

Solar Irrigation Set Specification				
S.No	Particulars	Specification	Complied / Not Complied	Remarks
1	PV array capacity	5 KWp		
2	Motor pump set	A.C. Induction Motor Pump Set with a suitable Inverter		
		Motor capacity- 5HP		
3	Output performance	Under the "Average Daily Solar Radiation" condition of 7.15 KWh / sq.m. On the surface of PV array (i.e. coplanar with the PV Modules), the minimum water output from a Solar PV Water Pumping System at different "Total Dynamic Heads" should be as specified below:-		
		I. 90 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 metres (Suction head, if applicable, minimum of 7 metres) and with the shut off head being at least 12metres.		
		II. 45 liters of water per watt peak of PV array, from a Total Dynamic Head of 20 metres (Suction head, if applicable, up to a maximum of 7 metres) and with the shut off head being at least 25metres.		
		III. 32 liters of water per watt peak of PV array, from a Total Dynamic Head of 30 metres and the shut off head being at least 45metres.		
		IV. 19 liters of water per watt peak of PV array, from a Total Dynamic Head of 50 metres and the shut off head being at least 70metres.		
		V. 13 liters of water per watt peak of PV array, from a Total Dynamic Head of 70 metres and the shut off head being at least 100metres.		
		VI. 8.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 100 metres and the shut off head being at least 150metres.		
		Note: The type of pump set used must match the total dynamic head requirement of the site (i.e. the location at which it is installed). Moreover, it should be appropriately tested and certified by the authorized test centres of the Ministry to meet the performance and water discharge norms specified above.		

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4	SPV water pumping system	Submersible motor set		
		Matching with PV array capacity of 4800-6000 Watts peak, measured under STC		
		Minimum peak per PV module- 240 W; with sufficient modules in series and parallel		
		Indigenously produced PV module (s) containing mono/ multi crystalline silicon solar cells should be used in the PV array for the SPV Water Pumping systems.		
		Modules supplied with the SPV water pumping systems should have certificate as per IEC 61215 specifications or equivalent National or International/ Standards.		
		Modules must qualify to IEC 61730 Part I and II for safety qualification testing.		
		The efficiency of the PV modules should be minimum 14% and fill factor should be more than70%.		
		The terminal box on the module should have a provision for "Opening" for replacing the cable, if required.		
		There should be a Name Plate fixed inside the module which will give:		
		Name of the Manufacturer or Distinctive Logo.		
		Model Number		
		Serial Number		
		Year of manufacture		
Test reports should be MNRE specification as per 2015-16.				
Attached the test report of module.				

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5	Motor pump set	All parts of the pump and the motor of the submersible pumps should be made of stainless steel.		
		The manufacturers of pumps should self-certify that, the pump and all external parts of motor used in submersible pump which are in contact with water, are of stainless steel. The pumps used for solar application should have a 5 years warranty so it is essential that the construction of the pump be made using parts which have a much higher durability and do not need replacement or corrode for at least 5 years.		
		Provision for remote monitoring of the installed pumps must be made in the controllers or the inverters either through an integral arrangement or through an externally fitted arrangement. It should be possible to ascertain the daily water output, the power generated by the PV array, the UP TIME of the pump during the year, number of days the pump was unused or under breakdown/repairs.		
		The following details should be marked indelibly on the motor pump set: a) Name of the Manufacturer or Distinctive Logo. b) Model number c) Serial number		
		The suction/ delivery pipe (GI/HDPE), electric cables, floating assembly, civil work and other fittings required to install the Motor Pump set.		
6	Mounting structure	The PV modules should be mounted on metallic structures of adequate strength and appropriate design, which can withstand load of modules and high wind velocities up to 150 km per hour. The support structure used in the pumping system should be hot dip galvanized iron with minimum 80 micron thickness. Movable structure with seasonal and daily tracking, installed at 8 feet height.		
7	Tracking system	To enhance the performance of SPV water pumping systems, manual or passive or auto tracking system must be used. For manual tracking, arrangement for seasonal tilt angle adjustment and three times manual tracking in a day should be provided.		

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8	Electronics and protections	Maximum Power Point Tracker (MPPT) should be included to optimally use the Solar panel and maximize the water discharge.		
		The inverter must have IP 54 protection or must be housed in a cabinet having at least IP54 protection.		
		Adequate protections should be incorporated against dry operation of motor pump set, lightning, hails and storms.		
		Full protection against open circuit, accidental short circuit and reverse polarity should be provided.		
9	On Off switch	A good reliable switch suitable for AC use is to be provided. Sufficient length of cable should be provided for inter- connection of the PV array, Controller / Inverter and the motor pump set.		
10	Warranty	The PV Modules must be warranted for output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. The whole system including submersible shall be warranted for 5 years. Required Spares for trouble free operation during the Warrantee period should be provided along with the system.		
11	Operation and maintenance manual	An Operation and Maintenance Manual, in English and Hindi, should be provided with the solar PV pumping system. The Manual should have information about solar energy, photovoltaic, modules, 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. Name and address of the person or Centre 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. Replacement or maintenance within a week.		
12	Water output*	40,800 liters per day 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		

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		the surface of PV array (i.e. coplanar with the PV Modules.)		
13	Module mounting	Module mounting structure shall be MS hot dipped galvanized, with a facility of manual tracking at least three times a day.		
14	Payment Terms and work Allocation	Reference: Standard Bidding Documents (SBD) (MNRE)		

<b>Specification for pipeline</b>				
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1	Pipeline	1500 feet, uPVC quality irrigation pipeline, Class 3, 90 mm diameter and 6 kg pressure		