channel17 Current
"SI181":"5.00",	SJB1, Channel18 Current
"SI191":"5.00",	SJB1, Channel19 Current
"SI201":"5.00",	SJB1, Channel20 Current
"SI211":"5.00",	SJB1, Channel21 Current
"SI221":"5.00",	SJB1, Channel22 Current
"SI231":"5.00",	SJB1, Channel23 Current
"SI241":"5.00",	SJB1, Channel24 Current
"SDCV1":"635.00",	SJB1, DC Voltage
"SDCTOTI1":"40.00",	SJB1, Total DC Current
"SDCTOTKW1":"28.00",	SJB1, Total DC Power
"SDI11":"1.00",	SJB1, Digital Input1
"SDI21":"1.00",	SJB1, Digital Input2
"ST11":"1.00",	SJB1, Temperature1
"ST21":"1.00",	SJB1, Temperature2
"ST31":"1.00"	SJB1, Temperature3
}	

Reaction	
Not Applicable	

Communication Format Annexure

Annexure – 5 RMS

Message Name : RMS
Message Format : JSON
Message Type : Heartbeat
Message Command Flow : Not Applicable
Message response Flow : RMS -> State SWPS IoT Platform
Message Medium : GPRS

Command Message	
Not Applicable	

Response Message	
Message	**Description**
{	
"VD":0	Virtual Device Index/Group
"TIMESTAMP":"2020-05-18 17:58:00",	RTC timestamp of RMS/DCU against all parameters of vd/group
“MAXINDEX”:96	maximum index of local storage date
"INDEX":7,	reference of local storage
"LOAD":0,	Local storage retrieval command & status
"STINTERVAL":15,	Periodic interval at which RMS shall store and transmit data to server. (in minutes)
"MSGID":"",	Message Transaction Id - required for “Ondemand”/”Config” message type, request/response/acknowledgement/feedback
"DATE":200518,	local storage date
"IMEI":"1234561234561234",	IMEI No. of First Sim to be considered always for unique identity of DCU
"POTP":"341234",	**Previous One Time Password**
"COTP":"341234",	**Current One Time Password**
"GSM":1,	Device connected to GSM network
"SIM":1,	SIM detected (1 - detected)
"NET":1,	Device in Network (1 - in network)
"GPRS":"1",	GPRS connected (1 - connected)
"RSSI":22,	Signal Strength
"SD":"1",	SD card detected (1 - detected)
"ONLINE":1,	Device Online (1- Online)
“GPS”:1,	GPS Module Status (1-ON,0-OFF)
“GPSLOC”:1,	GPS Location Locked
“RF”:1,	RF Module Status (1-ON,0-OFF)
"RTCDATE":180918,	RTC Date
"RTCTIME":175800,	RTC Time
“TEMP”:45.5,	Device Temperature

“LAT”:19.06,	Latitude from gps
“LONG”:72.8777,	Longitude from gps
“SIMSLOT”:1,	Sim Slot (Current Sim Slot: 1 or 2)
“SIMCHNGCNT”:10,	Total Sim Slot Change Count
“FLASH”:1,	Device Flash Status 1: Detected 0: Error
“BATTST”:0,	Battery Input Status: 1 if on battery power else 0
“VBATT”:5.0,	Battery Voltage
“PST”:1	Power Supply (1-Mains, 2-Battery)
}	

Reaction	
Not Applicable	

Annexure – 6 DAQ System

Message Name	: Periodic Push DAQ System
Message Format	: JSON
Message Type	: Data
Message Command Flow	: Not Applicable for Data periodic Push
Message response Flow	: RMS -> State SWPS IoT Platform
Message Medium	: GPRS

Command Message	
Not Applicable	

Response Message	
Message	**Description**
{	
"VD":12	Virtual Device Index/Group
"TIMESTAMP":"2020-05-18 17:58:00",	RTC timestamp of RMS/DCU against all parameters of vd/group
“MAXINDEX”:96	maximum index of local storage date
"INDEX":7,	reference of local storage
"LOAD":0,	Local storage retrieval command & status
"STINTERVAL":15,	Periodic interval at which RMS shall store and transmit data to server. (in minutes)
"MSGID":"",	Message Transaction Id - required for “Ondemand”/”Config” message type, request/response/acknowledgement/feedback
"DATE":200518,	local storage date
"IMEI":"1234561234561234",	IMEI No. of First Sim to be considered always for unique identity of DCU
"POTP":"34123450",	**Previous One Time Password**
"COTP":"34123450",	**Current One Time Password**
“AI11”:45.5,	Analog Input – 1
“AI21”:45.5,	Analog Input – 2
“AI31”:45.5,	Analog Input – 3
“AI41”:45.5,	Analog Input – 4
“DI11”:1,	Digital Input – 1
“DI21”:0,	Digital Input – 2
“DI31”:1,	Digital Input – 3
“DI41”:0,	Digital Input – 4
“DO11”:1,	Digital Output – 1
“DO21”:1,	Digital Output – 2
“DO31”:1,	Digital Output – 3
“DO41”:1	Digital Output – 4
}	

Reaction	
Not Applicable	

Annexure – 7

Message Name : On Demand Read/Write Parameter/Keyword
Message Format : JSON
Message Type : Config
Message Command Flow : Cloud Server-> RMS
Message Response Flow : RMS -> Cloud Server
Message Medium : GPRS

Command Message	
Message	**Description**
{	
"timestamp":"2018-09-18 17:58:00",	
"type": "config",	
"cmd":"write",	To write config
"msgid":"130",	Server Auto Generated
"APN1": "www"	APN Value for sim1
"USR1": "string"	sim1 user name
"PASS1": "string"	sim1 password
"APN2": "Internet"	APN Value for sim2
"USR2": "string"	Sim2 user name
"PASS2": "string"	Sim2 password
"RESTART":1	To restart DCU, 1 : Execute command
"UPDATEINTERVAL":15	Enter update interval in mins.
"HEARTINTERVAL":5	Heartbeat Update Interval in mins
"URTCDATE":200622	DCU RTC Date (YYMMDD) Update
"URTCTIME":220312	DCU RTC Time (HH:MM:SS) Update - 24 hour format
"UPDATERTC":1	Update RTC, 1: Execute command, 0 : Successful execution
"GSMSYNC":1	RTC auto GSM synchronization, 1: to execute command
"DO1":1	Pump Remote ON/OFF Operation (1-ON, 0-OFF)
"AI1ZERO":1	Engineering Zero Value (4 mA dc) for AI1 E.G. 0(LPM)

"AI1SPAN":100	Engineering Span Value (20 mA dc) for AI1 E.G. 5000(LPM)
"AI2ZERO":1	Engineering Zero Value (4 mA dc) for AI2
"AI2SPAN":100	Engineering Span Value (20 mA dc) for AI2
"AI3ZERO":1	Engineering Zero Value (4 mA dc) for AI3
"AI3SPAN":100	Engineering Span Value (20 mA dc) for AI3
"AI4ZERO":1	Engineering Zero Value (4 mA dc) for AI4
"AI4SPAN":100	Engineering Span Value (20 mA dc) for AI4
"URL":"rms1.kusumiiot.co"	URL of Broker Server
"PORT":8883	Port of Broker Server
"CID":"d:860906045525646$standalonesolarpump$27"	Unique Client id of device
"USERNAME":"860906045525646$standalonesolarpump$27"	Username for device authentication
"PASSWORD":"9e0baa73"	Password for device authentication
"FTPURL": "rms1.kusumiiot.co"	URL for FTP
"FTPUSER":"866191037709301"	Username for FTP
"FTPPASS":"908552f"	Password for FTP
"FTPPORT":22	Port for FTP
"FTPDOWN":1	Download Certificates from ftp 1: To execute command, 0: Command is successfully executed
}	

Response Message	
Message	**Description**
{	
"timestamp":"2018-09-18 17:58:00",	

"type": "config",	
"cmd":"write",	To write config
"msgid":"130",	Server Auto Generated
"APN1": “www”	APN Value for sim1
"USR1": "string"	sim1 username
"PASS1": "string"	sim1 password
"APN2": “Internet”	APN Value for sim2
"USR2": "string"	Sim2 username
"PASS2": "string"	Sim2 password
"RESTART":1	To restart DCU, 1: Execute command
"UPDATEINTERVAL":15	Enter update interval in mins.
"HEARTINTERVAL":5	Heartbeat Update Interval in mins
"URTCDATE":200622	DCU RTC Date (YYMMDD) Update
"URTCTIME":220312	DCU RTC Time (HH:MM: SS) Update - 24 hour format
"UPDATERTC":1	Update RTC, 1: Execute command, 0 : Successful execution
"GSMSYNC":1	RTC auto GSM synchronization, 1: to execute command
"DO1":1	Pump Remote ON/OFF Operation (1-ON, 0-OFF)
"AI1ZERO":1	Engineering Zero Value (4 mA dc) for AI1 E.G. 0(LPM)
"AI1SPAN":100	Engineering Span Value (20 mA dc) for AI1 E.G. 5000(LPM)
"AI2ZERO":1	Engineering Zero Value (4 mA dc) for AI2
"AI2SPAN":100	Engineering Span Value (20 mA dc) for AI2
"AI3ZERO":1	Engineering Zero Value (4 mA dc) for AI3

"AI3SPAN":100	Engineering Span Value (20 mA dc) for AI3
"AI4ZERO":1	Engineering Zero Value (4 mA dc) for AI4
"AI4SPAN":100	Engineering Span Value (20 mA dc) for AI4
"URL":"rms1.kusumiiot.co"	URL of Broker Server
"PORT":8883	Port of Broker Server
"CID":"d:860906045525646$standalonesolarpump$27"	Unique Client id of device
"USERNAME":"860906045525646$standalonesolarpump$27"	Username for device authentication
"PASSWORD":"9e0baa73"	Password for device authentication
"FTPURL": "rms1.kusumiiot.co"	URL for FTP
"FTPUSER":"866191037709301"	Username for FTP
"FTPPASS":"908552f"	Password for FTP
"FTPPORT":22	Port for FTP
"FTPDOWN":1	Download Certificates from ftp 1: To execute command, 0: Command is successfully executed
}	

Command Message	
Command – B. In case, if some key in command are invalid	
Message	**Description**
{	
"timestamp":"2018-09-18 17:58:00",	
"type":"config",	
"cmd":"write",	to write config
"msgid":"130,	server auto generated
"APNN1": 2	send value "2"
"USR1": "xyz"	send value "xyz"
}	

Response Message	
Message	**Description**
{	
"timestamp":"2018-09-18 17:58:00",	
"type": "config",	
"cmd":"write",	to write config
"msgid":"130",	server auto generated
"APNN1": 0	invalid Key, value will be returned '0'
"USR1": "xyz"	actual value received
}	

Reaction	
Not Applicable	

Communication Format Annexure

Annexure - 8 USPC

Message Name : Periodic Push USPC
Message Format : JSON
Message Type : Data
Message Command Flow : Not Applicable for Data periodic Push
Message response Flow : RMS -> State SWPS IoT Platform
Message Medium : GPRS

Command Message	
Not Applicable	

Response Message		
Message	**Description**	**Unit**
{		
"VD":1	Virtual Device Index/Group	-
"TIMESTAMP":"2020-05-18 17:58:00",	RTC timestamp of RMS/DCU against all parameters of vd/group	-
“MAXINDEX”:96	maximum index of local storage date	-
"INDEX":7,	reference of local storage	-
"LOAD":0,	Local storage retrieval command & status	-
"STINTERVAL":15,	Periodic interval at which RMS shall store and transmit data to server. (in minutes)	-
"MSGID":"",	Message Transaction Id - required for “Ondemand”/”Config” message type, request/response/acknowledgement/feedba Ck	-
"DATE":200518,	local storage date	YYM MDD
"IMEI":"1234561234561234",	IMEI No. of First Sim to be considered always for unique identity of DCU	-
"ASN_11":"34123450",	**Pump Controller Serial No.** RMS: 0 DAQ: 1-9 Pump Controller / USPC: 11-19 Meter: 21-29 Inverter: 31-39 String Combiner Box: 41-49	-
"POTP":"341234",	**Previous One Time Password**	-
"COTP":"341234",	**Current One Time Password**	-
"PMAXFREQ1":"50.00",	**Maximum Frequency**	Hz
"PFREQLSP1":"50.00",	**Lower Limit Frequency**	Hz
"PFREQHSP1":"50.00",	**Upper Limit Frequency**	Hz

"PCNTRMODE1":"1",		**Solar Pump Controller Control Mode Status**	-
0	Variable Frequency Control Mode		
1	CVT Mode for Solar		
2	MPPT mode for Solar		
"PRUNST1":"2",		**Solar Pump Controller Run Status**	-
0	Stop		
1	Running		
2	Sleep		
3	Low Speed Protection		
4	Dry Run Protection		
5	Over Current Protection		
6	Minimum Power Protection		
"PREFFREQ1":"50.00",		**Solar Pump Controller Reference Frequency**	Hz
"POPFREQ1":"50.00",		**Solar Pump Controller Output Frequency**	Hz
"POPI1":"20.00",		**Output Current**	A
"POPV1":"230.00",		**Output Voltage**	V
"POPKW1":"45.00",		**Output Active Power**	KW
"PDC1V1":"550.00",		**DC Input Voltage**	DC V
"PDC1I1":"50.00",		**DC Current**	DC I
"PDCVOC1":"650.00",		**DC Open Circuit Voltage**	DC V
"PDKWH1":"35.00",		**Today Generated Energy**	KWH
"PTOTKWH1":"120.00",		**Cumulative Generated Energy**	KWH
"POPFLW1":"2",		**Flow Speed**	LPM
"POPDWD1":"120",		**Daily Water Discharge**	Litres
"POPTOTWD1":"220",		**Total Water Discharge**	Litres
"PMAXDCV1":"750.00",		**Max DC Voltage**	DC V
"PMAXDCI1":"40.00",		**Max DC Current**	DC I
"PMAXKW1":"650.00",		**Max Output Active Power**	DC KW
"PMAXFLW1":"650 ",		**Max Flow Speed**	LPM
"PDHR1":"8.00",		**Pump Day Run Hours**	Hrs
"PTOTHR1":"8.00",		**Pump Cumulative Run Hours**	Hrs
“UDKWH1":"35.00",		**Channel 1 Today Generated Energy of USPC**	KWH
"UTOTKWH1":"120.00",		**Channel 1 Cumulative Generated Energy of USPC**	KWH
"UDHR1":"4.78",		**Channel 1 USPC Day Run Hours**	Hrs
"UTOTHR1":"13.94",		**Channel 1 USPC Cumulative Run Hours**	Hrs
"UOPI1":"20.00",		**Channel 1 Output Current**	A
"UOPV1":"230.00",		**Channel 1 Output Voltage**	V
"UOPKW1":"45.00",		**Channel 1 Output Active Power**	KW
“URUNST1”:1		**Channel 1 Run Status : 1 – ON, 0 – OFF**	
“UFLTST1”:1		**Chanel 1 Fault Status 1 – Fault, 0 – No Fault**	
“UDKWH2":"35.00",		**Channel 2 Today Generated Energy of USPC**	KWH
"UTOTKWH2":"120.00",		**Channel 2 Cumulative Generated Energy of USPC**	KWH

"UDHR2":"4.78",	**Channel 2 USPC Day Run Hours**	Hrs
"UTOTHR2":"13.94",	**Channel 2 USPC Cumulative Run Hours**	Hrs
"UOPI2":"20.00",	**Channel 2 Output Current**	A
"UOPV2":"230.00",	**Channel 2 Output Voltage**	V
"UOPKW2":"45.00",	**Channel 2 Output Active Power**	KW
“URUNST2”:1	**Channel 2 Run Status : 1 – ON, 0 – OFF**	
“UFLTST2”:1	**Chanel 2 Fault Status 1 – Fault, 0 – No Fault**	
“UDKWH3":"35.00",	**Channel 3 Today Generated Energy of USPC**	KWH
"UTOTKWH3":"120.00",	**Channel 3 Cumulative Generated Energy of USPC**	KWH
"UDHR3":"4.78",	**Channel 3 USPC Day Run Hours**	Hrs
"UTOTHR3":"13.94",	**Channel 3 USPC Cumulative Run Hours**	Hrs
"UOPI3":"20.00",	**Channel 3 Output Current**	A
"UOPV3":"230.00",	**Channel 3 Output Voltage**	V
"UOPKW3":"45.00",	**Channel 3 Output Active Power**	KW
“URUNST3”:1	**Channel 3 Run Status : 1 – ON, 0 – OFF**	
“UFLTST3”:1	**Chanel 3 Fault Status 1 – Fault, 0 – No Fault**	
“UDKWH4":"35.00",	**Channel 4 Today Generated Energy of USPC**	KWH
"UTOTKWH4":"120.00",	**Channel 4 Cumulative Generated Energy of USPC**	KWH
"UDHR4":"4.78",	**Channel 4 USPC Day Run Hours**	Hrs
"UTOTHR4":"13.94",	**Channel 4 USPC Cumulative Run Hours**	Hrs
"UOPI4":"20.00",	**Channel 4 Output Current**	A
"UOPV4":"230.00",	**Channel 4 Output Voltage**	V
"UOPKW4":"45.00",	**Channel 4 Output Active Power**	KW
“URUNST4”:1	**Channel 4 Run Status : 1 – ON, 0 – OFF**	
“UFLTST4”:1	**Chanel 4 Fault Status 1 – Fault, 0 – No Fault**	
“UDKWH5":"35.00",	**Channel 5 Today Generated Energy of USPC**	KWH
"UTOTKWH5":"120.00",	**Channel 5 Cumulative Generated Energy of USPC**	KWH
"UDHR5":"4.78",	**Channel 5 USPC Day Run Hours**	Hrs
"UTOTHR5":"13.94",	**Channel 5 USPC Cumulative Run Hours**	Hrs
"UOPI5":"20.00",	**Channel 5 Output Current**	A
"UOPV5":"230.00",	**Channel 5 Output Voltage**	V
"UOPKW5":"45.00",	**Channel 5 Output Active Power**	KW
“URUNST5”:1	**Channel 5 Run Status : 1 – ON, 0 – OFF**	
“UFLTST5”:1	**Chanel 5 Fault Status 1 – Fault, 0 – No Fault**	

Reaction	
Not Applicable	

32/645/2017-SPV Division
Government of India
Ministry of New & Renewable Energy

Atal Akshay Urja Bhawan
Lodhi Road, New Delhi
Date: 17.01.2024

Order

Subject: Comprehensive guidelines for implementation of Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyaan (PM-KUSUM) Scheme

In supersession to this Ministry's Office Memorandum 32/645/2017-SPV Division dated 22.07.2019 regarding guidelines for implementation of Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyaan (PM-KUSUM) Scheme and all the amendments so far under this scheme, it has been decided to issue a comprehensive guidelines for implementation of PM KUSUM Scheme, with following components:

i. Component-A: Setting up of 10,000 MW of Decentralized Ground/ Stilt Mounted Grid Connected Solar or other Renewable Energy based Power Plants;

ii. Component-B: Installation of 14 Lakh Stand-alone Solar Agriculture Pumps;

iii. Component-C: Solarisation of 35 Lakh Grid Connected Agriculture Pumps including Feeder Level Solarization.

2. The comprehensive guidelines for implementation of PM KUSUM Scheme are enclosed.

3. This is issued with the approval of Competent Authority.

Enclosed: As above.

Nikhil Gakkhar 17/1/24
(Dr. Nikhil Gakkhar)
Scientist 'D'
011-20849115

To
All concern

Guidelines for Implementation of New Scheme for Farmers for Installation of Solar Pumps and Grid Connected Solar Power Plants

1. Background

1.1. Government of India has taken various policy measures to increase the installed power generation capacity from non-fossil fuel sources by 2030. To provide energy and water security to farmers and enhance their income, de-dieselize the farm sector, and reduce environmental pollution, the Government of India launched PM-KUSUM on 08.03.2019.

1.2. During 2020-21, the scheme was scaled-up and expanded from its pilot stage and notified with due approval of Ministry of Finance. In August 2022, the scheme was extended till March 2026.

2. Components of PM KUSUM

2.1. The PM KUSUM Scheme has the following components:

i. Component-A: Setting up of 10,000 MW of Decentralized Ground/ Stilt Mounted Grid Connected Solar or other Renewable Energy based Power Plants by the farmers on their land

ii. Component-B: Installation of 14 Lakh Stand-alone Solar Agriculture Pumps

iii. Component-C: Solarisation of 35 Lakh Grid Connected Agriculture Pumps including Feeder Level Solarization

2.2. The PM-KUSUM Scheme allows inter-se transfer of quantities between Component-B and Component-C. All three components of the scheme aim to add Solar capacity of about 34,800 MW by March 2026 with the total Central Financial support of ₹ 34,422 crore.

3. Implementation mechanism

These consolidated guidelines subsume all the previously issued amendments from time to time.

4. Component A

4.1. Salient Features

i. This Component aims at setting up of 10,000 MW of Decentralized Ground/ Stilt Mounted Grid Connected Solar or other Renewable Energy based Power Plants by farmers on their land.
ii. Solar or other Renewable Energy based Power Plants (REPP) of capacity of 500 kW to 2 MW will be setup by Renewable Power Generator (RPG).
iii. The REPP will be preferably installed within five km radius of the sub-stations in order to avoid high cost of sub-transmission lines and to reduce transmission losses.
iv. The total energy purchased from these RE plants will be accounted for Renewable Purchase Obligation (RPO) under Decentralized Renewable Energy (DRE) category by the DISCOM.

4.2. Eligibility

i. The REPP under the scheme would be installed by the farmers on his own land either directly by himself or in partnership with group of farmers/ cooperatives/ panchayats/ Farmer Producer Organisations (FPO)/Water User associations (WUA), or through a developer.
ii. Group of farmers/ cooperatives/ panchayats/ Farmer Producer Organisations (FPO)/ Water User associations (WUA) etc. can opt for developing the REPP through developer(s). The farmer may provide his land to the DISCOM, which will then be considered as RPG in this case. In such a case, the land owner will get lease rent as mutually agreed between the parties. The lease rent may be in terms of Rs. per year per acre of land or in terms of Rs. per unit energy generated per acre of land area. The farmer(s) may opt for payment of lease rent directly in their bank account by the DISCOM, from the payment due to the developer. A model Land Lease Agreement to facilitate the beneficiaries is as per Annexure I. However, the terms of Land Lease Agreement may be finalised with mutual consent of concerned parties.

4.3. Notification of sub-station wise generation capacity and intent to setup REPP

i. DISCOM shall assess and notify RE generation capacity that can be injected into 33/11 kV or 66/11 kV or 110/11 kV sub-station in rural areas and place such notification on its website for information of all stakeholders.
ii. DISCOMs will notify sub-station wise surplus capacity which can be fed from such RE power plants to the Grid
iii. DISCOMs should prefix the levelized tariff.
iv. DISCOM shall invite applications from interested beneficiaries for setting up the renewable energy plants.
v. The renewable power generated will be purchased by DISCOMs at the pre-fixed levelized tariff.
vi. In case the aggregate capacity offered by Applicants is more than notified capacity for a particular sub-station, bidding route will be followed by DISCOMs to select Renewable Power generator and in such cases the pre-fixed levelized tariff will be the ceiling tariff for bidding.

vii. For setting up of plant, land will be required. To facilitate farmers willing to lease out their land for development of RE plants near the notified substation(s), DISCOMs may make a list of such farmers and place that list on their website.

viii. However, the leasing of land of any farmers will be a bi-partite agreement between the farmer and the developer, and the DISCOM will not be held responsible for failure in getting the land leased out to a developer.

4.4. Application procedure & Selection of REPP

i. DISCOM may invite applications for Expression of Interest (EOI) from prospective RPGs, through their online portal.

ii. The RPGs shall submit their application for setting up REPP to DISCOM/SIA, as per prescribed format.

iii. The application should be submitted along with a non-refundable processing fee from the interested RPGs, which in no case shall be higher than Rs. 5000 per MW or part thereof of the capacity applied for.

iv. In case the total aggregate capacity of eligible applications received for a particular sub-station is less than or equal to the capacity notified for connectivity at the sub-station, Letter of Award (LoA) will be awarded to all eligible applicants for procurement of renewable power at a pre-fixed levelized tariff on first come first serve basis within one month from the receipt of application

v. In case the total aggregate capacity of eligible application received for a particular sub-station is more than the capacity notified for connectivity at the sub-station, then DISCOM or any agency authorized by the DISCOM shall invite Bids from all these applicants.

vi. Selection of bidders will be based on the lowest tariff offered in the ascending order as quoted by the bidders in the closed bid or e-reverse auction. In such cases, the pre-fixed levelised tariff will be the ceiling tariff for bidders.

vii. In case of bidding, all eligible applicants will have to submit tariff bids within a prescribed time. Selection of bidders will be based on the **lowest tariff** offered in the ascending order as quoted by the bidders in the **closed bid**. LoA will be awarded to all successful bidders.

4.5. Clearances required from the State Government and other local bodies

The RPG is required to obtain necessary clearances as required for setting up the REPP in coordination with DISCOMs. District Collectors should facilitate the clearances required for issues related to land permissions, right of way, etc.

4.6. Power Purchase Agreement (PPA)

i. A model PPA (Power Purchase Agreement) to be executed between RPG and DISCOMs is as per Annexure II.

ii. The duration of PPA will be 25 years from Commercial Operation Date (COD) of the project.

iii. The PPA will have to be executed by RPG within two months from the date of issue of LoA by DISCOM or any agency authorized by the DISCOM.

iv. The DISCOM will be obliged to buy the entire power from RPG within the contract capacity.

v. The RPG will be free to operate the plant after expiry of the 25 years of PPA period if other conditions (like land lease, etc.) permits.
vi. However, any extension of the PPA period beyond 25 years shall be through mutual agreement between the RPG and DISCOM.
vii. As a payment security measure, DISCOM will have to maintain Escrow Arrangement as defined in the PPA.

4.7. Bank Guarantees (BG)

i. In case of bidding, the RPG shall provide Earnest Money Deposit (EMD) of Rs. 1 Lakh/MW in the form of Bank Guarantee along with EoI.
ii. The EMD of Rs. 1 Lakhs per MW will be converted into Performance Bank Guarantee (PBG) for the successful bidders, who have signed the PPA within stipulated time period.
iii. In case the selected RPG fails to execute the PPA within the stipulated time period, the Bank Guarantee equivalent to EMD shall be encashed by DISCOM as penalty.
iv. In case any bidder is not selected, DISCOM shall release the EMD within 15 days of the date of issue of LoA to selected RPG(s).
v. The PBGs shall be valid for a period of 15 months from the date of issue of LoA for the REPP.
vi. The PBG will be returned to the RPG immediately after successful commissioning of REPP, after considering any penalties due to delay in commissioning as per provisions stipulated in the Guidelines.

4.8. Connectivity

i. The selected RPG will be responsible for laying of dedicated 11 or 33 kV, 66/11 kV or 110/11 kV, line from REPP to sub-station, construction of bay and related switchgear at sub-station where the plant is connected to the grid and metering is done.
ii. RPG can get the transmission line constructed through DISCOM by paying the applicable cost and other charges. RPG will generally be responsible for maintaining this dedicated transmission line.
iii. In case more than one bidder are awarded projects to be connected to same Sub-station, they shall be permitted to co-ordinate with each other for setting up common transmission line for feeding to Sub-Station if they so desire and with the approval of DISCOM. The RPG shall comply with grid connectivity and other regulations as applicable.

4.9. Release of Performance Based Incentive (PBI) to DISCOM

i. DISCOM will be eligible to get Performance Based Incentive (PBI) @ Rs. 0.40 per unit purchased or Rs. 6.6 lakh per MW of capacity installed, whichever is less, for a period of five years from the COD.
ii. To avail the PBI, DISCOM shall submit following documents after completion of one year from the COD and every year thereafter till five years:

(a) Timely payment of monthly lease rent, if applicable, to the land owner of the project.

(b) Monthly units purchased from the plant and corresponding payment made to the project developer.

iii. Applicable PBI would be released to the DISCOM after submission of these documents by DISCOM to MNRE.
iv. The DISCOMs can, if they desire so, pass on the PBI given to DISCOMs by the Central Government under this component, to the REPP owner to get more competitive tariff of RE Power.

4.10. Timeline and Penalty

i. The selected RPG shall commission the solar power plant within 15 months from date of issuance of LoA.
ii. The DISCOM is obliged to purchase power from the commissioned REPP even in case of early commissioning.
iii. A duly constituted Committee of DISCOM officials will physically inspect the Plant in not more than 03 days from the date of receiving a call from the RPG and certify successful commissioning of the plant.
iv. In case any RPG fails to achieve this milestone, DISCOM shall encash the Performance Bank Guarantee (PBG) in the following manner:
    (a) Delay up to six months – The PBG on per day basis and proportionate to the balance capacity not commissioned.
    (b) In case the commissioning of the solar power plant is delayed over six months, the PPA capacity shall stand reduced / amended to the Project capacity commissioned at the end of six month from scheduled Commissioning Date.
v. In case of delays of plant commissioning due to the reasons beyond the control of the RPG, DISCOM after having satisfied with documentary evidences produced by the RPG for the purpose, can extend the time for commissioning date without any financial implications to the RPG.

4.11. Quality Control, Monitoring and Maintenance

i. In order to ensure only quality systems are installed, prevailing MNRE/BIS specifications and quality control orders applicable for solar modules, inverters, Balance of System (BOS) and other equipment shall be followed. These shall be monitored by State Implementing Agency (SIA) periodically.
ii. The SIA would be responsible for ensuring Quality Control, proper maintenance and monitoring of REPPs.
iii. SIA may assign technical consultants to assist farmers with the preparation of DPR and financial models who could also provide capacity building and guidance on the best practices of system installation and O&M.

4.12. Roles and responsibilities of stakeholders

4.12.1. Ministry of New and Renewable Energy

i. MNRE will provide Procurement Based Incentive (PBI) to the DISCOMs @ 40 paise/kWh or Rs.6.60 lakhs/MW/year, whichever is lower, for buying solar/ other renewable power under this scheme.
ii. The PBI will be given to the DISCOMs for a period of five years from the Commercial Operation Date of the plant. Therefore, the maximum PBI that shall be payable to DISCOMs will be Rs. 33 Lakh per MW for the entire period.

4.12.2. DISCOMs

i. The DISCOMs/SIAs shall aggregate the demand and send their proposal for sanction under the scheme along with details on their readiness to implement the Component A of the scheme, to MNRE.
ii. Implementing Agencies will ensure transparency & objectivity in allocating capacity
iii. The DISCOMs will ensure "must-run" status to the solar/ other renewable power plants installed under this scheme and will keep the feeders 'ON' during sunshine hours of a day.
iv. DISCOM shall act as facilitator to the beneficiaries in implementation of this scheme.
v. In case RPG has taken land from a farmer/group of farmers on lease for the project, the amount of monthly lease rent would be paid by the DISCOMs to the lessor directly in his/her bank account before 5th day of the month following the month for which the lease rent is due. In such a case, the lease rent paid by the DISCOM will be deducted from monthly payment due to the RPG.

4.12.3. State Implementing Agency (SIA)

i. SIA will coordinate with State/UT, DISCOM and farmers for implementation of the scheme.
ii. SIA will assist the farmers in project development activities including formulation of DPR, PPA/EPC contracts, getting funds from financial institutions, etc.
iii. SIAs will provide the handholding support required by farmers/developers, like availing financing from banks, etc. It will also coordinate with District Authorities for ease of implementation.
iv. A State level Committee under the chairmanship of Principal Secretary (Renewable Energy/Energy) will be setup by the participating SIA of that State. The committee will be responsible for settlement of any issues arising during selection of solar/ other renewable energy-based power plants and their implementation.
v. SIA will be responsible for coordinating/organizing the quarterly meetings of the State Level Committee.
vi. SIAs shall ensure publicity of the scheme and create awareness through advertisements etc, and monitor the implementation of the scheme.
vii. The SIA will be eligible to get service charge of Rs. 0.25 Lakh per MW after commissioning of the projects.

4.12.4. Renewable Power Generator (RPG)

i. RPG will be responsible for signing PPA and installing the plant as per provisions of scheme guidelines
ii. RPG must adhere to applicable rules and regulations and make necessary compliances towards proper commissioning and operation of the plant during the PPA period.

5. Component B

5.1. Salient Features

i. This Component is for installation of standalone Solar Pumps/replacement of diesel pumps by solar pumps.
ii. Under this Component, individual farmers will be supported to install standalone Solar Agriculture pumps or replacement of existing diesel Agriculture pumps / irrigation systems in off-grid areas, where grid supply is not available.
iii. Priority would be given to small and marginal farmers and farmers using micro irrigation.
iv. Pumps of capacity higher than 7.5 HP may be allowed, but the CFA will be limited to the CFA applicable for pump of 7.5 HP.
v. For the individual farmers in the North-Eastern region (NER); Hilly region (Jammu & Kashmir, Ladakh, Uttarakhand and Himachal Pradesh) and Islands (Andaman & Nicobar, Lakshadweep), the CFA will be available for pump capacity up to 15 HP, however the CFA for pumps up to 15 HP will be restricted to 10% of total installations
vi. Maximum Solar PV capacity in kW is allowed as per the pump capacity in HP, in accordance with the MNRE specifications. For example, 3 HP pump capacity cannot have solar capacity of more than 3 kW.
vii. DISCOMs/ Agricultural Department/ Minor Irrigation Department/ any other Department designated by State Government will be the implementing agencies for this component.
viii. Agricultural Department may be prioritized as State Implementing Agency (SIA) by the State Governments given their extensive network of Agri and allied services along with embedded human resource availability.
ix. Implementing agency will get service charges as applicable under Scheme Guidelines

5.2. Pre-Commissioning Activities

5.2.1. Demand Aggregation and Allocation of Solar Pumps

i. The SIA will submit proposals to MNRE for approval.
ii. The SIA after submitting proposal to MNRE may choose to start the preparatory activities including tendering process. However, the Letter of Award/Purchase Order shall be issued after the issuance of sanction letter by MNRE.
iii. Based on the demand received from SIAs, MNRE will allocate quantity of pumps to the implementation agencies in the States after approval by a Screening Committee under the chairmanship of Secretary, MNRE.
iv. MNRE will have the discretion to modify/cancel the allocated capacity based on the pace of progress in any particular state, or as per requirements of the scheme

5.2.2. Implementation

Component B can be implemented in two modes – with State share and without State share. The Central Government will provide financial assistance of 30% (or 50% for North Eastern Region/Hilly region/Islands) of the Benchmark Cost or the Tender Cost, whichever is lower, of the stand-alone solar Agriculture pump. The State Government will provide a subsidy of atleast 30%; and the remaining up to 40% is to be provided by bank loan/farmer.

In case the State Government is not in a position to give its share of subsidy of 30% but farmers are willing to set up solar water pumping system with the Central Financial Assistance only, the farmers are permitted to do so. Central share will continue to remain 30% (or 50% for NER/Hilly region/Islands), with the remaining 70% in General category states and 50% in Hilly region/NER/Islands being borne by the farmer. The Ministry will develop a National Portal to enable beneficiaries to apply for solar pump with central subsidy only.

5.2.3. Bidding Procedure

The States will call for tender for installation of solar water pumping system through the SIAs or any other agency nominated by the State Government. These agencies will carry out tendering process as per the guidelines, standards, & specifications laid down by MNRE. Any deviation shall normally be not permissible except in specific cases with the approval of Screening Committee in MNRE. The MNRE will list out the pumps/motors/panels and other equipments of high quality and specify that only those pumps/motor/panels which are in the approved list, can be used. The following categories, subject to meeting the technical and financial requirement of the tender, are allowed to participate in the tendering:

(a) System Integrators/ Aggregators/ Any other entities fulfilling technical and financial criteria.

(b) Any manufacturer of solar PV modules or manufacturer of solar pumps or manufacturer of solar pump controllers.

(c) Joint venture of any of manufacturers mentioned at (b) above with system integrators/aggregators.

If the vendor fails to install the allocated pumps within the stipulated period, the said vendor shall be debarred for five years' period from the date of such decision of debarment. Extension may be granted for valid reasons. In all cases, the successful bidder shall provide AMC for five years from the date of installation, real time monitoring, helpline, district level service centers and comply with standards of performance in dealing with complaints/redressal mechanism. It will be mandatory to use indigenously manufactured solar modules with indigenous 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 manufacturing of solar water pumping system.

5.2.4. Provision of USPC

Since pumps are generally used for 150 days in a year, the installed solar capacity can be optimally utilized by using Universal Solar Pump Controller (USPC), through which farmers can use solar power for other activities like operating chaff cutter, floor mill, cold storage, drier, etc., and increase his income. Option would be given to the farmer to opt for USPC and separate bid price for solar water pumping system with USPC will be invited and subsidy will be made available for these pumps according to benchmark price of solar pumps without USPC, even if the price discovered for solar pumps without USPC are less

than benchmark price. States/UTs may bear this additional cost to facilitate use of solar energy for other activities and increasing the income of farmers.

5.2.5. Water Saving Techniques

New Solar Agriculture pumps would not be covered under this component in Dark zones/black zones. However, existing standalone diesel pumps, can be converted into standalone solar pumps in these areas provided they use micro irrigation techniques to save water. 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 size of pump would be selected on the basis of 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 (WUA)/Farmer Producer Organizations (FPO)/Primary Agriculture Credit Societies (PACS) or for cluster-based irrigation system, the CFA will be allowed for solar pump capacity of higher than 7.5 HP considering up to 7.5 HP capacity for each individual in the group (for example when a group of 5 farmers in above mentioned category installs a pump of 40 HP capacity than the CFA up to 37.5 HP will be given to the group).

5.3. Post Commissioning Activities

5.3.1. Central Financial Assistance

MNRE will release the CFA towards the installation of solar pumps under the scheme as per the Benchmark cost or tender cost, whichever is lower. MNRE will be issuing the benchmark cost for various capacities and models being implemented under the scheme, from time to time.

5.3.1.1. Eligible CFA with State share

i. CFA of 30% of the benchmark cost or tender cost, whichever is lower, of a particular category/type of the stand-alone solar Agriculture pump will be provided. The State Government will give a subsidy of at-least 30%; and the remaining 40% will be provided by the farmer.
ii. However, in North Eastern States, Sikkim, Jammu & Kashmir, Himachal Pradesh and Uttarakhand, Lakshadweep and A&N Islands, CFA of 50% of the benchmark or tender cost whichever is lower, of a particular category/type of the stand-alone solar Agriculture pump will be provided. The State Government will give a subsidy of at-least 30%; and the remaining at most 20% will be provided by the farmer.

5.3.1.2. Eligible CFA without State share

i. CFA of 30% of the benchmark cost or tender cost whichever is lower, of a particular category/type of the stand-alone solar Agriculture pump will be provided. The remaining 70% will be provided by the farmer either directly or through loan.
ii. In North Eastern States, Sikkim, Jammu & Kashmir, Himachal Pradesh and Uttarakhand, Lakshadweep and A&N Islands, CFA of 50% of the benchmark cost or tender cost

whichever is lower, of a particular category/type of the stand-alone solar Agriculture pump will be provided. The remaining 50% will be provided by the farmer.

iii. MNRE will also develop an online portal where farmer can directly register themselves and avail transfer of subsidy in their account after successful completion of installation. Subsidy in this case will be restricted to 30% of Benchmark Cost or Tender Cost, relevant to the State, whichever is lower.

5.3.2. Access to Financing

i. Bank finance may be made available for farmer's contribution, so that farmer has to initially pay only 10% of the cost and the remaining amount (other than subsidy) can come from loan.

ii. SIAs will make special efforts to organize events like *Bank Mela* at block and district levels and sensitize the banks to the need of farmers for accessibility of finance under the scheme.

5.3.3. Installation timeline and Penalties

Projects for installation of Solar Agriculture pumps systems shall be completed within 24 months from the date of sanction by MNRE. Extension in project completion timelines, up to a maximum period of three months, will be considered at the level of Group Head in MNRE and up to 6 months or beyond at the level of Screening Committee in MNRE on submission of valid reasons by the implementing agency.

5.3.4. Release of funds by MNRE

i. Funds up to **30%** of the applicable CFA for the sanctioned quantity would be released **as advance** to the implementing agency after placement of letter of award(s) to the selected vendors.

ii. **Second instalment up to 60%** of the applicable CFA would be released on submission of the provisional UCs of the first release and the details of partial installation of pumps.

iii. The **last installment** of balance eligible CFA **up to 10%** along with applicable service charges would be released on acceptance of the Project Completion Report in the prescribed format, Utilization Certificates as per GFR and other related documents by the Ministry.

iv. The implementing agencies may pass on these funds to the selected vendors in different stages on achievement of various milestones as per terms and conditions of letter of award(s).

v. 2% of the eligible CFA will be provided as service charges in totality to all the agencies involved in implementation including the designated SIA. Part of service charges (to be decided by MNRE) shall be given to the central agency for centralised tendering.

vi. MNRE may release 50% of eligible service charges for the sanctioned quantity to State Implementation Agencies after placement of LoA for preparatory activities. Additionally, MNRE will retain 33% of eligible service charges for nation-wide Information, Education and Communication (IEC) activities.

vii. The CFA in case of online portal, as per Para 5.2.2 (iv), will be released after installation of pump.

5.4. Monitoring and maintenance

i. Selected vendors shall be responsible for design, supply, installation and commissioning of solar agriculture pumps. Vendors will mandatorily provide AMC 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.

ii. AMC 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. To ensure timely maintenance of the systems the vendor shall have one authorized service centre in each operational district or cluster of districts as decided by the SNA depending upon number of installed pumps and a helpline in local language should be made available. The helpline number shall be indicated on the pump/ controller at suitable location easily visible to the user.

iii. All solar agriculture pumps sanctioned under the Programme shall be provided with remote monitoring system by the vendor. It will be mandatory to submit performance data of solar power plant online to MNRE in the manner and format prescribed by MNRE.

iv. Monitoring of the Scheme and its implementation will be carried out during the period of implementation of the Scheme as given below:

   a) The implementing agency would be responsible for monitoring include timely installation and functioning of the pumps. The progress report of its installation will be submitted to the MNRE by the SIAs every month.
   b) Funds may be released by implementing agency to the vendor on submission of bank guarantee as specified in the tender by that vendor for a period of five years. Alternatively, BG may be provided initially for a period of one year which may be extended on year to year basis thereafter.
   c) The Ministry officials/ designated agency may inspect the ongoing installation or installed plants.

v. In case the installed systems are not as per standard, non-functional on account of poor quality of installation, or non-compliance of AMC, the Ministry/State Government reserves the right to debar the bidder/vendor and any of its successors up to a period of five years from the date of such decision of debarment.

5.5. Responsibilities of Implementation Agency

The Implementing Agencies will be responsible for the following activities:

(i) Carry out wide publicity of the scheme to increase awareness, identify potential beneficiaries, and coordinate with banks for easy access of finances.
(ii) Ascertain the demand for solar pumps in the state, prepare beneficiary list and submit to MNRE for allocation of demand.
(iii) Carry-out the state bids/tenders for installation and maintenance of solar pumps sanctioned by MNRE under Component-‘B’.
(iv) Ensure project completion within the given timelines and compliance of MNRE guidelines, and standards.

(v) Oversee installation of solar pumps, ensure timely O&M, and report periodical progress to MNRE (this will include but is not limited to online submission of monthly and quarterly progress reports).
(vi) Inspection of installed systems and online submission of completion reports to MNRE.
(vii) Submission of utilization certifications and audited statement of expenditure through EAT/PFMS module and disbursement of MNRE CFA.
(viii) Maintenance of updated records and make them available for inspection at the call of MNRE.
(ix) Maintain real time monitoring data of the installed systems through dedicated web-portal.
(x) Ensure the effective working of the Remote Monitoring System of the installed pumps, and conduct periodical inspection of the same.
(xi) Submission of accurate, verified, and complete records in all aspects to MNRE for ensuring the timely payment of CFA.
(xii) Performance monitoring of installed system through third party.
(xiii) Ensure compliance of AMC by the vendors.

6. Component C

6.1. Salient Features

i. This Component aims at solarization of grid connected agriculture pumps including Feeder Level Solarization
ii. The objective of this component is to provide reliable day-time solar power to farmers, enhancing their income by purchasing surplus solar power and thus incentivizing them for saving water
iii. Under Individual Pump Solarization (IPS), solar PV capacity up to two times of pump capacity in kW is allowed, so that the farmer will be able to use the generated solar power to meet the irrigation needs and get additional income by selling surplus solar power to DISCOMs.
iv. Under Feeder Level Solarization (FLS), States are supported for solarization of agricutlural feeder or mixed feeders.
v. DISCOMs /GENCO/ any other Department designated by State Government will be the implementing agencies
vi. State Implementing agencies will submit proposals to MNRE for approval.
vii. In case of dark zones/black zones only existing grid connected pumps will be solarized.
viii. Implementing agency will get service charges as applicable under Scheme Guidelines.

6.2. Demand Aggregation and allocation of quantities

i. State Implementing agencies will submit proposals to MNRE for approval.
ii. Based on demand received from SIAs, MNRE will allocate quantity of pumps to the implementation agencies in the States after approval by a Screening Committee under the chairmanship of Secretary, MNRE.
iii. The SIA after submitting proposal to MNRE may choose to start the preparatory activities including tendering process. However, the Letter of Award/Purchase Order shall be issue after the issuance of sanction letter by MNRE.
iv. MNRE will have the discretion to modify/cancel the allocated capacity based on the pace of progress in any particular state, or as per requirements of the scheme

6.3. Individual Pump Solarization (IPS)

6.3.1. Options for solarisation under Component C (IPS)

Followings are the two options through which grid connected pumps can be solarized; State may choose any other option, as well.

i. **Pump to run on both Solar and Grid:** In this case the agriculture pump will continue to run at rated capacity taking power from solar panels and balance power from grid, if required, and in case solar power generation is higher than required by pump, the additional solar power would be fed to the grid. Net metering may be provided in this case.
    a) Farmer would be able to import and export power to the grid at the rate specified by the SERC.

b) DISCOM may introduce different drawal and injection tariff rates so that farmers are discouraged to draw power from the grid during the peak hours. Further, Time of Day (ToD) tariff is also an alternative to efficiently manage demand and supply on the solarised feeders.

ii. **Pump to run on solar power only**: In this case the pump will only run on the solar power as in case of stand-alone solar pump and no power will be drawn from the grid for operation of pump.

a) The motor pump set will have to be replaced with AC/DC solar water pumping system as per MNRE specification for standalone solar pump and when the pump is not running the solar power can be fed into the grid through suitable grid-tied inverter.

b) The total solar PV capacity including capacity additionally allowed under the Scheme can be bifurcated into two portions, one portion of SPV capacity as per MNRE specifications required for the solar pumps of given HP, which will either run the pump or feed power to the grid when the pump is not running; and other portion of SPV capacity out of the total allowed by the State will continuously feed power to the grid during sunshine hours.

6.3.2. Selection of Feeders and load survey

i. Feeder-wise implementation is to be carried out under this component for solarisation of grid-connected agricultural pumps.

ii. Feeders may be selected on the basis of load, technical and commercial losses, number of consumers, etc. Efforts should be made to solarise all agriculture pumps in a feeder, however, SIAs may impose a minimum solarisation requirement for a feeder in terms of minimum % of pumps solarized on that feeder.

iii. GPS Survey should be carried out on eligible feeders to correct feeder coding and ensure accurate feeder loads and distribution loss calculations.

iv. Farmers may be given option to declare his actual connected load or alternatively the SIAs may carry out survey to get details on actually connected load so that solar PV panels of required capacity is provided to the participating farmers.

v. SIAs may also assess the actual requirement of pump capacity based on water requirement and water table

6.3.3. System Specifications

i. MNRE will provide updated specifications (as amended from time to time) for solar water pumping system, solar modules, MMS and other balance of system.

ii. The vendors shall provide only such pumps/panels and other equipments which are BIS certified. MNRE may also draw a list of high quality solar pumps/panels and in such a case, vendors will supply only such models which are in the approved list.

iii. It will be mandatory to use indigenously manufactured solar panels with indigenous solar cellls and modules. Further, inverter/controllers and balance of system should also be manufactured indigenously. The vendor has to declare the list of imported components used manufacturing of equipment used in the solarisation system.

6.3.4. Bidding Procedure

i. There will be State tendering for solar water pumping system through the SIAs or any other agency nominated by the State Government. These agencies will carry out tendering process as per the guidelines, standards, & specifications issued by MNRE from time to time. Any deviation shall normally be not permissible except in specific cases with the approval of Screening Committee, MNRE.

ii. The vendors shall use only BIS certified equipment and systems. MNRE may also draw a list of certified models and manufacturers and in that case the equipment will be from that list.

iii. The following categories subject to meeting the technical and financial requirement of the tender are allowed to participate in the tendering:

(a) System Integrators/ Aggregators/ Any other entities fulfilling technical and financial criteria

(b) Any manufacturer of solar PV modules or manufacturer of solar pumps or manufacturer of solar pump controllers using indigenous technology.

(c) Joint venture of any of manufacturers mentioned at (b) above with system integrators/aggregators.

iv. Selected vendors shall be responsible for design, supply, installation and commissioning of solar agriculture pumps.

v. If the vendor upon empanelment fails to install the allocated pumps within the stipulated period, the said vendor shall be debarred for five years' period from the date of such decision of debarment.

vi. 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.

vii. Thorough maintenance of selected agriculture feeders is required to maintain feeder availability during sunshine hours. This includes maintenance of 33/11 kV sub-station, 33 kV, 11 kV and LT lines and distribution transformers, etc., on regular basis in a time bound manner. Proper protection system including improved earthing of equipment shall be provided considering possibility of high voltage/current due to multiple generating sources in the feeder selected for solarisation.

6.3.5. Eligible CFA under Component C (IPS)

i. The CFA will be limited to Solar PV capacity up to two times of pump capacity in kW for pumps up to 7.5 HP. Solarisation of Pumps of capacity higher than 7.5 HP is also allowed, however, the CFA in such cases would be limited to the CFA applicable for pump of 7.5 HP in the respective State/UTs.

ii. The solar pumps installed by the individual farmers in the North-Eastern States; UTs of Jammu & Kashmir and Ladakh; and the state of Uttarakhand and Himachal Pradesh the CFA will be available for pump capacity up to 15 HP, however the CFA for pumps up to 15 HP will be restricted to 10% of total installations

iii. CFA up to 30% (upto 50% of NER/Hilly/Islands) of the cost of solarisation will be provided for solar PV component including solar modules, module mounting structure, controller/inverter, balance of system, installation & commissioning, five Year CMC, insurance, etc., on basis of benchmark cost or cost discovered through tender whichever is less. The States are free to provide additional CFA to reduce the beneficiary farmer contribution.

iv. There is no CFA for replacement of existing less efficient grid connected agricultural pump with energy efficient agricultural pump, however, the states are free to provide additional financial support for replacement of existing pumps with energy efficient pumps.

v. It is also permitted to implement Component C(IPS) without state subsidy. If any State Government does not provide for subsidy by the State, the farmer may choose and implement the solarization with only Central Government subsidy and his contribution and loan from the banks. The banks may provide loans of up to 70% of the cost. From such sale of excess power from the Solar PV project, the additional income should be paid to the bank towards repayment of loan in addition to the regular installment by the farmer.

vi. All the modalities and conditions for the release of CFA under Component C (IPS) will remain same as Component B, as provided in Para 5.5.

6.3.6. Monitoring and maintenance

i. Vendors will mandatorily provide AMC 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.

ii. AMC 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. To ensure timely maintenance of the systems the vendor shall have one authorized service centre in each operational district or cluster of districts as decided by the SNA depending upon number of installed pumps and a helpline in local language should be made available. The helpline number shall be indicated on the pump/ controller at suitable location easily visible to the user.

iii. All solar Agriculture pumps sanctioned under the Programme shall be provided with remote monitoring system by the vendor. It will be mandatory to submit performance data of solar power plant online to MNRE in the manner and format prescribed by MNRE. The remote monitoring system may consist of smart meters, communication hardware/ IoT devices, software interface, web and mobile application and internet connection.

iv. Monitoring of the Scheme and its implementation will be carried out during the period of implementation of the Scheme as is given below:

a) The implementing agency would be responsible for monitoring the installation of the solar pumps and their functioning.
b) Implementing agencies will submit monthly progress report for the sanctioned projects.
c) Funds may be released by implementing agency to the vendor on submission of bank guarantee as specified in the tender by that vendor for a period of five years. Alternatively, BG may be provided initially for a period of one year which may be extended on year to year basis thereafter.
d) The Ministry officials or designated agency may inspect the ongoing installation or installed plants.

v. In case the installed systems are not as per standard, non-functional on account of poor quality of installation, or non-compliance of AMC, the Ministry and the State Government reserves the right to debar the bidder/vendor and any of its successors up to a period of five years from the date of such decision of debarment.

vi. Possibilities would be explored by States for convergence of present scheme with schemes on promotion of micro irrigation system and replacement of agriculture pumps with energy efficient pumps and they may work out the modalities.

6.4. Implementation of Feeder Level Solarization

For the implementation of Feeder Level Solarization (FLS), the DISCOMs need to evaluate the agricultural load, segregate the feeder and solarize it. The States may also choose to offer virtual segregation using feeder level (Internet of Things) IoT. However, segregation would not be precondition for the solarization of mixed feeders. This component will be applicable to farmers already connected to grid. The feeder will be solarised, however, States may impose a minimum requirement of pumps on a feeder. The detailed framework for feeder level solarization will be as follows:

6.4.1. Execution Methodology

i. The SNA /DISCOM/ SIA, will be the implementing agency for feeder level solarisation in their respective areas.
ii. State Government may choose to appoint any other expert agency to help these implementing agencies for tendering and other related activities of installation of solar power plant for feeder level solarisation.
iii. Where agriculture feeders have already been separated, those feeders may be solarised under the scheme.
iv. Where the agriculture feeders are not separated, feeders having major load for agriculture may also be considered for solarisation under the Scheme. The requirement of total annual power for an agriculture feeder will be assessed and a solar power plant of capacity that can cater to the requirement of annual power for that feeder can be installed through CAPEX/RESCO mode, which will supply solar power to that feeder.
v. Feeder level solar power plant may be installed to cater to the requirement of power for a single feeder or for multiple agriculture feeders emanating from a distribution sub-station (DSS) to feed power at 11 kV or at the higher voltage level side of the DSS. There

is no cap of the capacity of solar power plant for feeder level solarisation. The DISCOMs may identify land near DSS, get ownership of land or its lease rights, provide connectivity at DSS and lay sub-transmission line between DSS and solar power plant.

vi. There could be situations where for distribution substation, the solar power plant can be installed either under Component A or under FLS of Component C. In such situations, DISCOMS while bidding for installation of solar power plants under FLS of Component C, the qualification requirement may be kept at par with the guidelines of Component A. This will allow all the eligible participants under Component A to also participate under Component C (FLS).

6.4.2. Simplified step by step procedure

i. Identifying the substation: State Nodal Agencies/Implementing Agencies/DISCOM will identify substations having downstream agriculture load along with the number of pumps connected to that substation. The annual power requirement for the agriculture feeders and the capacity of solar power plant that can cater to the power requirement for that agriculture feeder may be assessed. Preference may be given to the substations with 11/33 kV bus bars. The identification will include an assessment of the agriculture load served downstream.

ii. Land for setting up the solar plant: If there is no Government land near the substation to set up solar plant, theland may be taken on lease from the farmers. Land lease rates would be announced by the state government. Currently, some State offer lease rates which range from Rs 25,000 to Rs 50,000 per acre per year or 6% of ready reckoner rate, whichever is higher, with a yearly 3% increment of the base rate, and Rs 1/hectare/year for public land for a period of 30 years. The States may decide similar competitive provisions. The State Government will publicise these rates along with the list of substations and request farmers to offer their land on lease in the vicinity of the substations at the offered lease rent.

iii. Development of Online portal: A dedicated online portal can be developed by the States/SIA/DISCOM which will serve as centralized portal for land aggregation. The state should have the details of identified substations. The portal may be developed by State/SIA/DISCOM. The States/SIA/DISCOMs will advertise their intention to take land on lease from the farmers in the vicinity of the indetified substation along with a declaration of land lease rates. The farmers who wish to offer their land near the substation on lease may apply directly on the portal. They may also apply to the Tehsildar/District Magistrates. It would be the responsibility of the District Collector/District Magistrates to ensure that the offline applications received at their end from the framers to lease their land for the installation of solar power plants, are shared with DISCOM/SIAs. The DISCOM/SIA would update the same on online portal on regular basis.

iv. Modalities for leasing

a) Public Land: The State may facilitate by providing unutilized land on lease at a pre-decided annual rent. The State may also include their unutilized water bodies for the development of the projects.
b) Private Land: All the private land owners who are interested in providing their land for projects may be encouraged to offer their land through the above-mentioned portal. The revenue authority should also verify the authenticity of the land through the respective District Collectors/Magistrates. In order to protect the interest of land owner, the State may decide the amount of lease rent for the land along with annual escalation provisions.

Considering the land required for 1 MW is around 4-5 acres, contiguous land of a minimum of 5 acres and nearer to the substation would be given the preference.

v. Provision of SPV: The DISCOMs may form an SPV which can implement the project along with arrangements for leasing the land etc.

vi. Lessee and Lessor Agreement: The Nodal Agency/DISCOM/SPV may also become the single entity to sign land lease agreements with all landowners. In such cases, the individual land owner need not interact with SPD and face uncertainty in timely lease payment. The nodal agency should sign an agreement with individual land owner and a tripartite agreement between DISCOM, Nodal Agency and Solar Power Developers may be worked out where payments are transferred to nodal agency for the purpose of lease rent. Nodal agency will inform the District Collector/District Magistrate from time to time, about the requirement of land and get in touch with the farmers to lease their land for the purpose.

vii. Selection of Solar Power Developers (SPD): Since the scale of an individual solar project with substation is relatively small, therefore in order to get the benefit of economy of scale, multiple substations may be grouped as one bidding group. The SPD may be permitted to quote the tariff common for all projects under one group and SPD may sign a single PPA with DISCOM.

viii. For the project under this mechanism, the States are free to choose Renewable Energy Implementing Agencies of Government of India to act as an intermediatory procurer.

6.4.3. Estimation of Plant Capacity and eligible CFA under FLS

i. For the purpose of calculating Solar Plant Capacity and eligible CFA, the following appoach would be taken:
   1) The existing load of the feeder will be assessed and a solar power plant of capacity that can cater to the requirement of annual power for that agriculture feeder can be installed either through CAPEX mode or RESCO mode, which will supply solar

power to that feeder. For example, a feeder having annual power requirement of say 10 lakh units, the power can be supplied by solar power plant of capacity around 600 kW with an annual CUF of 19%.

2) Average of consumption of last three years shall be considered for calculating the solar plant capacity as per calculations in Para 1) above
3) Mixed feeders can also be solarized, however, MNRE CFA will be available based on capacity required for agriculture consumption.
4) Solarisation of pumps of any capacity is allowed, however, in case of pumps of capacity above 7.5 HP, the CFA will be limited to solar capacity for 7.5 HP pumps.
5) The solar pumps installed for feeder solarization in the North-Eastern States; UTs of Jammu & Kashmir and Ladakh; and the state of Uttarakhand and Himachal Pradesh the CFA will be available for pump capacity up to 15 HP, however the CFA for pumps up to 15 HP will be restricted to 10% of total installations
6) For calculating consumption for pumps of capacity higher than 7.5 HP or 15 HP, as the case may be, average consumption of 7.5 HP/15 HP pumps on the same feeder may be considered. This average consumption may be used in estimating consumption for all pumps of capacity higher than 7.5 HP/15 HP.
7) The state may choose to install feeder level solar power plant of capacity higher than capacity required for supplying power to agriculture feeder. However, in this case CFA will be limited for solar capacity required for supplying power to the agriculture feeder.
8) Since the projects are to be commissioned near the point of consumption, distribution losses would be reduced, therefore, losses shall not be considered in plant capacity estimation.
9) CUF shall be taken as per the solar insolation on site, however, annual CUF of minimum 19% shall be considered for calculation of plant capacity eligible for CFA. No restrictions to be made on installing DC capacity higher than total contracted AC capacity of the plant to help achieve higher CUF.
10) In case of unmetered connections, following methods may be followed for calculation of consumption:
    a. Indexation approved by the State Electricity Regulatory Commission may be followed.
    b. If both metered and unmetered connections are there on the same feeder, capacity-wise average of consumption of the metered connections may be extended to the unmetered connections. This shall be cross-checked with the feeder level meter.
    c. Consumption on feeder level meters may be used for estimation of plant capacity. However, if pumps of capacity higher than 7.5 HP/15 HP are there on such feeder, capacity may be calculated based on consumption reduced in proportion of the load if capacity is capped at 7.5 HP/15 HP and actual load on the feeder.

ii. The cost of installation of solar power plant for the purpose of CFA, will be notified by MNRE from time to time. The eligible CFA would be 30% of the cost of installation of the solar power plant of capacity needed to meet the average consumption of the pumps connected on the feeder(s), as per calculations in Para (i) above.

6.4.4. Implementation under CAPEX mode and eligible CFA

i. FLS can be implemented in CAPEX mode. The process of tendering and signing of work agreement with EPC contractor should normally be completed by SIA within six months from the date of issuance of sanction by MNRE.
ii. For installation of feeder level solar power plant CFA of 30% (50% in case of NE States, hilly states/UTs and Island UTs) will be provided by central Government and balance will be met through loan from NABARD/PFC/REC.
iii. Concessional financing will be available for solarisation of agriculture pumps as RBI has already included this component under priority sector lending and MoAFW has included community level solarisation under Agriculture Infrastructure Fund.
iv. The current outlay on subsidy being presently provided for supply of electricity to agriculture pumps by State Government can be used to repay the loan in five to six years after which power will be available free of cost and outflow from State Government's exchequer on account of electricity subsidy for agriculture will come to an end.
v. On an average power for agriculture will be required only for 150 days in a year, the electricity produced from the solar power plant in the remaining days will possibly provide an additional income to the DISCOM. If this is also used to pay off the loans taken from NABARD/PFC/REC, the loan can be repaid sooner.
vi. The DISCOM may carry-out operation and maintenance of the solar power plant. Alternatively, the EPC contractor who install the solar power plant may also be given task for O&M of plant and supply guaranteed solar power for 25 years.
vii. Payment for O&M of solar plant can be linked with energy production. An undertaking to this effect will be submitted by DISCOM to MNRE.

6.4.5. Implementation under RESCO mode and eligible CFA

i. For selection of RESCO developer and PPA, the Guidelines and Model PPA issued by MNRE for implementation of Component-A of PM-KUSUM Scheme may be used, with suitable modifications.
ii. The maximum timeline allowed for commissioning of solar power plant by RESCO Developer will be 12 months from date of issuance of LoA. However, the implementing agency may increase this time on case to case basis, up to the sanctioned timeline given by MNRE.
iii. The process of selection of RESCO Developer and signing of PPA should normally be completed by implementing agency within six months from the date of issuance of sanction by MNRE.
iv. A suitable clause on PPA shall be included to ensure that RESCO developer does not sell solar power to any other buyer except the concerned DISCOM during tenure of PPA, including penal provision calling for refund of proportionate CFA granted to the project by MNRE on violation of this condition.
v. For installation of feeder level solar power plants through RESCO model, the developers will be selected on the basis of lowest tariff offered for supply of required solar power for a period of 25 years after taking into account the subsidy being given by Govt. of India.

vi. In case of any liquidation of assets of the solar power plant prior to completion of PPA period, the first charge shall be towards recovery of proportionate CFA granted to the project by MNRE.

vii. The developer will get CFA @ 30% of the estimated cost of installation of solar power plant.

viii. The solar power supplied by RESCO developer would much cheaper than present cost of power delivered at distribution sub-station and therefore, DISCOM will save the amount equal to difference between the two.

ix. In the RESCO model the burden of electricity subsidy for agriculture will be reduced to the extent of difference mentioned above and not become zero as in case of CAPEX model, where once the loan is repaid, subsidy support from state Government is no longer required.

x. States may choose to provide upfront subsidy in lieu of electricity subsidy being given to agriculture consumers. This upfront subsidy from state could be in the form of VGF to RESCO developer, in addition to CFA, to supply power to farmers of an agriculture feeder at present subsidised rates or any other rate fixed by state Government.

6.4.6. System specifications and Quality Control

i. All components used for installation of solar power plants shall confirm to applicable BIS/MNRE specifications and follow quality control guidelines issued by MNRE. It will be mandatory to use indigenously manufactured solar panels with indigenous solar cells.

ii. Further, the balance of system should also be manufactured indigenously. The vendor must declare the list of imported components used in the solarisation system.

iii. MNRE will draw up a list of approved models and manufacturers after carrying the quality checks. When such a list is prepared only that equipment shall be allowed which is within the approved list.

iv. To ensure the quality, inspection shall be carried out of the solar modules, inverter/controller, MMS, etc., during the installation of system and final commissioning of the system. Officers involved in inspection should be domain experts, properly trained and equipped with necessary tools for inspection. The SIA may engage a third-party inspection agency for this purpose.

v. Thorough maintenance of selected agriculture feeders is required to maintain feeder availability during sunshine hours. This includes maintenance of DSS, sub-transmission/LT lines and distribution transformers, etc., on regular basis in a time bound manner.

6.4.7. Monitoring and maintenance

i. Selected vendors shall be responsible for all aspects of solarisation viz., design, supply, installation, and commissioning.

ii. Vendors will mandatorily provide AMC 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.

iii. AMC will include submission of quarterly inspection report of the installation as per prescribed format. To ensure timely maintenance of the systems the vendor shall have one authorized service center in each operational district and a helpline in local language in each operational State.

iv. State may choose to install watchdog transformer and devices to regulate power supply and monitor non-participating connections on the feeder concerned.

v. MNRE has developed a central monitoring portal which will extract data from the State portals for monitoring of the scheme and analyze data generated, which is in turn be used in scheme refinement and taking measures to attract more farmers to the scheme and induce required behavioral changes.

vi. It will be mandatory for DISCOMs to monitor solar power generation and performance of the solar power plant through online system. The online data will be integrated with central monitoring portal which will extract data from the State portals for monitoring of the scheme.

vii. SIA may specify a minimum guaranteed generation during a year from the solar system installed for a specified period and provision of compensation in case of not achieving the same.

viii. Monitoring of the Scheme and its implementation will be carried out during the period of implementation of the Scheme as given below:

a) The implementing agency would be responsible for monitoring parameters such as end-use verification and compilation of statistical information.
b) Implementing agencies will submit monthly progress report for the sanctioned projects.
c) Funds may be released by implementing agency to the vendor on submission of bank guarantee as specified in the tender by that vendor for a period of five years. Alternatively, BG may be provided initially for a period of one year which may be extended on year to year basis thereafter, up to 5 years.

ix. The Ministry officials or designated agency may inspect the ongoing installation or installed plants. In case the installed systems are not as per standard, non-functional on account of poor quality of installation, or non-compliance of AMC, the Ministry reserves the right to debar the bidder/vendor and any of its successors up to a period of five years from the date of such decision of debarment.

x. In case the system is installed by the RESCO operator does not work for 25 years, the entire plant will be seized and auctioned by the DISCOM/SIA to recover the CFA.

6.4.8. Release of funds for Component C (FLS)

i. The CFA up to 30% (upto 50% of NER/Hilly/Islands) of the cost of solarisation will be provided for the projects installed under Component C (FLS).

ii. In case of installation under CAPEX mode, the SIAs are eligible for advance upto 40% of eligible CFA after completion of tendering process and signing of work agreement with EPC contractor selected for installation of solar power plant. The balance up to 60% eligible CFA would be released at the end of commissioning of plant where plant starts supplying power to agriculture feeder(s) and on submission of PCR and other related documents, as prescribed by MNRE.

iii. Under the RESCO mode, CFA upto 100% of the total eligible CFA will be released to the RESCO developer through DISCOM on successful operation and performance of the solar plant for two months after the commissioning, with at least one month CUF as per minimum CUF agreed in PPA. The SIA need to submit PCR and other related documents, as prescribed by MNRE.

iv. 2% of the eligible CFA will be provided as service charges in totality to all the agencies involved in implementation including the designated SIA. Part of service charges (to be decided by MNRE) shall be given to the central agency for centralised tendering.

v. The MNRE will retain 33% of eligible service charges for national wide IEC activities. MNRE may release 50% of eligible service charges for the sanctioned quantities to SIAs after implementation of LOAs for preparatory activities.

6.5. Installation timeline and Penalties under Component C (IPS & FLS)

i. Projects for installation of solar agriculture pumps and feeder level solarization under Component C shall be completed within 24 months from the date of sanction by MNRE.

ii. Extension in project completion timelines on valid grounds, up to a maximum period of six months, will be considered at the level of Joint Secretary in MNRE. Extension beyond six months can be given by Secretary, MNRE for valid reasons.

6.6. Water saving and enhancing farmers' income

i. Component C will enable farmers to access daytime reliable solar power for irrigation. Therefore, farmers can be incentivized for saving water and enhancing their income.

ii. The DISCOMs shall assess the average power requirement by farmers of an area depending upon various factors. This power requirement will be treated as their benchmark consumption. The DISCOMs shall incentivize farmers for consuming power less than benchmark consumption.

iii. Such saving of power shall be treated as surplus power injected by farmers and they will be paid by DISCOMs against this saved power at pre-determined tariff. The DISCOM will inform the farmers about the benchmark consumption and amount incentive per unit which they can avail of, in case of lower consumption. This will be an important measure for conserving groundwater level.

iv. Some of the states have indicated that for a feeder being solarised not all farmers may be willing to install meters necessary for availing the said incentives under the scheme. Therefore, it will be the farmers choice to opt or not for this facility.

v. 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 systems.

6.7. Responsibilities of Implementation Agency

The Implementing Agencies will be responsible for the following activities:

i. Carry out publicity of the scheme, in consultation with MNRE to increase awareness amongst potential beneficiaries.
ii. Coordinate with Banks/FIs to provide the loan facilities for the required farmer share.
iii. Prepare proposals and submit to MNRE for sanction
iv. Conduct tendering process as per MNRE guidelines
v. Issue additional instructions/ conditions such as minimum solarisation level of feeder for IPS.
vi. Issue connectivity standards/regulations, if required, and facilitate connection to the grid for FLS.
vii. Selection of feeder for solarisation and demand aggregation for solarisation of pumps under FLS.
viii. Encourage Feeder wise committee of farmers to coordinate amongst the participating members and other agencies involved in implementation of the Scheme.
ix. Selection of beneficiaries and implementation of scheme
x. Oversee installation of systems.
xi. Inspection of installed systems and online submission of completion reports to MNRE.
xii. Disbursement of MNRE CFA and submission of utilization certificates and audited statement of expenditure through EAT/PFMS module.
xiii. Online submission of monthly and quarterly progress reports.
xiv. Ensure project completion within the given timelines and compliance of MNRE Guidelines and Standards.
xv. Online and offline maintenance for records.
xvi. Real time monitoring through dedicated web-portal
xvii. Performance monitoring of installed system through third party
xviii. Ensure compliance of AMC and training of locals by the vendors.
xix. Any other activity to ensure successful implementation of the programme.

7. Installation of Innovative Standalone Solar Pumps

The scheme permits installation of innovative stand-alone solar pumps (under Component B and C) in test mode. The guidelines for installation of innovative stand-alone solar pumps are placed at Annexure III. These guidelines are applicable for all Indian innovators/ manufacturers/ service providers, who wish to install innovative stand-alone solar pumps in the country under this scheme.

8. Interpretation of the Guidelines

In case of any ambiguity in interpretation of any of the provisions of these guidelines, the decision of the Ministry of New & Renewable Energy shall be final.

The Guidelines may be reviewed by the Ministry from time to time and necessary modifications made with approval of Minister, New & Renewable Energy.

*****

Glossary and Definitions

i. Ministry (Ministry of New & Renewable Energy)

Nodal Ministry of the Government of India for all matters relating to new and renewable energy to deploy new and renewable energy to supplement the energy requirements of the country and is reffered to as Ministy in these guidelines.

ii. Renewable Power Generator (RPG)

Solar or other Renewable Energy based Power Plants (REPP) of capacity up to 2 MW will be setup by individual farmers/ group of farmers/ cooperatives/ panchayats/ Farmer Producer Organizations (FPO)/Water User associations (WUA) hereinafter called Renewable Power Generator (RPG).

iii. Renewable Energy based Power Plant (REPP)

Renewable Energy based Power Plants to be commissioned under PM KUSUM

iv. Renewable Power Obligation

Under Section 86(1) (e) of the Electricity Act 2003 ("EA 2003") and the National Tariff Policy 2006, Renewable purchase obligation (RPO), is a mechanism by which the obligated entities are obliged to purchase certain percentage of electricity from Renewable Energy sources, as a percentage of the total consumption of electricity.

v. Commercial Operation Date

The Commercial Operation Date (COD) shall be considered as the actual date of commissioning of the solar power plant as declared by the Commissioning Committee.

vi. Expression of Interest

DISCOM may also invite applications for Expression of Interest(EOI) from prospective RPGs to identify the interested beneficiaries.

vii. Power Purchase Agreement

A electricity purchase agreement signed by the DISCOM with the qualified RPG for purchasing the electricity for a period of 25 years at the pre-determined/transparently determined Tariff.

viii. Letter of Award

Letter of Award (LoA) will be awarded to all eligible applicants for procurement of renewable power at a pre-fixed levelized tariff on first come first serve basis.

ix. Earnest Money Deposit (EMD)

In case of bidding, the RPG shall provide Earnest Money Deposit (EMD) in the form of Bank Guarantee along with EoI.

x. Performance Bank Guarantee(PBG)

The EMD will be converted into PBG for the successful bidders, who has signed the PPA within stipulated time period.

xi. Universal Solar Pump Controller

Universal Solar Pump Controller (USPC) is an electronic device through which farmer can use solar power for other activities like operating chaff cutter, floor mill, cold storage, drier, etc., and increase his income.

Annexure-I

MODEL LEASE AGREEMENT

This **AGREEMENT OF LEASE** entered into on this_____day of _____at_____.

BETWEEN:

_____

(hereinafter referred to as the **"LESSOR/OWNER"**, which expression shall, wherever the context so requires or admits, SHALL mean and include his legal heirs, executors, administrators and assignees);

AND:

_____(Name of Renewable Power Generator (RPG))

Represented by _____

(hereinafter referred to as the **"LESSEE**, which expression shall, wherever the context so requires or admits, SHALL mean and include its executors, administrators and assignees successors in interest).

I. WHEREAS the Lessor is the owner in possession of the Barren/ Agricultural land measuring _____ Acre _____ Kanal_____ marla_____Share out of Hadbast No._____Khewat No._____Khatoni No. ___Khasra No._____Mustil No. _____Kila No. _____ situated at Village/City _____ Tehsil _____District which is morefully described in the Schedule hereunder and hereinafter referred to as the Schedule property.

(Note: The legal revenue terms to be changes to those prevalent in the State)

II. WHEREAS the _____ (Name of RPG) being a _____(Details of RPG) with an object to plan, develop and operate Renewable Energy based Power Plant (REPP) under MNRE Scheme notified on 8th March 2019.

(a) WHEREAS pursuant to the request of the Lessee, the Lessor has agreed to grant the lease, the Lessee has agreed to take on lease from the Lessor the land which is morefully described in Schedule written hereunder and hereinafter referred to as **"THE SCHEDULE PROPERTY"** for setting up of the " _____Power Plant".

(b) That pursuant to the request of the Lessee, the Lessor has submitted an applicationunder Section _____for the conversion of the land and on behalf of the Lessor/owner the _____(Name of RPG) shall presume that the land is deemed to have been converted fornon-agricultural purposes. (Clause to be modified as per State Policy for use of Agriculture land for generation of renewable power)

III. NOW THIS AGREEMENT OF LEASE WITNESSES THAT in consideration of the above and of the mutual covenants of the Parties hereto, the Lessor hereby grants and the Lesseehereby accepts the lease of the Schedule property on the following terms and conditions:

1. PURPOSE OF LEASE:

The grant of lease by the Lessor to the lessee in respect of the Schedule property is for the purposeof developing a_____Power Plant under MNRE Scheme notified on 8th March 2019.

2. PERIOD OF THE LEASE

The period of this Lease shall be for Twenty-seven (27) years from this day which may be renewed at the option of the Lessee and Lessor for further period, on such mutually agreeableterms as may be agreed at the time of renewal, by both the parties, by executing and registeringseparate Lease Agreement.

3. RENT

(a) The rent payable by the Lessee to the Lessor for the Schedule Property shall be Rs._____/- (Rupees_____) only per annum per Acre. The portion of the land less than one Acre shall be calculated in terms of Square meter and the rent payable for the same shall be at Rs._/- per Square meter or part thereof, per annum.

OR

The rent payable by the Lessee to the Lessor after Commercial Operation of the power plant shall be Rs._per unit of total power generated from the power

plant installed on the land of Lessor. Till the start of commercial operation of the plant, the rent shall be Rs._____/- (Rupees_____) only per annum per Acre.

(b) The annual rent shall be paid in twelve equal instalments and each instalment to bepaid by 5th day of every month, by crediting the same to the Lessor's Bank Accountthe details of which may be furnished by the Lessor from time to time.

OR

In case of lease rent on the basis of Rs.___per unit, the monthly lease rent wouldbe calculated on the basis of monthly electricity injected in to the grid from the power plant installed on the land of Lessor.

(c) Lessor may opt for payment of lease rent directly from the Distribution company, which will sign Power Purchase Agreement with Lessee for the above-mentioned _____Power Plant to be installed by Lessee. In such a case the Distribution company will pay the lease rent to Lessor on monthly basis from the proceeds payable to the Lessee in lieu of Power supplied by Lessee. In order to give this effect a suitable provision will be made in the PPA to be signed between Lessee andthe Distribution Company.

(d) [on mutual agreement between Lessor and Lessee] The rent hereby reserved shall be paid by enhancing the same at the end of every_____year(s), at_% on therent hereby agreed.

(e) If the Lessee delays the payment of rent by due date of every month, for any reason,the same shall be paid by adding the interest at the rate_% for the said delayed period.

4. **GENERAL TERMS**

i. In consideration of the rent herein agreed as payable to the Lessor being paid bythe Lessee regularly and on complying other terms and conditions and covenants by the Lessee, the Lessee shall peacefully possess and enjoy the **Schedule Property** during the lease period without any interruption by the Lessor.

ii. The Lessor shall allow the Lessee or its representatives to conduct survey and otherrelated work.

iii. The Lessor has no objections for the Lessee to establish the_____Power Plant in the Schedule property which is the purpose of the grant of this lease and to thateffect the Lessee entering into any agreement/s, deeds with companies, individuals, developers/third party etc. in respect of the Schedule property.

iv. The Lessor has no objections for the Lessee or its representatives for installationof machineries, equipments, etc. for generation of_____power in the Schedule property and all work relating to thereto including but not limited to laying poles,wires, etc.

5. EVENT OF SALE, ACCEPTANCE OF LEASE BY THE NEW OWNER

(a) In the event of the owners transferring their rights/interest in any manner during the existence of the lease to any other person, the same may be allowed without affecting the rights of the Lessee under the Lease Agreement in any manner and the owners/purchasers/transferees shall inform the Lessee about the acquiring of the right/interest in respect of the leased property and on receipt of such information, the Lessee shall accept such new purchaser's/transferee's ownership of the land and obtain a written confirmation from such new owner/purchaser/transferee to the effect that he will be bound by the terms of the Lease Agreement.

(b) In the event of the owners transferring their rights/interest to any other person, the samemay be informed to the Lessee and the Lessor shall ascertain and obtain all the necessary documents from the transferee to the effect that the transferee will be boundby the terms and conditions of the Lease Agreement for the balance period of the leaseor for using the said documents for renewal of the lease for the balance period.

(c) During the subsistence of the lease, the Lessor shall not carry any activity, in the Scheduleproperty, other than those agreed in this agreement;

(d) The change in the legal status of the Lessee shall not affect the terms and conditions ofthis Agreement.

(e) The original Lease Agreement shall be with the Lessee and the copy of the same will be with the Lessor.

(f) In the event of any dispute in respect of the land, the Lessee shall deposit the rent in theconcerned civil court. In the event of retention of the rent with the Lessee, the Lessee shall be pay the same together with interest thereon at the rate_% for such period.

(g) The Lessee shall not offer or create any charge or encumbrance by offering the same asby way of mortgage, security, etc. in favour of any Banks or financial institutions in respect of the loans or advances or any other financial facilities that may be availed bythe Lessee.

(h) The owners shall pay the land tax/revenue in respect of the lands.

6. PAYMENT OF STAMP DUTY AND REGISTRATION CHARGES:

The stamp duty and other registration charges, as applicable for this Agreement of Leaseshall be paid by the Lessee.

7. FORCE MAJEURE:

It is also agreed and understood between the parties that in case of any mishap due to fire, earthquake, strike, floods, tempest, war, riot, civil war or civil commotions, mob violence,civil disturbance, act of God or on account of terrorist attack, the Lessor shall not be liablefor any loss or damage that may be occasioned to the Lessee/its merchandise.

8. ADDRESSES FOR CORRESPONDENCE, ETC

Any notice and/or communications between the Parties shall be deemed to be sufficient, if delivered by hand under acknowledgement or sent by registered post acknowledgementdue to the following address or the address that may be intimated in writing to the Lesseeby the Lessor from time to time:

LESSOR'S:

LESSEE'S:

9. LESSOR'S DUTIES, COVENANTS AND OBLIGATIONS

a) The Lessor hereby covenants with the Lessee that the Lessee paying regularly the rentshereby reserved and performing and observing all the covenants of the Lessee herein contained, shall be entitled, during the subsistence of this lease to enjoy the Schedule property without let, hindrance or interference from the Lessor or any other person/s claiming through or under him; Still, in the event of the Lessee restrained from enjoyingthe peaceful possession of the Schedule property or on account of any action by the Government during the period of lease and in the event of dispossession of the Lessee from the Schedule property or any portion thereof forcibly, due to any default of the Lessor, the Lessor shall make good the reasonable loss that may be suffered by the Lessee.

b) The Lessor shall offer necessary support and co-operation to the Lessee in its process toobtain required permission/s, approval/s, clearances, etc., from any Statutory Authority orother Local Bodies for the purpose of obtaining and licence, permissions, etc., for installation of power plant. However, obtaining such permission/s, approval/s, clearances,etc., shall be the sole responsibility of Lessee.

10. LESSEE'S COVENANT AND OBLIGATIONS

The Lessee hereby covenants with the Lessor as under:

(a) The Schedule property shall be utilised for the purpose referred to in Clause (1) above;

(b) The Lessee shall pay the rents (as per Clause (3)) regularly and promptly;

11. TERMINATION AND RE-ENTRY

The Lease shall be determinable under all or any of the following circumstances, namely –

i) by efflux of time;

ii) in the event of breach by either party of the terms, conditions and covenants hereof;

iii) if the Scheduled Premises or any part thereof is severely damaged or destroyed dueto any unforeseen circumstances or civil commotion, act of God, etc., and these damages be not restored to by the LESSOR within a reasonable time or if the demised premises is acquired compulsorily by any authority;

iv) After the expiry of lease period, the Lessee shall handover the land to the Lessor asit was existed previously at the time of this agreement (subject to normal wear andtear).

12. <u>VARIATION</u>:

The Lessor and the Lessee hereto acknowledge that this agreement supersedes all prior communications between them including all oral or written proposals. Any variation, addition and modifications of this agreement between the parties shall be valid only if in writing by the Lessor and Lessees authorized representative.

13. <u>ARBITRATION</u>:

a) Any disputes or differences arising between the Parties hereto as to the effect, interpretation or application any of the clauses of this LEASE AGREEMENT or as to their rights, duties or liabilities thereunder, or as to any act, matter or thing arising out of, or consequent to, or in connection with this LEASE AGREEMENT shall be referred to and resolved by Arbitration by referring the same for arbitration to any retired District Judge and shall be resolved finally at his arbitration under Arbitration and Conciliation Act 1996 and its Amendments or any other Enactment. The Arbitration proceedings shall be held at and shall be in English/_____ Language.

b) This LEASE AGREEMENT shall be governed by the laws of India. The Courts at _____alone shall have the jurisdiction to entertain and or try any dispute arisingout of or in connection with or in relation to the terms of this LEASE AGREEMENT.

IN WITNESS WHEREOF the parties hereto have executed these presents in the presence ofthe witnesses attesting hereunder on the day, month and year mentioned hereinabove.

LESSOR **LESSEE**

WITNESSES:
1.

2.

SCHEDULE PROPERTY

All that piece and parcel of Barren/ Agricultural land measuring_____Acre _____

Kanal_____ marla_____Share out of Hadbast No. _____Khewat

No._____Khatoni No. ___Khasra No._____Mustil No. _____Kila No.

_____situated at Village/City_____Tehsil

_____District andbounded on the:

(Note: The legal revenue terms to be changes to those prevalent in the State)

East by:

West by :

North by :

South by :

Annexure-II

STANDARD

POWER PURCHASE AGREEMENT (PPA) FOR

PROCUREMENT OF ….. MW_____POWER ON LONG TERM BASIS

Between

[Name of Renewable Power Generator]

And

[Name of Distribution Company]

[month and year]

This Power Purchase Agreement is made on the_____day of_____of_____at _____

Between

_____[name of the Renewable Power Generator],_____, [details of Renewable Power Generator] (hereinafter referred to as **"Renewable Power Generator or RPG"**, which expression shall, unless repugnant to the context or meaning thereof, be deemed to include its successors and permitted assigns) as a Party of the **First Part**;

And

_____**[Distribution Company]**, a company incorporated under the Companies Act 1956, having its registered office at_____(hereinafter referred to as **"DISCOM"**, which expression shall, unless repugnant to the context or meaning thereof, be deemed to include its successors and assignees) as a Party of the **Second Part**;

The RPG and DISCOM are individually referred to as 'Party' and collectively referred to as 'Parties'.

WHEREAS:

A. The Ministry of New and Renewable Energy [MNRE] has launched a scheme for farmers on 8th March 2019 and issued implementation guidelines on _____.

B. The MNRE has accorded a sanction and allotted a capacity of _____MW to DISCOM for under the said scheme of 8th March 2019.

C. DISCOM had initiated a selection process for procurement of __ MW of the power generated from the Grid connected_____Power Project on the terms and conditions contained in the EoI/RfS No._____dated_____.

D. The RPG has been selected in the Process for development, generation and supply of electricity from the_____MW_____Power Project to be established by RPG at_____[location of proposed power plant] and electricity generated to be fed to the_____[Name and location of 33/11 kV sub-station];

E. DISCOM has issued the Letter of Award No..... dated... ..... in favour of the RPG for development and establishment of the ..... MW_____Power Project as per the terms and conditions contained in the EoI/RfS.

F. The RPG has furnished the Performance Bank Guarantee in the sum of Rs... ..... in favour of DISCOM as per the format prescribed by the DISCOM.

G. The RPG has fulfilled the terms and conditions for signing this Power Purchase Agreement as a definitive agreement for establishing the_____ Power Project of.....MW at.....,

for generation and sale of electricity by the RPG to DISCOM at_____33(or 66 or 110)/11 kV S/S;

H. The parties have agreed to execute this Power Purchase Agreement in terms of the EoI/RfS and the Letter of Award in regard to the terms and conditions for establishment of the_____Power Project at ....., and for generation and supply of electricity by the RPG to DISCOM.

Now therefore, in consideration of the premises and mutual agreements, covenants and conditions set forth herein, it is hereby agreed by and between the Parties as follows:

ARTICLE 1: DEFINITIONS AND INTERPRETATION

1.1 *Definitions*

The terms used in this Agreement, unless as defined below or repugnant to the context, shall have the same meaning as assigned to them by the Electricity Act, 2003 and the rules or regulations framed there under, including those issued/framed by the Appropriate Commission (as defined hereunder), as amended or re-enacted from time to time.

"Act" or "Electricity Act, 2003"	shall mean the Electricity Act, 2003 and include any modifications, amendments and substitution from time to time;
"Agreement" or "Power Purchase Agreement" or "PPA"	shall mean this Power Purchase Agreement including its recitals and Schedules, amended or modified from time to time in accordance with the terms hereof;
"Appropriate Commission"	Unless otherwise stated, Appropriate Commission shall be the commission of the state where DISCOM is situated;
"Bill Dispute Notice"	shall mean the notice issued by a Party raising a Dispute regarding a Monthly Bill or a Supplementary Bill issued by the other Party;
"Business Day"	shall mean with respect to RPG and DISCOM, a day other than Sunday or a statutory holiday, on which the banks remain open for business in the State;
"Capacity Utilisation Factor" or "CUF"	shall have the same meaning as provided in CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2009as amended from time to time; However, for avoidance of any doubt, it is clarified that the CUF shall be calculated on the Contracted Capacity; In any Contract Year, if 'X' MWh of energy has been metered out at the Delivery Point for 'Y' MW Project capacity, CUF= (X MWh/(Y MW*8766)) X100%;
"Change in Law"	shall have the meaning ascribed thereto in Article 12 of this Agreement;

"Commercial Operation Date (COD)"	shall mean the date on which the commissioning certificate is issued upon successful commissioning (as per provisions of this Agreement) of the project;
"Competent Court of Law"	shall mean any court or tribunal or any similar judicial or quasi- judicial body in India that has jurisdiction to adjudicate upon issues relating to this Agreement;
"Consents, Clearances and	shall mean all authorizations, licenses, approvals, registrations, permits, waivers,
"Permits"	privileges, acknowledgements, agreements, or concessions required to be obtained from or provided by any concerned authority for the purpose of setting up of the generation facilities and/ or supply of power;
"Consultation Period"	shall mean the period of ninety (90) days or such other longer period as the Parties may agree, commencing from the date of issuance of a RPG Preliminary Default Notice or DISCOM Preliminary Default Notice as provided in Article 13 of this Agreement, for consultation between the Parties to mitigate the consequence of the relevant event having regard to all the circumstances;
"Contract Year"	shall mean the period beginning from the Effective Date and ending on the immediately succeeding March 31 and thereafter each period of 12 months beginning on April 1 and ending on March 31 provided that: (i) in the financial year in which the COD would occur, the Contract Year shall end on the date immediately before the COD and a new Contract Year shall commence once again from the COD and end on the immediately succeeding March 31, and thereafter each period of twelve (12) months commencing on April 1 and ending on March 31, and (ii) provided further that the last Contract Year of this Agreement shall end on the last day of the Term of this Agreement
"Contracted Capacity"	shall mean …… [Insert capacity] MW contracted with DISCOM for supply by the RPG to DISCOM at the Delivery Point from the_____Power Project;
"Delivery Point"	"Delivery Point" shall mean the point at the voltage level of 11kV or above of the 33/11 kV Sub-station. Metering shall be done at this interconnection point where the power is injected into the 33/11 kV Sub-station. For interconnection with grid and metering, the RPG shall abide by the relevant and applicable regulations, Grid Code notified by the State Commission and Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 as amended and revised from time to time, or orders passed thereunder by the Appropriate Commission or CEA. All charges and losses related to Transmission of power from project up to Delivery Point as notified by the Appropriate Commission shall be borne by the RPG.

"Dispute"	shall mean any dispute or difference of any kind between DISCOM and the RPG, in connection with or arising out of this Agreement including but not limited to any issue on the interpretation and scope of the terms of this Agreement as provided in Article 16 of this Agreement;
"Due Date"	Due Date shall mean the forty-fifth (45th) day after a Monthly Bill (including all the relevant documents) or a Supplementary Bill is received in hard copy and duly acknowledged by the DISCOM or, if such day is not a Business Day, the immediately succeeding Business Day, by which date such Monthly Bill or a Supplementary Bill is payable by the DISCOM.
"Effective Date"	shall have the meaning ascribed thereto in Article 2.1 of this Agreement;
"Electricity Laws"	shall mean the Electricity Act, 2003 and the rules and regulations made there under from time to time along with amendments thereto and replacements thereof and any other Law pertaining to electricity including regulations framed by the Appropriate Commission;
"Event of Default"	shall mean the events as defined in Article 13 of this Agreement;
"Expiry Date"	Shall mean the date occurring twenty five (25) years from the Commercial Operation Date subject to that the supply of power shall be limited for a period of 25 years from the COD unless extended by the Parties as per this Agreement;
"Financing Agreements"	shall mean the agreements pursuant to which the RPG has sought financing for the Power Project including the loan agreements, security documents, notes, indentures, security agreements, letters of credit and other documents, as may be amended, modified, or replaced from time to time, but without in anyway increasing the liabilities of DISCOM;
"Force Majeure" or "Force Majeure Event"	shall have the meaning ascribed thereto in Article 11 of this Agreement;
"Indian Governmental Instrumentality"	shall mean the Government of India, Governments of state of_____and any ministry, department, board, authority, agency, corporation, commission under the direct or indirect control of Government of India or the above state Government or both, any political sub-division of any of them including any court or Appropriate Commission or tribunal or judicial or quasi-judicial body in India;
"Insurances"	shall mean the insurance cover to be obtained and maintained by the RPG in accordance with Article 8 of this Agreement;

"Interconnection Facilities"	shall mean the facilities on RPG's side of the Delivery Point for scheduling, transmitting and metering the electrical output in accordance with this Agreement and which shall include, without limitation, all other transmission lines and associated equipment, transformers, relay and switching equipment and protective devices, safety equipment and RTU, Data Transfer and Acquisition facilities for transmitting data subject to Article 7, the Metering System required for supply of power as per the terms of this Agreement;
"Invoice" or "Bill"	shall mean either a Monthly Bill / Supplementary Bill or a Monthly Invoice/ Supplementary Invoice raised by any of the Parties;
"Late Payment Surcharge"	shall have the meaning ascribed thereto in Article 10.3.3 of this Agreement;
"Law"	shall mean in relation to this Agreement, all laws including Electricity Laws in force in India and any statute, ordinance, regulation, notification or code, rule, or any interpretation of any of them by an Indian Governmental Instrumentality and having force of law and shall further include without limitation all applicable rules, regulations, orders, notifications by an Indian Governmental Instrumentality pursuant to or under any of them and shall include without limitation all rules, regulations, decisions and orders of the Appropriate Commissions;
"Letter of Credit" or "L/C"	shall have the meaning ascribed thereto in Article 10.4 of this Agreement;
"Letter of Award" or "LoA"	shall mean Letter of Award issued by the DISCOM to the RPG for the project;
"MNRE"	shall mean the Ministry of New and Renewable Energy, Government of India;
"Month"	shall mean a period of thirty (30) days from (and excluding) the date of the event, where applicable, else a calendar month;
"Party" and "Parties"	shall have the meaning ascribed thereto in the recital to this Agreement;
"Payment Security Mechanism"	shall have the meaning ascribed thereto in Article 10.4 of this Agreement;

"Power Project" or "Project"	shall mean the_____power generation facility of Contracted Capacity of ……..[Insert capacity] MW, located at....., [Insert name of the District and State] having a separate control system, metering and separate points of injection into the grid at Delivery point of 33/11 kV substation. The Project shall include all units and auxiliaries such as water supply, treatment or storage facilities, bay(s) for transmission system in the switchyard, dedicated transmission line up to the Delivery Point and all the other assets, buildings/structures, equipment, plant and machinery, facilities and related assets required for the efficient and economic operation of the power generation facility, whether completed or at any stage of development and construction or intended to be developed and constructed for the purpose of supply of power as per this Agreement;
"Preliminary Default Notice"	shall have the meaning ascribed thereto in Article 13 of this Agreement;
"Project Capacity"	shall mean the maximum AC capacity of the Project at the point of injection on which the Power Purchase Agreement has been signed.
"Prudent Utility Practices"	shall mean the practices, methods and standards that are generally accepted internationally from time to time by electric utilities for the purpose of ensuring the safe, efficient and economic design, construction, commissioning, operation and maintenance of power generation equipment and which practices, methods and standards shall be adjusted as necessary, to take account of: a) operation and maintenance guidelines recommended by the manufacturers of the plant and equipment to be incorporated in the Power Project; b) the requirements of Indian Law; and the physical conditions at the site of the Power Project
"Rebate"	shall have the same meaning as ascribed thereto in Article 10.3.5 of this Agreement;
"Rupees", "Rs.", "₹"	shall mean Indian rupees, the lawful currency of India;
"Scheduled Commissioning Date" or "SCD" of the Project	Shall mean..... [Insert Date that is fifteen (15) Months from the Dateof issuance of LoA by the DISCOM to the RPG];
"Tariff"	Shall have the same meaning as provided for in Article 9 of this Agreement;
"Tariff Payment"	shall mean the payments to be made under Monthly Bills as referred to in Article 10 and the relevant Supplementary Bills;
"Termination Notice"	shall mean the notice given by either Parties for termination of this Agreement in accordance with Article 13 of this Agreement;

"Term of Agreement"	shall have the meaning ascribed thereto in Article 2 of this Agreement;

ARTICLE 2: TERM OF AGREEMENT

2.1 Effective Date

2.1.1 This Agreement shall come into effect from_____and such date shall be referred to as the Effective Date.

2.2 Term of Agreement

2.2.1 Subject to Article 2.3 and 2.4 of this Agreement, this Agreement shall be valid for a term from the Effective Date until the Expiry Date. This Agreement may be extended for a further period at least one hundred eighty (180) days prior to the Expiry Date, on mutually agreed terms and conditions.

2.2.2 The RPG is free to operate their plants beyond the Expiry Date if other conditions like land lease / Right to Use of Land (as applicable), permits, approvals and clearances etc. allow. In such case unless otherwise agreed by the DISCOM, DISCOM shall not be obligated to procure power beyond the Expiry Date.

2.3 Early Termination

2.3.1 This Agreement shall terminate before the Expiry Date if either DISCOM or RPG terminates the Agreement, pursuant to Article 13 of this Agreement.

2.4 Survival

2.4.1 The expiry or termination of this Agreement shall not affect any accrued rights, obligations and liabilities of the Parties under this Agreement, including the right to receive penalty as per the terms of this Agreement, nor shall it affect the survival of any continuing obligations for which this Agreement provides, either expressly or by necessary implication, which are to survive after the Expiry Date or termination including those under Article 11 (Force Majeure), Article 13 (Events of Default and Termination), Article 14 (Liability and Indemnification), Article 16 (Governing Law andDispute Resolution), Article 17 (Miscellaneous Provisions), and other Articles and Schedules of this Agreement which expressly or by their nature survive the Term or termination of this Agreement shall continue and survive any expiry or termination of this Agreement.

ARTICLE 3: CONDITIONS SUBSEQUENT

3.1 The RPG agrees and undertakes to make Project Financing Arrangements for its Project and shall provide necessary documents to DISCOM in this regard within six Months from the Date of issue of LoA by DISCOM for the project.

ARTICLE 4: CONSTRUCTION & DEVELOPMENT OF THE PROJECT

4.1 RPG's Obligations

4.1.1 The RPG undertakes to be responsible, at RPG's own cost and risk, for:

a) The RPG shall be solely responsible and make arrangements for Land & associated infrastructure for development of the Project and for Connectivity with the 33/11 kV sub-station for confirming the evacuation of power by the Scheduled Commissioning date or COD, whichever is earlier, and all clearances related thereto;

The RPG shall furnish the necessary documents to establish possession in the name of the Project Developer of the required land/ Lease Agreement;

b) obtaining all Consents, Clearances and Permits as required and maintaining all documents.

c) Designing, constructing, erecting, commissioning, completing and testing the Power Project in accordance with the applicable Law, the Grid Code, the terms and conditions of this Agreement and Prudent Utility Practices.

d) the commencement of supply of power up to the Contracted Capacity to DISCOM no later than the Scheduled Commissioning Date and continuance of the supply of power throughout the term of the Agreement;

e) Connecting the Power Project switchyard with the Interconnection Facilities at the Delivery Point. The RPG shall make adequate arrangements to connect the Power Project switchyard with the Interconnection Facilities at Interconnection / Metering / Delivery Point.

f) owning the Power Project throughout the Term of Agreement free and clear of encumbrances, except those expressly permitted under Article 15;

f) fulfilling all obligations undertaken by the RPG under this Agreement.

g) The RPG shall be responsible to for directly coordinating and dealing with the DISCOM, and other authorities in all respects in regard to declaration of availability, scheduling and dispatch of Power and due compliance with deviation and settlement mechanism and the applicable Grid code/State Regulations.

4.2 Purchase and sale of Contracted Capacity

4.2.1 Subject to the terms and conditions of this Agreement, the RPG undertakes to sell to DISCOM and DISCOM undertakes to pay Tariff for all the energy supplied at the Delivery Point corresponding to the Contracted Capacity.

4.3 Right to Contracted Capacity & Energy

4.3.1 DISCOM, in any Contract Year shall not be obliged to purchase any additional energy from the RPG beyond the contract capacity. If for any Contract Year except for the first year of operation, it is found that the RPG has not been able to generate minimum energy of Million kWh (MU) till the end of 10 years from the COD and..... Million kWh (MU) for the rest of the Term of the Agreement, on account of reasons solely attributable to the RPG, the non-compliance by RPG shall make the RPG liable to pay the compensation. For the first year of operation, the above limits shall be considered on pro-rata basis. The lower limit will, however be relaxable by DISCOM to the extent

of grid non-availability for evacuation which is beyond the control of the RPG. This compensation shall be applied to the amount of shortfall in generation during the Contract Year. The amount of such penalty shall be as determined by the Appropriate Commission, and such penalty shall ensure that the DISCOM is offset for all potential costs associated with low generation and supply of power under the PPA. However, the minimum compensation payable to DISCOM by the RPG shall be 25%(twenty-five percent) of the cost of this shortfall in energy terms, calculated at PPA tariff. This compensation shall not be applicable in events of Force Majeure identified under PPA.

4.3.2 In case at any point of time, the peak of capacity reached is higher than the contracted capacity and causes disturbance in the system at the point where power is injected, the RPG will have to forego the excess generation and reduce the output to the contract capacity and shall also have to paythe penalty/charges (if applicable) as per applicable regulations.

4.4 Extensions of Time

4.4.1 In the event that the RPG is prevented from performing its obligations under Article 4.1 by the Scheduled Commissioning Date due to:

a) any DISCOM Event of Default; or
b) Force Majeure Events affecting DISCOM, or
c) Force Majeure Events affecting the RPG,

the Scheduled Commissioning Date and the Expiry Date shall be deferred, subject to Article 4.4.5, for a reasonable period but not less than 'day for day' basis, to permit the RPG or DISCOM through the use of due diligence, to overcome the effects of the Force Majeure Events affecting the RPG or DISCOM, or till such time such Event of Default is rectified by DISCOM.

4.4.2 In case of extension due to reasons specified in Article 4.4.1(b) and (c), and if such Force Majeure Event continues even after a maximum period of three (3) months, any of the Parties may choose to terminate the Agreement as per the provisions of Article 13.5. In case neither party terminates the agreement under this clause, the agreement shall stand terminated on the expiry of twelve (12) months of the continuation of the Force majeure event unless the parties mutually agree to extend the agreement for the further period.

4.4.3 If the Parties have not agreed, within thirty (30) days after the affected Party's performance has ceased to be affected by the relevant circumstance, on the time period by which the Scheduled Commissioning Date or the Expiry Date should be deferred, any Party may raise the Dispute to be resolved in accordance with Article 16.

4.4.4 As a result of such extension, the newly determined Scheduled Commissioning Date and newly determined Expiry Date shall be deemed to be the Scheduled Commissioning Date and the Expiry Date for the purposes of this Agreement.

4.4.5 Notwithstanding anything to the contrary contained in this Agreement, any extension of the Scheduled Commissioning Date arising due to any reason envisaged in this Agreement shall not be allowed beyond the date pursuant to Article 4.5.2.

4.4.6 Delay in commissioning of the project beyond the scheduled commissioning date for reasons other than those specified in Article 4.4.1 shall be an event of default on part of the RPG and shall be subject to the consequences specified in the Article 4.5.

4.5 Liquidated Damages not amounting to penalty for delay in Commissioning

4.5.1 If the RPG is unable to commission the Project by the Scheduled Commissioning Date other than for the reasons specified in Article 4.4.1, the RPG shall pay to DISCOM, damages for the delay in such commissioning and making the Contracted Capacity available for dispatch by the Scheduled Commissioning Date as per the following:

Delay beyond the Scheduled Commissioning Date upto (& including) the date as on fifteen months from the Date of issue of LoA: The total Performance Bank Guarantee amount shall be encashed on per day basis and proportionate to the balance capacity not commissioned.

4.5.2 The maximum time period allowed for commissioning of the full Project Capacity with encashment of Performance Bank Guarantee shall be limited to 21 Months from the Date of issue of LoA. In case, the Commissioning of the Project is delayed beyond 21 Months from the Date of issue of LoA, it shall be considered as an RPG Event of Default and provisions of Article 13 shall apply and the Contracted Capacity shall stand reduced / amended to the Project Capacity Commissioned within 21 Months of the Date of issue of LoA and the PPA for the balance Capacity will stand terminated and shall be reduced from the project capacity.

4.5.3 The RPG further acknowledge that the amount of the liquidated damages fixed is genuine and reasonable pre-estimate of the damages that may be suffered by DISCOM.

4.6 Acceptance/Performance Test

4.6.1 Prior to synchronization of the Power Project, the RPG shall be required to get the Project certified for the requisite acceptance/performance test as may be laid down by respective authorities.

4.7 Third Party Verification

4.7.1 The RPG shall be further required to provide entry to the site of the Power Project free of all encumbrances at all times during the Term of the Agreement to DISCOM and a third Party nominated by any Indian Governmental Instrumentality for inspection and verification of the worksbeing carried out by the RPG at the site of the Power Project.

4.7.2 The third party may verify the construction works/operation of the Power Project being carried out by the RPG and if it is found that the construction works/operation of the Power Project is notas per the Prudent Utility Practices, it may seek clarifications from RPG or require the works tobe stopped or to comply with the instructions of such third party.

4.8 Breach of Obligations

4.8.1 The Parties herein agree that during the subsistence of this Agreement, subject to DISCOM being in compliance of its obligations & undertakings under this Agreement, the RPG would have no right to negotiate or enter into any dialogue with any third party for the sale of Contracted Capacity of power which is the subject matter of this Agreement. It is the specific understanding between the Parties that such bar will apply throughout the entire term of this Agreement.

4.9 Generation compensation for Off-take constraints

4.9.1 Generation Compensation in offtake constraints due to Grid Unavailability: During the operation of the plant, there can be some periods where the Project can generate power but due to temporary transmission unavailability, the power is not evacuated, for reasons not attributable to the RPG. In such cases, subject to the submission of documentary evidences from the competent authority, the generation compensation shall be restricted to the following and there shall be no otherclaim, directly or indirectly against DISCOM:

Duration of Grid unavailability	**Provision for Generation Compensation**
Grid unavailability in a contract yearas defined in the PPA: (only period from 8 am to 6 pm to be counted):	***Generation Loss = [(Average Generation per hour during the Contract Year) × (number of hours of grid unavailability during the Contract Year)]*** Where, Average Generation per hour during the Contract Year (kWh) = Total generation in the Contract Year (kWh) ÷ Total hours of generation in the Contract Year.

The excess generation by the RPG equal to this generation loss shall be procured by DISCOM at the PPA tariff so as to offset this loss in the succeeding 3 (three) Contract Years.

4.9.2 Offtake constraints due to Backdown: The RPG and DISCOM shall follow the forecasting and scheduling process as per the regulations in this regard by the Appropriate Commission. In the eventuality of backdown, subject to the submission of documentary evidences from the competent authority, the RPG shall be eligible for a minimum generation compensation, from DISCOM, restricted to the following and there shall be no other claim, directly or indirectly against DISCOM:.

Duration of Backdown	**Provision for Generation Compensation**
Hours of Backdown during a monthly billing cycle.	***Mininum Generation Compensation = 50% of [(Average Generation per hour during the month) X (number of backdown hours during the month)] X PPA tariff*** Where, Average Generation per hour during the month (kWh) = Total generation in the month (kWh) ÷ Total hours of generation in the month

The RPG shall not be eligible for any compensation in case the Backdown is on account of events like consideration of grid security or safety of any equipment or personnel or other such conditions. The Generation Compensation shall be paid as part of the energy bill for the successive month after JMR.

ARTICLE 5: SYNCHRONISATION, COMMISSIONING AND COMMERCIAL OPERATION

5.1 Synchronization, Commissioning and Commercial Operation

5.1.1 The RPG shall give the DISCOM at least thirty (30) days' advanced preliminary written notice and at least fifteen (15) days' advanced final written notice, of the date on which it intends to synchronize the Power Project to the Grid System.

5.1.2 Subject to Article 5.1.1, the Power Project may be synchronized by the RPG to the Grid System when it meets all the connection conditions prescribed in applicable Grid Code then in effect and otherwise meets all other Indian legal requirements for synchronization to the Grid System.

5.1.3 The synchronization equipment and all necessary arrangements / equipment including RTU for scheduling of power generated from the Project and transmission of data to the concerned authority as per applicable regulation shall be installed by the RPG at its generation facility of the Power Project at its own cost. The RPG shall synchronize its system with the Grid System only after the approval of synchronization scheme is granted by the head of the concerned substation/ and checking/verification is made by the concerned authorities of the DISCOM.

5.1.4 The RPG shall immediately after each synchronization/tripping of generator, inform the sub-station of the Grid System to which the Power Project is electrically connected in accordance with applicable Grid Code. In addition, the RPG will inject in-firm power to grid time to time to carry out operational/ functional test prior to commercial operation. For avoidance of doubt, it is clarified that Synchronization / Connectivity of the Project with the grid shall not to be considered as Commissioning of the Project.

5.1.5 The RPG shall commission the Project within fifteen (15) Months from the Date of issue of LoA. Declaration of COD shall only be done upon the successful visit by the Commissioning Committee.

5.1.6 The Parties agree that for the purpose of commencement of the supply of electricity by RPG to DISCOM, liquidated damages for delay etc., the Scheduled Commissioning Date as defined in this Agreement shall be the relevant date.

ARTICLE 6: DISPATCH AND SCHEDULING

6.1 Dispatch and Scheduling

6.1.1 The RPG shall be required to schedule its power as per the applicable regulations of SERC /SLDC or any other competent agency and same being recognized by the SLDC or any other competent authority / agency as per applicable regulation/ law / direction and maintain compliance to the applicable Codes/ Grid Code requirements and directions, if any, as specified by concerned SLDC from time to time. Any deviation from the Schedule will attract the provisions of applicable regulation / guidelines / directions and any financial implication on account of this shall be on the account of the RPG.

6.1.2 The RPG shall be responsible for directly coordinating and dealing with the DISCOM, State Load Dispatch Centers, and other authorities in all respects in regard to declaration of availability, scheduling and despatch of Power and due compliance with deviation and settlement mechanism and the applicable Grid code Regulations.

6.1.3 The RPG shall be responsible for any deviation from scheduling and for any resultant liabilities on account of charges for deviation as per applicable regulations. UI charges on this account shall be directly paid by the RPG.

6.1.4 Auxiliary power consumption will be treated as per the concerned state regulations.

ARTICLE 7: METERING

7.1 Meters

7.1.1 For installation of Meters, Meter testing, Meter calibration and Meter reading and all matters incidental thereto, the RPG and DISCOM shall follow and be bound by the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006, the Grid Code, as amendedand revised from time to time.

7.1.2 The RPG shall bear all costs pertaining to installation, testing, calibration, maintenance, renewal and repair of meters at RPG's side of Delivery Point.

7.1.3 In addition to ensuring compliance of the applicable codes, the RPG shall install Main & Check meters at the Delivery Point, along with Stand-by meter(s) as per the applicable regulations of the State where the Project is located.

7.2 Reporting of Metered Data and Parameters

7.2.1 The grid connected renewable power plants will install necessary equipment for regular monitoring of required data and simultaneously for monitoring of the electric power generated from the Project.

7.2.2 Online arrangement would have to be made by the RPG for submission of above data regularly for the entire period of this Power Purchase Agreement to the DISCOM, to central portal of MNRE and concerned agency as per applicable regulation / directions.

7.2.3 Reports on above parameters on monthly basis (or as required by regulation / guidelines) shall be submitted by the RPG to Ministry of New and Renewable Energy/National Institute of Solar Energy through DISCOM for entire period of PPA.

ARTICLE 8: INSURANCES

8.1 Insurance

8.1.1 The RPG shall effect and maintain or cause to be effected and maintained, at its own cost and expense, throughout the Term of PPA, Insurances against such risks to keep the Project in good condition and shall take Industrial All Risk insurance policy covering risks against any loss or damage, with such deductibles and with such endorsements and co-insured(s), which the Prudent Utility Practices would ordinarily merit maintenance of and as required under the Financing Agreements, and under the applicable laws.

8.2 Application of Insurance Proceeds

8.2.1 In case of the Project not being implemented through Financing Agreement(s), save as expressly provided in this Agreement or the Insurances, the proceeds of any insurance claim made due to loss or damage to the Power Project or any part of the Power Project shall be first applied to reinstatement, replacement or renewal of such loss or damage.

In case of the Project being financed through Financing Agreement(s), save as expressly provided in this Agreement or the Insurances, the proceeds of any insurance claim made due to loss or damage to the Power Project or any part of the Power Project shall be applied as per such Financing Agreements.

8.2.2 If a Force Majeure Event renders the Power Project no longer economically and technically viable and the insurers under the Insurances make payment on a "total loss" or equivalent basis, DISCOM shall have claim on such proceeds of such Insurance limited to outstanding dues of DISCOM against RPG.

8.3 Effect on liability of DISCOM

8.3.1 Notwithstanding any liability or obligation that may arise under this Agreement, any loss, damage, liability, payment, obligation or expense which is insured or not or for which the RPG can claim compensation, under any Insurance shall not be charged to or payable by DISCOM. It is for the RPG to ensure that appropriate insurance coverage is taken for payment by the insurer for the entire loss and there is no under insurance or short adjustment etc.

ARTICLE 9 : APPLICABLE TARIFF

9.1 The RPG shall be entitled to receive the Tariff of Rs..... / kWh, fixed for the entire term of this Agreement, with effect from the COD, for the power sold to the DISCOM as reflected in the Energy Accounts.

ARTICLE 10: BILLING AND PAYMENT

10.1 General

10.1.1 From the commencement of supply of power, DISCOM shall pay to the RPG the monthly Tariff Payments subject to the adjustments as per provisions of this Agreement including Article 6, in accordance with Article 9. All Tariff Payments by DISCOM shall be in Indian Rupees.

10.1.2 The RPG shall be required to make arrangements and payments for import of energy (if any) as per applicable regulations.

10.2 Delivery and Content of Monthly Bills/Supplementary Bills

10.2.1 The RPG shall issue to DISCOM hard copy of a signed Monthly Bill for the immediately preceding Month based on the JMR/Energy Account along with all relevant documents (payments made by RPG for drawl of power, payment of reactive energy charges, Metering charges or any other charges as per regulations of SERC/SLDC, if applicable.)

Each Monthly Bill shall include all charges as per this Agreement for the energy supplied for the relevant Month based on JMR/Energy Accounts. The Monthly Bill amount shall be the product of the energy as per Energy Accounts and the Applicable Tariff. Energy drawn from the grid will be regulated as per the regulations of respective State the Project is located in.

10.3 Payment of Monthly Bills

10.3.1 DISCOM shall pay the amount payable under the Monthly Bill by the Due Date to such account of the RPG, as shall have been previously notified by the RPG.

10.3.2 All payments required to be made under this Agreement shall also include any deduction or set off for:

i) deductions required by the Law; and
ii) Amount claimed by DISCOM, if any, from the RPG, will be adjusted from the monthly energy payment.

The RPG shall open a bank account (the "RPG's Designated Account") for all Tariff Payments to be made by DISCOM to the RPG, and notify DISCOM of the details of such account at least sixty (60) Days before the dispatch of the first Monthly Bill.

10.3.3 Late Payment Surcharge

In the event of delay in payment of a Monthly Bill by DISCOM beyond thirty (30) days of its Due

Date, a Late Payment Surcharge shall be payable to the RPG at the rate of 1.25% per month on the outstanding amount calculated on a day to day basis. The Late Payment Surcharge shall be claimedby the RPG through the Supplementary Bill.

10.3.5 ***Rebate***

For payment of any Bill on or before Due Date, the following Rebate shall be paid by the RPG to DISCOM in the following manner and the RPG shall not raise any objections to the payments made under this article.

a) A Rebate of 2% shall be payable to the DISCOM for the payments made within a period of seven clear working days of the presentation of hard copy of Bill along with required supporting documents at DISCOM office.
b) Any payments made after seven clear working days of the date of presentation of hard copy of the Bill along with the required supporting documents at DISCOM office up to the Due Date shall be allowed a rebate of 1 %.
c) For the above purpose, the date of presentation of Bill shall be the next Business Day of delivery of the physical copy of the Bill at DISCOM. .
d) No Rebate shall be payable on the Bills raised on account of Change in Law relating to taxes, duties, cess etc. and on Supplementary Bill.

For the above purpose date of presentation of bill shall be the same day of delivery in hard copy. However, for consideration of rebate, next business day shall be considered.

10.4 Payment Security Mechanism

Letter of Credit (LC):

10.4.1 DISCOM shall provide to the RPG, in respect of payment of its Monthly Bills and/or Supplementary Bills, a monthly unconditional, revolving and irrevocable letter of credit ("Letter of Credit"), opened and maintained which may be drawn upon by the RPG in accordance with this Article.

10.4.2 Not later than one (1) Month before the start of supply, DISCOM through a scheduled bank open a Letter of Credit in favour of the RPG, to be made operative from a date prior to the Due Date of its first Monthly Bill under this Agreement. The Letter of Credit shall have a term of twelve (12) Months and shall be renewed annually, for an amount equal to:

i) for the first Contract Year, equal to the estimated average monthly billing;
ii) for each subsequent Contract Year, equal to the average of the monthly billing of the previous Contract Year.

10.4.3 Provided that the RPG shall not draw upon such Letter of Credit prior to the Due Date of the relevant Monthly Bill and/or Supplementary Bill, and shall not make more than one drawal in a Month.

10.4.4 Provided further that if at any time, such Letter of Credit amount falls short of the amount specified in Article 10.4.2 due to any reason whatsoever, DISCOM shall restore such shortfall within fifteen (15) days.

10.4.5 DISCOM shall cause the scheduled bank issuing the Letter of Credit to intimate the RPG, in writing regarding establishing of such irrevocable Letter of Credit.

10.4.6 DISCOM shall ensure that the Letter of Credit shall be renewed not later than its expiry.

10.4.7 All costs relating to opening, maintenance of the Letter of Credit shall be borne by DISCOM.

10.4.8 If DISCOM fails to pay undisputed Monthly Bill or Supplementary Bill or a part thereof within and including the Due Date, then, subject to Article 10.4.6 & 10.5.2, the RPG may draw uponthe Letter of Credit, and accordingly the bank shall pay without any reference or instructions from DISCOM, an amount equal to such Monthly Bill or Supplementary Bill or part thereof, in accordance with Article 10.4.3 above, by presenting to the scheduled bank issuing the Letter of Credit, the following documents:

i) a copy of the Monthly Bill or Supplementary Bill which has remained unpaid to RPG and;
ii) a certificate from the RPG to the effect that the bill at item (i) above, or specified part thereof, is in accordance with the Agreement and has remained unpaid beyond the Due Date;

10.5 Disputed Bill

10.5.1 If the DISCOM does not dispute a Monthly Bill or a Supplementary Bill raised by the RPG within fifteen (15) days of receiving such Bill shall be taken as conclusive.

10.5.2 If the DISCOM disputes the amount payable under a Monthly Bill or a Supplementary Bill, as the case may be, it shall pay undisputed amount of the invoice amount and it shall within fifteen (15) days of receiving such Bill, issue a notice (the "Bill Dispute Notice") to the invoicing Party setting out:

i) the details of the disputed amount;
ii) its estimate of what the correct amount should be; and iii) all written material in support of its claim.

10.5.3 If the RPG agrees to the claim raised in the Bill Dispute Notice issued pursuant to Article 10.5.2, the RPG shall revise such Bill and present along with the next Monthly Bill. In such a case excess amount shall be refunded along with interest at the same rate as Late Payment Surcharge, which shall be applied from the date on which such excess payment was made by the disputing Partyto the invoicing Party and up to and including the date on which such payment has been received as refund.

10.5.4 If the RPG does not agree to the claim raised in the Bill Dispute Notice issued pursuant to Article 10.5.2, it shall, within fifteen (15) days of receiving the Bill Dispute Notice, furnish a notice (Bill Disagreement Notice) to the DISCOM providing:

i) reasons for its disagreement;

ii) its estimate of what the correct amount should be; and iii) all written material in support of its counter-claim.

10.5.5 Upon receipt of the Bill Disagreement Notice by the DISCOM under Article 10.5.4, authorized representative(s) or a director of the board of directors/ member of board of the DISCOMand RPG shall meet and make best endeavours to amicably resolve such dispute within fifteen (15) days of receipt of the Bill Disagreement Notice.

10.5.6 If the Parties do not amicably resolve the Dispute within fifteen (15) days of receipt of Bill Disagreement Notice pursuant to Article 10.5.4, the matter shall be referred to Dispute resolution in accordance with Article 16.

10.5.7 For the avoidance of doubt, it is clarified the despite a Dispute regarding an invoice, DISCOM shall, without prejudice to its right to Dispute, be under an obligation to make payment of undisputed amount of the invoice amount in the Monthly Bill.

10.6 Quarterly and Annual Reconciliation

10.6.1 The Parties acknowledge that all payments made against Monthly Bills and Supplementary Bills shall be subject to quarterly reconciliation within 30 days of the end of the quarter at the beginning of the following quarter of each Contract Year and annual reconciliation at the end of each Contract Year within 30 days to take into account the Energy Accounts, Tariff adjustment payments, Tariff Rebate, Late Payment Surcharge, or any other reasonable circumstanceprovided under this Agreement.

10.6.2 The Parties, therefore, agree that as soon as all such data in respect of any quarter of a Contract Year or a full Contract Year as the case may be has been finally verified and adjusted, the RPG and DISCOM shall jointly sign such reconciliation statement. Within fifteen (15) days of signing of a reconciliation statement, the RPG shall make appropriate adjustments in the next Monthly Bill. Late Payment Surcharge/ interest shall be payable in such a case from the date on which such payment had been made to the invoicing Party or the date on which any payment was originally due, as may be applicable. Any Dispute with regard to the above reconciliation shall be dealt with in accordance with the provisions of Article 16.

10.7 Payment of Supplementary Bill

10.7.1 RPG may raise a ("Supplementary Bill") for payment on account of:

i) Adjustments required by the Energy Accounts (if applicable); or

ii) Change in Law as provided in Article 12

And such Supplementary Bill shall be paid by the other Party.

10.7.2 DISCOM shall remit all amounts due under a Supplementary Bill raised by the RPG to the RPG's Designated Account by the Due Date, except open access charges, RLDC or scheduling charges and transmission charges (if applicable). For Supplementary Bill on account of adjustment required by energy account, Rebate as applicable to Monthly Bills pursuant to Article 10.3.5 shall equally apply. No surcharge will be applicable other than that on the monthly energy payment and associated debit and credit note.

10.7.3 In the event of delay in payment of a Supplementary Bill by either Party beyond its Due Date, a Late Payment Surcharge shall be payable at the same terms applicable to the Monthly Bill in Article 10.3.3.

ARTICLE 11: FORCE MAJEURE

11.1 Definitions

11.1.1 In this Article, the following terms shall have the following meanings:

11.2 Affected Party

11.2.1 An affected Party means DISCOM or the RPG whose performance has been affected by an event of Force Majeure.

11.3 Force Majeure

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

a) Act of God, including, but not limited to lightning, drought, fire and explosion (to the extent originating from a source external to the site), earthquake, volcanic eruption, landslide, flood, cyclone, typhoon or tornado if and only if it is declared / notified by the competent state / central authority / agency (as applicable);
b) any act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, terrorist or military action if and only if it is declared / notified by the competent state / central authority / agency (as applicable); or
c) radioactive contamination or ionising radiation originating from a source in India or resulting from another Force Majeure Event mentioned above excluding circumstances where the source or cause of contamination or radiation is brought or has been brought into or near the Power Project by the Affected Party or those employed or engaged by the Affected Party.

11.4 Force Majeure Exclusions

11.4.1 Force Majeure shall not include (i) any event or circumstance which is within the reasonable control of the Parties and (ii) the following conditions, except to the extent that they are consequences of an event of Force Majeure:

a. Unavailability, late delivery, or changes in cost of the plant, machinery, equipment, materials, spare parts or consumables for the Power Project;
b. Delay in the performance of any contractor, sub-contractor or their agents ;
c. Non-performance resulting from normal wear and tear typically experienced in power generation materials and equipment;
d. Strikes at the facilities of the Affected Party;
e. Insufficiency of finances or funds or the agreement becoming onerous to perform; and
f. Non-performance caused by, or connected with, the Affected Party's:
    i. Negligent or intentional acts, errors or omissions;
    ii. Failure to comply with an Indian Law; or
    iii. Breach of, or default under this Agreement.

11.5 Notification of Force Majeure Event

11.5.1 The Affected Party shall give notice to the other Party of any event of Force Majeure as soon as reasonably practicable, but not later than seven (7) days after the date on which such Party knew or should reasonably have known of the commencement of the event of Force Majeure. If an event of Force Majeure results in a breakdown of communications rendering it unreasonable to give notice within the applicable time limit specified herein, then the Party claiming Force Majeure shall give such notice as soon as reasonably practicable after reinstatement of communications, but not later than one (1) day after such reinstatement.

11.5.2 Provided that such notice shall be a pre-condition to the Affected Party's entitlement to claim relief under this Agreement. Such notice shall include full particulars of the event of Force Majeure, its effects on the Party claiming relief and the remedial measures proposed. The Affected Party shall give the other Party regular (and not less than monthly) reports on the progress of those remedial measures and such other information as the other Party may reasonably request about the Force Majeure Event.

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

11.6 Duty to Perform and Duty to Mitigate

11.6.1 To the extent not prevented by a Force Majeure Event pursuant to Article 11.3, the Affected Party shall continue to perform its obligations pursuant to this Agreement. The Affected Party shall use its reasonable efforts to mitigate the effect of any Force Majeure Event as soon as practicable.

11.7 Available Relief for a Force Majeure Event

11.7.1 Subject to this Article 11:

(a) no Party shall be in breach of its obligations pursuant to this Agreement except to the extent that the performance of its obligations was prevented, hindered or delayed due to a Force Majeure Event;

(b) every Party shall be entitled to claim relief in relation to a Force Majeure Event in regard to its obligations;

(c) For avoidance of doubt, neither Party's obligation to make payments of money due and payable prior to occurrence of Force Majeure events under this Agreement shall be suspended or excused due to the occurrence of a Force Majeure Event in respect of such Party.

(d) Provided that no payments shall be made by either Party affected by a Force Majeure Event for the period of such event on account of its inability to perform its obligations due to such Force Majeure Event.

ARTICLE 12: CHANGE IN LAW

12.1 Definitions

In this Article 12, the term Change in Law shall refer to the occurrence of any of the following events pertaining to this project only after the last date of the bid submission, including

(i) the enactment of any new law; or

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

(iii) the requirement to obtain a new consent, permit or license; or

(iv) any modification to the prevailing conditions prescribed for obtaining an consent, permit or license, not owing to any default of the RPG; or (v) any change in the rates of any Taxes including any duties and cess or Introduction of any new tax made applicable for setting up the power project and supply of power from the Power project by the RPG Which have a direct effect on the Project.

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

In the event a Change in Law results in any adverse financial loss/ gain to the RPG then, in order to ensure that the RPG is placed in the same financial position as it would have been had it not been for the occurrence of the Change in Law, the RPG/ DISCOM shall be entitled to compensation by the other party, as the case may be, subject to the condition that the quantum and mechanism of compensation payment shall be determined and shall be effective from such date as may be decided by the Appropriate Commission.

In the event of any decrease in the recurring/ nonrecurring expenditure by the RPG or any income to the RPG on account of any of the events as indicated above, RPG shall file an application to the Appropriate Commission no later than sixty (60) days from the occurrence of such event, for seeking approval of Change in Law. In the event of the RPG failing to comply with the above requirement, in case of any gain to the RPG, DISCOM shall withhold the monthly tariff payments on immediate basis, until compliance of the above requirement by the RPG.

12.2 Relief for Change in Law

12.2.1 The aggrieved Party shall be required to approach the Appropriate Commission forseeking approval of Change in Law.

12.2.2 The decision of the Appropriate Commission to acknowledge a Change in Law and the date from which it will become effective, provide relief for the same, shall be final and governing on both the Parties.

ARTICLE 13: EVENTS OF DEFAULT AND TERMINATION

13.1 RPG Event of Default

13.1.1 The occurrence and/or continuation of any of the following events, unless any such event occurs as a result of a Force Majeure Event or a breach by DISCOM of its obligations under this Agreement, shall constitute an RPG Event of Default:

(i) the failure to commence supply of power to DISCOM up to the Contracted Capacity, by the end of the period specified in Article 4, or failure to continue supply of Contracted Capacity to DISCOM after Commercial Operation Date throughout the term of this Agreement, or

if

a) the RPG assigns, mortgages or charges or purports to assign, mortgage or charge any of its assets or rights related to the Power Project in contravention of the provisions of this Agreement; or

b) the RPG transfers or novates any of its rights and/ or obligations under this agreement,in a manner contrary to the provisions of this Agreement; except where such transfer

- is in pursuance of a Law; and does not affect the ability of the transferee to perform, and such transferee has the financial capability to perform, its obligations under this Agreement or
- is to a transferee who assumes such obligations under this Agreement and the Agreement remains effective with respect to the transferee;

(ii) if (a) the RPG becomes voluntarily or involuntarily the subject of any bankruptcy or insolvency or winding up proceedings and such proceedings remain uncontested for a period of thirty (30) days, or (b) any winding up or bankruptcy or insolvency order is passed against the RPG, or (c) the RPG goes into liquidation or dissolution or has a receiver or any similar officer appointed over all or substantially all of its assets or official liquidator is appointed to manage its affairs, pursuant to Law, provided that a dissolution or liquidation of the RPG will not be a RPG Event of Default if such dissolution or liquidation is for the purpose of a merger, consolidation or

reorganization and where the resulting company retains creditworthiness similar to the RPG and expressly assumes all obligations of the RPG under this Agreement and is in a position to perform them; or

(iii) the RPG repudiates this Agreement and does not rectify such breach within a period of thirty (30) days from a notice from DISCOM in this regard; or

(iv) except where due to any DISCOM's failure to comply with its material obligations, the RPG is in breach of any of its material obligations pursuant to this Agreement, and such material breach is not rectified by the RPG within thirty (30) days of receipt of first notice in this regard given by DISCOM.

(v) occurrence of any other event which is specified in this Agreement to be a material breach/ default of the RPG.

(vi) except where due to any DISCOM's failure to comply with its material obligations, the RPG is in breach of any of its material obligations pursuant to this Agreement, and such material breach is not rectified by the RPG within thirty (30) days of receipt of first notice in this regard given by DISCOM.

13.2 DISCOM Event of Default

13.2.1 The occurrence and the continuation of any of the following events, unless any such event occurs as a result of a Force Majeure Event or a breach by the RPG of its obligations under this Agreement, shall constitute the Event of Default on the part of defaulting DISCOM:

(i) DISCOM fails to pay (with respect to a Monthly Bill or a Supplementary Bill), subject to Article 10.5, for a period of ninety (90) days after the Due Date and the RPG is unable to recover the amount outstanding to the RPG through the Letter of Credit,

(ii) DISCOM repudiates this Agreement and does not rectify such breach even within a period of sixty (60) days from a notice from the RPG in this regard; or

(iii) except where due to any RPG's failure to comply with its obligations, DISCOM is in material breach of any of its obligations pursuant to this Agreement, and such material breach is not rectified by DISCOM within sixty (60) days of receipt of notice in this regard from the RPG to DISCOM; or

if

- DISCOM becomes voluntarily or involuntarily the subject of any bankruptcy or insolvency or winding up proceedings and such proceedings remain uncontested for a period of sixty (60) days, or
- any winding up or bankruptcy or insolvency order is passed against DISCOM, or
- DISCOM goes into liquidation or dissolution or a receiver or any similar officer is appointed over all or substantially all of its assets or official liquidator is appointed to manage its affairs, pursuant to Law, provided that it shall not constitute a DISCOM Event of Default, where such dissolution or liquidation of DISCOM or DISCOM is for the purpose of a merger, consolidation or reorganization and where the resulting entity has the financial standing to perform its obligations under this Agreement and has creditworthiness similar to DISCOM and expressly assumes all obligations of DISCOM and is in a position to perform them; or;

(iv) Occurrence of any other event which is specified in this Agreement to be a material breach or default of DISCOM.

13.3 Procedure for cases of RPG Event of Default

13.3.1 Upon the occurrence and continuation of any RPG Event of Default under Article 13.1, DISCOM shall have the right to deliver to the RPG, with a copy to the representative of the lenders to the RPG with whom the RPG has executed the Financing Agreements, a notice stating its intentionto terminate this Agreement (DISCOM Preliminary Default Notice), which shall specify in reasonable detail, the circumstances giving rise to the issue of such notice.

13.3.2 Following the issue of a DISCOM Preliminary Default Notice, the Consultation Period of ninety (90) days or such longer period as the Parties may agree, shall apply and it shall be the responsibility of the Parties to discuss as to what steps shall be taken with a view to mitigate the consequences of the relevant Event of Default having regard to all the circumstances.

13.3.3 During the Consultation Period, the Parties shall continue to perform their respective obligations under this Agreement.

13.3.4 Within a period of seven (7) days following the expiry of the Consultation Period unless the Parties shall have otherwise agreed to the contrary or the RPG Event of Default giving rise to the Consultation Period shall have ceased to exist or shall have been remedied, DISCOM may terminate this Agreement by giving a written Termination Notice of sixty (60) days to the RPG.

13.3.5 Subject to the terms of this Agreement, upon occurrence of a RPG Event of Default under this Agreement, the lenders in concurrence with the DISCOM, may exercise their rights, if any, under Financing Agreements, to seek substitution of the RPG by a selectee for the residual period of the Agreement, for the purpose of securing the payments of the total debt amount from the RPG and performing the obligations of the RPG. However, in the event the lenders are unable to substitute the defaulting RPG within the stipulated period, DISCOM may terminate the PPA and may acquire the Project assets for an amount equivalent to 90% of the debt due or less as mutually agreed, failing which, the lenders may exercise their mortgage rights and liquidate the Project assets.
Provided that any substitution under this Agreement can only be made with the prior consent of DISCOM including the condition that the selectee meets the eligibility requirements of Request for Selection (RfS) issued by DISCOM and accepts the terms and conditions of this Agreement.

13.3.6 The lenders in concurrence with DISCOM, may seek to exercise right of substitution under Article 13.3.5 by an amendment or novation of the PPA in favour of the selectee. The RPG shall cooperate with DISCOM to carry out such substitution and shall have the duty and obligation to continue to operate the Power Project in accordance with this PPA till such time as the substitution is finalized. In the event of Change in Shareholding/Substitution of Promoters triggered by the Financial Institutions leading to signing of fresh PPA with a new entity, an amount of Rs. 1 Lakh per

MW +18% GST per transaction as facilitation fee (non-refundable) shall be deposited by the RPG to DISCOM.

13.3.7 In the event the lenders are unable to substitute the defaulting RPG within the stipulated period, DISCOM may terminate the PPA and may acquire the Project assets for an amount equivalent to 90% of the debt due, failing which, the lenders may exercise their mortgage rights andliquidate the Project assets.

13.4 Procedure for cases of DISCOM Event of Default

13.4.1 Upon the occurrence and continuation of any DISCOM Event of Default specified in Article 13.2, the RPG shall have the right to deliver to DISCOM, a RPG Preliminary Default Notice, which notice shall specify in reasonable detail the circumstances giving rise to its issue.

13.4.2 Following the issue of a RPG Preliminary Default Notice, the Consultation Period of ninety (90) days or such longer period as the Parties may agree, shall apply and it shall be the responsibility of the Parties to discuss as to what steps shall be taken with a view to mitigate the consequences of the relevant Event of Default having regard to all the circumstances.

13.4.3 During the Consultation Period, the Parties shall continue to perform their respective obligations under this Agreement.

13.4.4 After a period of two hundred ten (210) days following the expiry of the Consultation Period and unless the Parties shall have otherwise agreed to the contrary or DISCOM Event of Default giving rise to the Consultation Period shall have ceased to exist or shall have been remedied, DISCOM under intimation to RPG shall, subject to the prior consent of the RPG, novate its part of the PPA to any third party, including its Affiliates within the stipulated period. In the event the aforesaid novation is not acceptable to the RPG, or if no offer of novation is made by DISCOM within the stipulated period, then the RPG may terminate the PPA and at its discretion require DISCOM to either (i) takeover the Project assets by making a payment of the termination compensation equivalent to the amount of the debt due and 150% (one hundred and fifty per cent) ofthe adjusted equity or, (ii) pay to the RPG, damages, equivalent to 6 (six) months, or balance PPA period whichever is less, of charges for its contracted capacity, with the Project assets being retainedby the RPG.
Provided further that at the end of three (3) months period from the period mentioned in this Article 13.4.4, this Agreement may be terminated by the RPG.

13.5 Termination due to Force Majeure

13.5.1 If the Force Majeure Event or its effects continue to be present beyond a period as specified in Article 4.4.2, either Party shall have the right to cause termination of the Agreement. In such an event this Agreement shall terminate on the date of such Termination Notice without any further liability to either Party from the date of such termination.

ARTICLE 14: LIABILITY AND INDEMNIFICATION

14.1 Indemnity

14.1.1 The RPG shall indemnify, defend and hold DISCOM harmless against:

a) any and all third party claims against DISCOM for any loss of or damage to property of such third party, or death or injury to such third party, arising out of a breach by the RPG of any of its obligations under this Agreement; and

b) any and all losses, damages, costs and expenses including legal costs, fines, penalties and interest actually suffered or incurred by DISCOM from third party claims arising by reason of a breach by the RPG of any of its obligations under this Agreement, (provided that this Article 14 shall not apply to such breaches by the RPG, for which specific remedies have been providedfor under this Agreement).

14.1.2 DISCOM shall indemnify, defend and hold the RPG harmless against:

a) any and all third party claims against the RPG, for any loss of or damage to property of such third party, or death or injury to such third party, arising out of a breach by DISCOM of any of their obligations under this Agreement; and

b) any and all losses, damages, costs and expenses including legal costs, fines, penalties and interest ('Indemnifiable Losses') actually suffered or incurred by the RPG from third party claimsarising by reason of a breach by DISCOM of any of its obligations.

14.2 Procedure for claiming Indemnity

14.2.1 Third party claims

a. Where the Indemnified Party is entitled to indemnification from the Indemnifying Party pursuant to Article 14.1.1(a) or 14.1.2(a), the Indemnified Party shall promptly notify the Indemnifying Party of such claim referred to in Article 14.1.1(a) or 14.1.2(a) in respect of which it is entitled to be indemnified. Such notice shall be given as soon as reasonably practicable after the Indemnified Party becomes aware of such claim. The Indemnifying Party shall be liable to settle the indemnification claim within thirty (30) days of receipt of the above notice. Provided however that, if:

i) the Parties choose to refer the dispute before the Arbitrator in accordance with Article 16.3.2; and

ii) the claim amount is not required to be paid/ deposited to such third party pending the resolution of the Dispute,

the Indemnifying Party shall become liable to pay the claim amount to the Indemnified Party or to the third party, as the case may be, promptly following the resolution of the Dispute, if such Dispute is not settled in favour of the Indemnified Party.

b. The Indemnified Party may contest the claim by referring to the Arbitrator for which it is entitled to be Indemnified under Article 14.1.1(a) or 14.1.2(a) and the Indemnifying Party shall reimburse to the Indemnified Party all reasonable costs and expenses incurred by the Indemnified party. However, such Indemnified Party shall not settle or compromise such claim without first getting the consent of the Indemnifying Party, which consent shall not be unreasonably withheld or delayed.

An Indemnifying Party may, at its own expense, assume control of the defence of any proceedings brought against the Indemnified Party if it acknowledges its obligation to indemnify such Indemnified Party, gives such Indemnified Party prompt notice of its intention to assume control of the defence, and employs an independent legal counsel at its own cost that is reasonably satisfactory to the Indemnified Party.

14.3 Indemnifiable Losses

14.3.1 Where an Indemnified Party is entitled to Indemnifiable Losses from the Indemnifying Party pursuant to Article 14.1.1(b) or 14.1.2(b), the Indemnified Party shall promptly notify the Indemnifying Party of the Indemnifiable Losses actually incurred by the Indemnified Party. The Indemnifiable Losses shall be reimbursed by the Indemnifying Party within thirty (30) days of receipt of the notice seeking Indemnifiable Losses by the Indemnified Party. In case of nonpaymentof such losses after a valid notice under this Article 14.3, such event shall constitute a payment default under Article 13.

14.4 Limitation on Liability

14.4.1 Except as expressly provided in this Agreement, neither the RPG nor its/ their respective officers, directors, agents, employees or affiliates (or their officers, directors, agents or employees), shall be liable or responsible to the other Party or its affiliates, officers, directors, agents, employees, successors or permitted assigns or their respective insurers for incidental, indirect or consequential damages, connected with or resulting from performance or non-performance of this Agreement, or anything done in connection herewith, including claims in the nature of lost revenues, income or profits (other than payments expressly required and properly due under this Agreement), any increased expense of, reduction in or loss of power generation or equipment used therefore, irrespective of whether such claims are based upon breach of warranty, tort (including negligence, whether of DISCOM , the RPG or others), strict liability, contract, breach of statutory duty, operationof law or otherwise.

14.4.2 DISCOM shall have no recourse against any officer, director or shareholder of the RPG or any Affiliate of the RPG or any of its officers, directors or shareholders for such claims excluded under this Article. The RPG shall have no recourse against any officer, director or shareholder of DISCOM, or any affiliate of DISCOM or any of its officers, directors or shareholders for such claims excluded under this Article.

14.5 Duty to Mitigate

14.5.1 The Parties shall endevour to take all reasonable steps so as mitigate any loss or damage which has occurred under this Article 14.

ARTICLE 15: ASSIGNMENTS AND CHARGES

15.1 Assignments

This Agreement shall be binding upon, and inure to the benefit of the Parties and their respective successors and permitted assigns. This Agreement shall not be assigned by any Party, except to the Project Lenders or Lender's Representative as security for their debt under the Financing Agreements, other than by mutual consent between the Parties to be evidenced in writing. Such assignment shall be agreed to by DISCOM subject to the compliance of provisions contained in this Agreement and more specifically to the provisions of Article 4.1.1 of this Agreement. In no case, such assignment shall be permissible prior to the declaration of COD.

Provided that, DISCOM shall permit assignment of any of RPG's rights and obligations under this Agreement in favour of the lenders to the RPG, if required under the Financing Agreements. Provided that, such consent shall not be withheld if DISCOM seeks to transfer to any transferee all ofits rights and obligations under this Agreement.

The enforcement of the rights and obligation between the RPG and the DISCOM provided in this Agreement shall not be treated as an assignment but an enforcement of the terms agreed under this Agreement.

Provided further that any successor(s) or permitted assign(s) identified after mutual agreement between the Parties may be required to execute a new agreement on the same terms and conditions asare included in this Agreement. An amount of Rs. 1 Lakh per Transaction as Facilitation Fee (non-refundable) shall be deposited by the RPG to DISCOM. Provided further that, such consent shall not be withheld by the RPG if DISCOM seeks to transfer to any affiliate all of its rights and obligations under this Agreement.

In the event of Change in Shareholding/Substitution of Promoters triggered by the Financial Institutions leading to signing of fresh PPA with a New Entity, an amount of Rs. 1 Lakh per Transaction as Facilitation Fee (non-refundable) shall be deposited by the RPG to DISCOM.

15.2 Permitted Charges

15.2.1 RPG shall not create or permit to subsist any encumbrance over all or any of its rights and benefits under this Agreement, other than as set forth in Article 15.1 and the Guidelines.

ARTICLE 16: GOVERNING LAW AND DISPUTE RESOLUTION

16.1 Governing Law

16.1.1 This Agreement shall be governed by and construed in accordance with the Laws of India. Any legal proceedings in respect of any matters, claims or disputes under this Agreement shall be under the jurisdiction of appropriate courts in_____.

16.2 Amicable Settlement and Dispute Resolution

16.2.1 Amicable Settlement

i. Either Party is entitled to raise any claim, dispute or difference of whatever nature arising under, out of or in connection with this Agreement ("Dispute") by giving a written notice (Dispute Notice) to the other Party, which shall contain:
   (a) a description of the Dispute;
   (b) the grounds for such Dispute; and
   (c) all written material in support of its claim.

ii. The other Party shall, within thirty (30) days of issue of Dispute Notice issued under Article 16.2.1(i), furnish:
   (a) counter-claim and defences, if any, regarding the Dispute; and
   (b) all written material in support of its defences and counter-claim.

iii. Within thirty (30) days of issue of Dispute Notice by any Party pursuant to Article 16
   (i) if the other Party does not furnish any counter claim or defence under Article 16
   (ii) or thirty (30) days from the date of furnishing counter claims or defence by the other Party, both the Parties to the Dispute shall meet to settle such Dispute amicably. If the Parties fail to resolve the Dispute amicably within thirty (30) days from the later ofthe dates mentioned in this Article 16.2.1.
   (iii) the Dispute shall be referred for dispute resolution in accordance with Article 16.3.

16.3 Dispute Resolution

16.3.1 Dispute Resolution by the Appropriate Commission

i) Where any Dispute or differences arises in relation to this agreement of any nature whatsoever including the construction, interpretation or implementation of the provisions of this agreement as well as claim made by any Party for any change in or determination of the Tariff or any matter related to Tariff or claims made by any Party which partly or wholly relate to any change in the Tariff or determination of any of such claims could result in change in the Tariff, and relates to any matter agreed to be referred to the Appropriate Commission, shall be submitted to adjudication by the Appropriate Commission. Appeal against the decisions of the Appropriate Commission shall be made only as per the provisions of the Electricity Act, 2003, as amended from time to time.

ii) DISCOM shall be entitled to co-opt the lenders (if any) as a supporting party in such proceedings before the Appropriate Commission.

16.3.2 Dispute Resolution through Arbitration

i) If the Dispute arising as per Article 16.2.1 is not amicably resolved & such dispute is not covered in Article 16.3.1(i), such Dispute shall be resolved by arbitration under the provisions of the Electricity Act, 2003 (as amended from time to time) as under: Proceedings as well as appointment of the arbitrator(s) shall be carried out by the Appropriate Commissions under the Electricity Act 2003 as amended from time to time. As stipulated by the said Electricity Act

2003, the said arbitration will take place as per the provisions of the Arbitration and ConciliationAct 1996 as amended from time to time.

ii) ii) The place of arbitration shall be the_____(City where head quarter of DISCOM is located). The language of the arbitration shall be English.

iii) The Arbitration Tribunal's award shall be substantiated in writing. The Arbitration Tribunal shall also decide on the costs of the arbitration proceedings and the allocation thereof.

iv) The provisions of this Article shall survive the termination of this PPA for any reason whatsoever.

v) The award shall be of majority decision.

vi) DISCOM shall be entitled to co-opt the lenders (if any) as a supporting party in such arbitration proceedings.

16.4 Parties to Perform Obligations

16.4.1 Notwithstanding the existence of any Dispute and difference referred to the Appropriate Commission and save as the Appropriate Commission may otherwise direct by a final or interim order, the Parties hereto shall continue to perform their respective obligations (which are not in dispute) under this Agreement.

ARTICLE 17: MISCELLANEOUS PROVISIONS

17.1 Amendment

17.1.1 This Agreement may only be amended or supplemented by a written agreement between the Parties.

17.2 Third Party Beneficiaries

17.2.1 This Agreement is solely for the benefit of the Parties and their respective successors and permitted assigns and shall not be construed as creating any duty, standard of care or any liability to, any person not a party to this Agreement.

17.3 Waiver

17.3.1 No waiver by either Party of any default or breach by the other Party in the performance of any of the provisions of this Agreement shall be effective unless in writing dulyexecuted by an authorised representative of such Party.

17.3.2 Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement nor time or other indulgence granted by one Party to the other Parties shall act as a waiver of such breach or acceptance of any variation or the relinquishment of any such right or any other right under this Agreement, which shall remain in full force and effect.

17.4 Confidentiality

17.4.1 The Parties undertake to hold in confidence this Agreement and not to disclose the terms and conditions of the transaction contemplated hereby to third parties, except:

a) to their professional advisors;

b) to their officers, contractors, employees, agents or representatives, financiers, who need to have access to such information for the proper performance of their activities; or

c) disclosures required under Law, without the prior written consent of the other Party.

17.5 Severability

17.5.1 The invalidity or unenforceability, for any reason, of any part of this Agreement shall not prejudice or affect the validity or enforceability of the remainder of this Agreement, unless the part held invalid or unenforceable is fundamental to this Agreement.

17.6 Notices

17.6.1 All notices or other communications which are required to be given under this Agreement shall be in writing and in the English language.

17.6.2 If to the RPG, all notices or other communications which are required must be delivered personally or by registered post or facsimile or any other method duly acknowledged to the addresses below:

Address:
Attention:
Email:
Fax. No. :
Telephone No. :

17.6.3 If to DISCOM, all notices or communications must be delivered personally or by registered post or facsimile or any other mode duly acknowledged to the address(es) below:

Address:
Attention:
Email:
Fax. No. :
Telephone No. :

17.6.4 All notices or communications given by facsimile shall be confirmed by sending a copy of the same via post office in an envelope properly addressed to the appropriate Party for delivery by registered mail. All notices shall be deemed validly delivered upon receipt evidenced by an acknowledgement of the recipient, unless the Party delivering the notice can prove in case of delivery through the registered post that the recipient refused to acknowledge the receipt of the notice despite efforts of the postal authorities.

17.6.5 Any Party may by notice of at least fifteen (15) days to the other Party change the address and/or addresses to which such notices and communications to it are to be delivered or mailed.

17.7 Language

17.7.1 All agreements, correspondence and communications between the Parties relating to this Agreement and all other documentation to be prepared and supplied under the Agreement shall be written in English, and the Agreement shall be construed and interpreted in accordance with English language.

17.7.2 If any of the agreements, correspondence, communications or documents are preparedin any language other than English, the English translation of such agreements, correspondence, communications or documents shall prevail in matters of interpretation.

17.8 Restriction of Shareholders / Owners' Liability

17.8.1 Parties expressly agree and acknowledge that none of the shareholders of the Parties hereto shall be liable to the other Parties for any of the contractual obligations of the concerned Party under this Agreement. Further, the financial liabilities of the shareholder/s of each Party to this Agreement, shall be restricted to the extent provided in the Indian Companies Act, 2013.

17.9 Taxes and Duties

17.9.1 The RPG shall bear and promptly pay all statutory taxes, duties, levies and cess, assessed/ levied on the RPG, contractors or their employees that are required to be paid by the RPG as per the Law in relation to the execution of the Agreement and for supplying power as per the terms of this Agreement.

17.9.2 DISCOM shall be indemnified and held harmless by the RPG against any claims that may be made against DISCOM in relation to the matters set out in Article 17.9.1.

17.9.3 DISCOM shall not be liable for any payment of, taxes, duties, levies, cess whatsoever for discharging any obligation of the RPG by DISCOM on behalf of RPG.

17.10 Independent Entity

17.10.1 The RPG shall be an independent entity performing its obligations pursuant to the Agreement.

17.10.2 Subject to the provisions of the Agreement, the RPG shall be solely responsible for the manner in which its obligations under this Agreement are to be performed. All employees and representatives of the RPG or contractors engaged by the RPG in connection with the performance ofthe Agreement shall be under the complete control of the RPG and shall not be deemed to be employees, representatives, contractors of DISCOM and nothing contained in the Agreement or in any agreement or contract awarded by the RPG shall be construed to create any contractual relationship between any such employees, representatives or contractors and DISCOM.

17.11 Compliance *with Law*

Despite anything contained in this Agreement but without prejudice to this Article, if any provision of this Agreement shall be in deviation or inconsistent with or repugnant to the provisions contained in the Electricity Act, 2003, or any rules and regulations made there under, such provision of this Agreement shall be deemed to be amended to the extent required to bring it into compliance with the aforesaid relevant provisions as amended from time to time.

17.12 Breach of Obligations

The Parties acknowledge that a breach of any of the obligations contained herein would result in injuries. The Parties further acknowledge that the amount of the liquidated damages or the method of calculating the liquidated damages specified in this Agreement is a genuine and reasonable pre-estimate of the damages that may be suffered by the non-defaulting party in each case specified under this Agreement.

IN WITNESS WHEREOF the Parties have caused the Agreement to be executed through their duly authorized representatives as of the date and place set forth above.

For and on behalf of [DISCOM]	For and on behalf of [RPG]
Name, Designation and Address	Name, Designation and Address
Signature with seal	Signature with seal
Witness: 1. 2.	Witness: 1. 2.

Annexure-III

Guidelines for Installation of Innovative Stand-alone Solar Pumps

These guidelines are applicable for all Indian innovators/manufacturers/service providers, who wish to install innovative stand-alone solar pumps in the country under Schemes operated by the MNRE.

I. Call of Expression of Interest (EoI)

a) The Ministry will call EoI from time to time for inviting application from solar pump innovators claiming better performance on account of improved efficiency, cost effectiveness, monitoring, other value addition, etc. Only those innovative products which are available for testing and field trial will be eligible for participation in the EoI.

b) New technologies for which patent/IP related filings have been done (patent may not have been awarded) will also be eligible to participate in the EoI. Organization which has filed the patent should be the sole applicant or lead partner in case of a consortium/JV.

c) The elements of innovation in the context of improved performance of solar pump needs to be mentioned very clearly by the applicants in their response to EoI. A cost benefit analysis shall also be enclosed with the proposal.

II. Evaluation of Applications

Applications will be evaluated by an Evaluation Committee constituted by MNRE having technical and financial experts of the sector including academic experts. Test report for the proposed solar pump will be submitted by the innovator along with EoI, however, if deemed necessary, the Committee may recommend re-testing of performance of the pump at NISE or any other NABL accredited lab before allowing installation of such pumps in the field. In cases, where the technology is in its nascent stage, special method may be adopted to test the pumps in consultation with the innovator and NISE. The expenditure incurred on testing will be borne by the applicant.

III. Demonstration of the Innovation

a) On recommendations of the Committee, the innovative technology will be allowed for demonstration in the field after getting consent from respective state implementing agency (SIA) and the beneficiary farmers by the innovator. The innovator will be allowed to install up to 50 solar pumps in different parts of the State/UT for demonstration purpose.

b) For payment (subsidy and beneficiary share), AMC, performance guarantee, etc., the innovators will be treated at par with other vendors selected through competitive bidding process and awarded work for installation of solar water pumps in the respective state/UT and the innovators will not get any additional cost over and above the cost discovered through tendering process. Further, the innovators is required to deposit bank guarantee equivalent to payment made to him against the installation of solar pump, which will be encashed, if the pump is failed to meet at least the existing MNRE performance standards during demonstration period of one year. In addition, the innovators have to fill-up indemnity bond against damages caused to farmer due to under performance of pump during the period of demonstration. On successful trail of pump, the indemnity bond and bank guarantee would be released, however, the performance guarantee as applicable during the period of AMC will be retained by the SIA.

c) The field demonstration will continue for at least one year from date of installation of such pumps and during that period the performance of the pump will be monitored on real time basis. Access to remote monitoring facility for the installed pumps shall be provided to NISE so that field data may be accumulated and evaluated.

d) Innovator will submit on monthly basis a detailed performance report of the pump including a comparative analysis with similar capacity pump specified by the MNRE, along with feedback from SIA & beneficiary farmers to the Evaluation Committee. MNRE/NISE will also conduct field inspection to check the performance as and when required.

e) Installed innovative pumps shall meet at least the existing MNRE performance standards. However, only the innovations showing substantial improvement from the MNRE specifications may be considered for adoption. A comparative analysis of performance of innovative technology vis-à-vis MNRE specifications will also be done by the Evaluation Committee.

f) After detailed examination and deliberations, the Evaluation Committee may recommend for adoption of specifications of innovative pump, with certain modifications, if required.

IV. Adoption of technology by MNRE

On recommendations of the Evaluation Committee, the MNRE may adopt the innovative technology and update the existing specification after having detailed stakeholders' consultation on the same. For innovations with outstanding performance the innovators will get certificate of appreciation from MNRE.