



**Pradhan Mantri  
Kisan Urja Suraksha evam Utthan  
Mahabhiyan (PM KUSUM)**

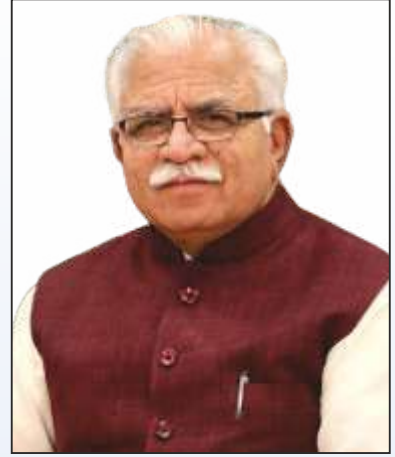


HAND BOOK ON  
**SOLAR WATER PUMPING  
PROGRAMME  
IN HARYANA**



**NEW AND RENEWABLE ENERGY DEPARTMENT, HARYANA  
HARYANA RENEWABLE ENERGY DEVELOPMENT AGENCY (HAREDA)**





## **Shri Manohar Lal**

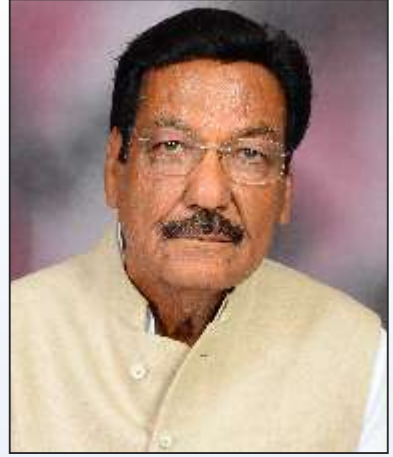
Hon'ble Chief Minister, Haryana

Agriculture is the basis of human life. Irrigation is a fundamental requirement for advanced agriculture. Haryana government is dedicated towards the welfare of farmers. Under the visionary leadership of Hon'ble Prime Minister Shri Narendra Modi, the Central Government and the State Government are taking many steps to increase the income of the farmers. One of these steps is the “Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Maha Abhiyan (PMKUSUM)” scheme for widespread use of solar energy in the agriculture sector, which aims to establish an additional capacity of 30,800 MW by the year 2022 in the country. This capacity will be achieved by the farmers through solarization of solar power plants, solar pumps and agricultural feeders.

Haryana Government is actively participating in this great campaign of Hon'ble Prime Minister. Pumps of 3 HP to 10 HP capacity are being provided to the farmers of the State at 75% subsidy. This will not only reduce the cost of farming but also provide facility of irrigation during daytime to the farmers. Solar energy is available in Haryana for 320 days in a year, so these pumps will be very beneficial for the farmers. From the year 1998 to the year 2014, only 492 pumps were installed in the State. Our Government had made a plan for installation of 50,000 solar pumps in the State in 2018 and has so far installed more than 23,000 solar pumps in the state which is a record.

I am happy to know that the farmers of the State have taken full advantage of this scheme and Haryana stood first in the country by installing 15,000 solar pumps in the year 2020-21. It will be our endeavor that all the diesel pump sets being used in the agricultural sector of the State should be replaced with solar pump sets at the earliest so that along with reducing the cost of agriculture, we can save foreign exchange by saving diesel and preserve the environment for future generations. The Department of New and Renewable Energy, has prepared this booklet to inform the farmers about the solar pump program. I hope this booklet will be beneficial for the farmers.

Manohar Lal



## **Shri Ranjit Singh**

Hon'ble Minister, Power & NRE, Haryana

Haryana is an agrarian State. Agriculture covers 80 percent of the state's land area of which about 84 percent is irrigated. There are about 6 lakh 40 thousand electric tube-bells and 3 lakh diesel tube-bells in the state. There is a huge demand for tube bulls for agricultural work in the State.

The State government is providing electric as well as solar tube-balls to farmers to meet their irrigation needs. Under the guidance of Hon'ble Prime Minister Shri Narendra Modi ji and Honorable Chief Minister of the State, Shri Manohar Lal ji, the "Pradhan Mantri Kisan Urja Suraksha and Utthan Maha Abhiyan (PMKUSUM)" scheme is being run in the State, under which farmers of the State are being provided pumps of 3 HP to 10 HP capacity at only 25% of the cost.

I am happy to know that the farmers of the state have taken full advantage of this scheme and Haryana stood first in the country by installing 15,000 solar pumps in the year 2020-21. Seeing the enthusiasm of the farmers towards this scheme, the state government has set a target of setting up 22,000 more solar pumps in the state in the year 2021-22.

I hope that this scheme will contribute not only in reducing the expenditure on fuel in agriculture but will also increase the clean energy production in the State. I congratulate the Department for their efforts.

Ranjit Singh



## **S.N. Roy, IAS**

Additional Chief Secretary to Govt. Haryana  
Power and NRE



Agriculture is the mainstay of Indian economy and about 17% of electricity and 80% of ground water is used in this sector alone. Agriculture sector also uses huge quantities of diesel for pump operations. India shares 17% of the global population with only 2.4% of land and 4% of the water resources. Therefore, efficient, affordable and reliable availability of water resources is crucial and national priority for sustainable development. Considering the climate change concerns of our country, under its Intended Nationally Determined Contribution (INDC) has pledged to reduce the emission intensity of its GDP by 33 to 35% by 2030 from 2005 level. The Govt. of India has fixed a goal to install 450 GW of renewable energy capacity by 2030. The Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan (PMKUSUM) scheme aims at to achieve enhanced solar capacity of 30.8 GW by 2022 with targets of 10,000 MW under Component A, 20 lakh stand alone solar pumps under Component B and Solarisation of 15 lakh grid connected pumps under Component C.

Haryana ranks 6th in the country with about 174.97 lakh MT annual food grain production whereas area wise it is at 22nd position. It spends more than seven thousand crore annually on agriculture pumps electric subsidy. Implementation of Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan (PMKUSUM) has provided an opportunity to farmers to shift from diesel pumps to solar pumps. Analysis of data shows that the beneficiaries of PMKUSUM are either marginal farmers who didn't have electricity connection or those who were using diesel pumps.

Haryana has performed well in achieving the target of 15,000 pumps of 2020-21 despite difficult COVID conditions and a target of 22,000 pumps has been fixed for 2021-22. The State Government is committed for the cause of farmers and efforts are being made to operationalize Component A and component C of the PMKUSUM also.

I congratulate the Department of New & Renewable Energy, Haryana for their efforts in implementing Solar Pumps scheme in the State in a big way. The 15,000 pumps installed in 2020-21 have added solar capacity of about 105 MW in the State and have resulted in reducing the carbon footprint by about 76,000 tonnes annually.

I hope that this booklet will be useful to the public in general and farmers in particular.

S.N. Roy



## **Dr. Hanif Qureshi, IPS**

Secretary to Govt. Haryana, New & Renewable Energy Department  
and Director General, NRE & HAREDA

Haryana is an agrarian State. About 84% of its land area is irrigated as against national average of about 48%. Extensive farm operations in the State have resulted in more than 6,40,000 grid connected tube-well connections, with another about 1,00,000 farmers waiting to get grid connection. In addition, there are about 300,000 diesel pumps. Together, the roughly one million pumps extract 9.45 billion cubic meters (BCM) of groundwater every year, against a net annual groundwater availability of 8.63 BCM.

The Government of Haryana's annual farm subsidy burden is more than Rs. 7,000 crores, amounting to an average per pump annual subsidy of Rs. 1,16,436. Not only is the farm subsidy burden in Haryana high and unsustainable, the regime under which the subsidy is delivered to farmers has also led to inefficient and unsustainable pumping of groundwater. With a spurt in global demand for solar PV technology and the Government of India adopting an ambitious target of achieving 100 Giga-watt (GW) of solar installed capacity by 2021, the prices of solar pumps have been steadily declining. Today, the cost of off-grid solar irrigation systems has fallen to below Rs. 55 per watt-peak. Replacing electric pumps with solar irrigation pumps presents an opportunity for state governments and utilities to get farmers off the electricity grid; thereby improving their financial viability. The cost structure of Solar Pumps is such that they have high capital cost but near-zero operating cost. This means that Solar Pumps can offer farmers high quality, day-time, zero marginal cost energy, with no possibility of rationing power supply. These pumps have unique feature of self-limiting, as it works only during day time. Doing so will incentivise farmers to use energy and groundwater efficiently, eliminate farm power subsidies, reduce the carbon footprint of groundwater irrigation and improve the financial viability of electricity utilities.

The launch of Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan (PMKUSUM) in July 2019 offered immense opportunities to States to propagate intervention of Solar Energy in farm sector for the benefit of farmers by independence from grid power and reduction in input costs. Haryana is one of the front runner States in grabbing the opportunity and it decided to implement the Component B of PMKUSUM for off-grid Solar Pumps with total 75% subsidy including 30% CFA from the Ministry of New & Renewable Energy (MNRE), Govt. of India. For 2019-20 (implemented in 2020-21) Haryana was given a target of 15,000 off-grid solar pumps of 3 HP to 10 HP capacity and I am pleased to say that the response of farmers for this scheme had been over-whelming due to which we could achieve the targets. Encouraged by the response of farmers, the Department has fixed a target of 22,000 off-grid pumps during the current financial year. Work orders for 8,884 pumps have been released and more than 1,000 pumps have already been installed.

This booklet has been prepared for benefit of farmers who can understand benefits of solar pumps, the process of application, broad specifications and operational parameters. I am sure that this effort of the Department will be well-received by all stakeholders.



## About the Department

The Department of Renewable Energy, Haryana, was established in May, 1995. It is the nodal department for the state of Haryana for Renewable Energy (RE), Demand Side Management (DSM) and Energy Conservation programmes. The Department has been appointed as a State Designated Agency for implementing the Energy Conservation Act, 2001. It is responsible for formulating policies and programmes/projects necessary for popularizing the applications of various renewable sources of energy in Haryana. The Department is mandated to implement programmes related to following areas:

- Promotion of Generation of Power from renewable energy.
- Promotion & implementation of RE programme/Schemes.
- Energy Conservation including implementation of EC Act-2001.
- Demand Side Management measures for conservation of Energy
- Electric Vehicles Charging Infrastructure

HAREDA is implementing programmes on promotion of generation of power from non-conventional energy sources with an objective to meet the increasing demand for power through renewable energy sources like small hydro, solar, biomass, bagasse and municipal solid waste. HAREDA is continuously engaged in identification of new sites and proposals for setting up of renewable energy based power projects in the state.

## INTRODUCTION OF SOLAR WATER PUMPING SCHEME

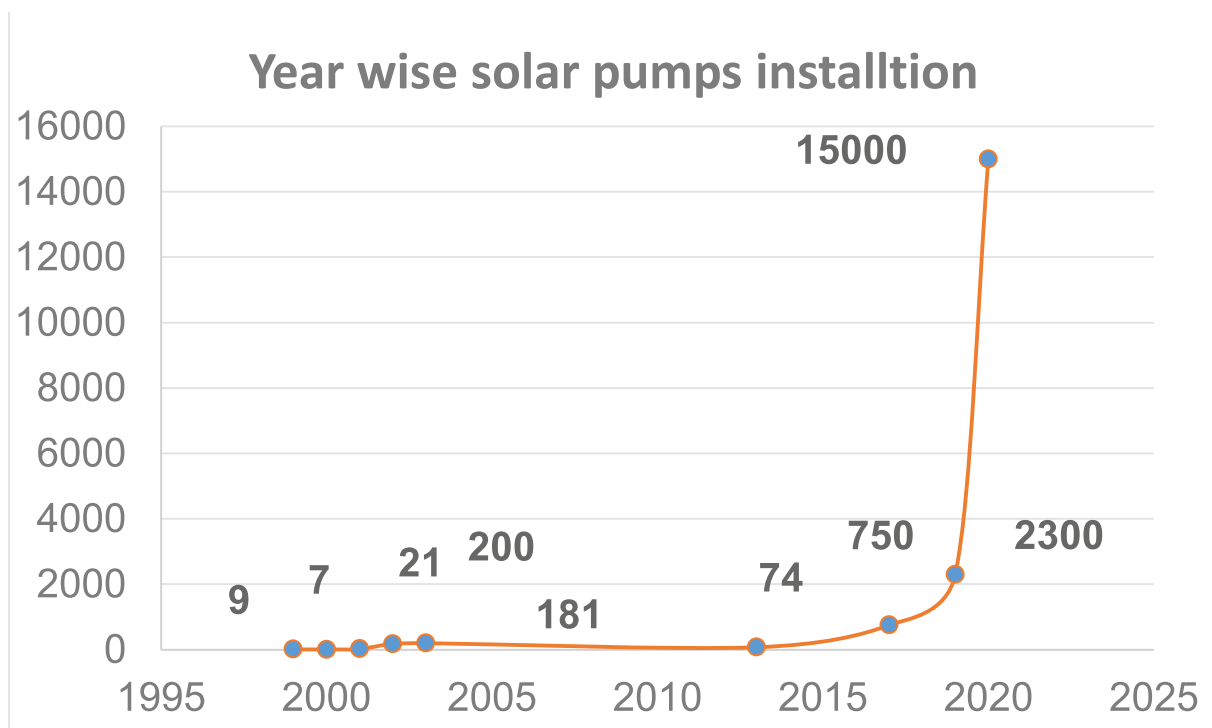
The Department of New & Renewable Energy, Haryana/HAREDA is implementing a scheme to provide solar water pumps in off-grid mode the State under PMKUSUM scheme with the objectives to support the farmers by providing a reliable, eco-friendly, cost effective and sustainable power source of irrigation and simultaneously reducing the dependence on conventional energy sources, to reduce the recurring subsidy expenditure of State Govt. for providing electric power to the tube well in agriculture sector.

## ADVANTAGES OF SOLAR WATER PUMPING SYSTEMS

The advantage of using solar energy for irrigation pumps are as follows:

- Solar energy is available in abundant.
- No running cost
- Clean and green energy
- Suitable for day time operations
- Strong correlation with the irrigation demand of the crops
- Uninterrupted operation
- Reduction in dependence on fossil fuels, thereby reduction in fuel import bills.
- Improved energy access and livelihood especially in rural areas

In Haryana, there are approximately 320 clear sunny days annually and solar water pumping systems would be able to generate power in these days. The Department has been promoting solar pumps 1998-99 when 9 pumps of 1 HP were installed. Till date, 3542 pumps have been installed as per detail given below:







## Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM KUSUM)

Agricultural policies remain an important determinant of the direction in which the Indian economy will go. India is one of the world's largest users of groundwater for irrigation. An enormous amount of electricity is required to pump out water to irrigate the fields which produce the food grains, fruits, and vegetables we all consume. The International Institute for Sustainable Development (IISD) estimates that electricity subsidies account for approximately 46 per cent of total agriculture subsidies in Haryana. Consequently, State finances are under strain. In such a scenario, the use of solar power in the agriculture sector especially for irrigation purposes can help ease both demand and supply pressures. With the use of solar pumps, the farmers would save expenditure on the diesel agri-pumps and get almost free solar power. This also becomes one more step towards the aim of doubling farm incomes, a goal frequently reiterated by the government.

This is also an important step towards meeting our Intended Nationally Determined Contribution (INDC), under which India has committed to increasing the share of installed capacity of electric power from non-fossil-fuel sources to 40 per cent by 2030. This was one of the commitments which India made at the Paris Climate Convention in 2015. Its goal is to limit global warming to well below two, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. The farmers are happy as they get power in the daytime obviating the need to go to the fields in the night to water

the plants; they get eight to 10 hours of free, clean power every day, and save on the expenses on polluting diesel pumps.

In July 2018, the Government of Haryana had sought technical assistance and guidance from World Bank to operationalize its vision. A World Bank team reviewed the past experiences of grid-connected solar pumps and analysed the available secondary data. As per the said report, Haryana has more than 605,000 agricultural tube well connections, with another 40,000 farmers waiting to get grid connection, which has further increased to nearly 84,537 connections till December 31, 2018. In addition, there are about 3,50,000 diesel pumps. The 6,05,000 electric pump sets consume an estimated 857.1 crore kWh (units) of electricity i.e. average of 14,160 kWh per pump per annum. Further, the electricity supply to farmers is highly subsidized and, on average, farmers pay only Rs 0.11/kWh against a cost of supply of Rs 7.34/kWh.

The above scenario is a paradigm shift being created in agriculture by Pradhan Mantri Kisan Urja Suraksha evem Uhan Mahabhiyan (PM KUSUM) scheme launched in 2019 by Ministry of New & Renewable Energy, GOI which is planned for off-grid and grid connected pumps with following components:

- **Component-A:** Seing up of 10,000 MW of Decentralized Ground/ Stilt Mounted Grid Connected Solar or other Renewable Energy based Power Plants;
- **Component-B:** Installation of 20 Lakh Stand-alone Solar Agriculture Pumps; and
- **Component-C:** Solarisation of 10 Lakh Grid Connected Agriculture Pumps or feeders.

The component-B is implemented by the Department of New & Renewable Energy while Component-A and Component-C are being implemented by the DISCOMs in their respective jurisdiction.

Haryana is one of the pioneer states in the adoption of the PM-KUSUM scheme. The total target for Haryana is 50,000 pumps under Component-B of PMKUSUM scheme. In 2019-20, the State Government has decided to install 15,000 solar water pumping systems of different capacities in the State at a cost of Rs. 520 crore under Component-B of PM-KUSUM scheme of MNRE, GoI with a solar capacity addition of 105 MW. Also, these 15,000 pumps will generate 94.5 million units of electricity every year. The icing on the cake is the prevention of the release of 75,600 tonnes of carbon dioxide annually in the atmosphere

For the year 2021-22, there is a target to provide 22,000 more solar pumps in the State at a cost of about Rs. 844 crore with a solar capacity addition of 154 MW. With installation of these 22,000 solar pumps, approx. 138.6 MU per year will be generated and there would be abatement of 1,10,880 tonnes of carbon dioxide annually.

## OBJECTIVES

- The main objective of the project is to provide Irrigation facilities to the farmers who have applied for new electric connection or are operating their pumps using diesel.
- To make a suitable environment for adoption of Solar Pump scheme in state at a large scale.
- To decrease dependence on fossil fuels for energy production.
- To improve agriculture production and thus rural economy in the state.
- To encourage the Solar Energy based agricultural & Irrigation pumps for proper utilization of agricultural land and water sources available in state.
- For growth of skilled and semi-skilled human resources in the field of non-conventional energy in state.
- Reduction in carbon footprint.

## ELIGIBILITY UNDER THE SCHEME

- a. Individual farmers will be supported to install standalone solar Agriculture pumps of capacity up to 10 HP for replacement of existing diesel Agriculture pumps / irrigation systems in off-grid areas, where grid supply is not available.
- b. Water User Associations, Gaushalas' and community/cluster based irrigation system will also be covered under this component. However, priority would be given to small and marginal farmers.

## NOTIFIED AREAS OF THE CENTRAL GROUND WATER AUTHORITY

- I. In the notified areas of the CGWA (list enclosed), farmers who are drawing water from farm ponds with micro irrigation techniques/Under Ground Pipe Lines shall only be considered.  
AND/OR
- II. New Solar Agriculture pumps would not be covered under this component in Notified areas. However, existing standalone diesel pumps, can be converted into standalone solar pumps in these areas provided they use micro irrigation techniques to save water.

## SUBSIDY PATTERN

These off-grid solar water pumping systems shall only be provided to the farmers/Gaushala's/ Water User Associations and community/cluster based irrigation system at 75% subsidy (State+MNRE) as per following pattern:

Capacity	User Share	MNRE Subsidy	State Subsidy
3-7.5 HP Pumps	25% of the cost	30% of the cost	45% of the cost
10 HP pumps	25% of the cost	30% of the cost of 7.5 HP pump	Balance of the user share and MNRE subsidy

## SELECTION OF BENEFICIARIES

- i. These solar water pumping systems shall only be provided to the farmers who opt for micro-irrigation (drip/sprinkler) and/or Under Ground Pipe Lines (UGPL) in their field.
- ii. The beneficiaries who have already covered under the scheme during the past seven years, shall not be eligible to get another solar water pumping systems irrespective of its capacity/location.

## HOW TO APPLY

The farmers who wish to install solar water pumping systems shall have to apply online through <http://saralharyana.gov.in/> portal. No hard copy of the application shall be entertained by the Department/HAREDA.

## PROCEDURE

- Application will be invited through on line <http://saralharyana.gov.in/> portal after empanelment of vendors by MNRE, GoI
- Online portal will have payment gateway to reduce time in collection of user share
- Applicant would have the choice to select any of the empaneled vendors online.
- Issue of work order by the Department
- Survey by empaneled vendors in 15 days through mobile app
- Refund of user share for non-feasible sites
- Installation of pumps by vendors in 90 days or as per DNIT conditions of MNRE
- Monitoring of pumps through online portal [pmkusum.hareda.gov.in](http://pmkusum.hareda.gov.in)

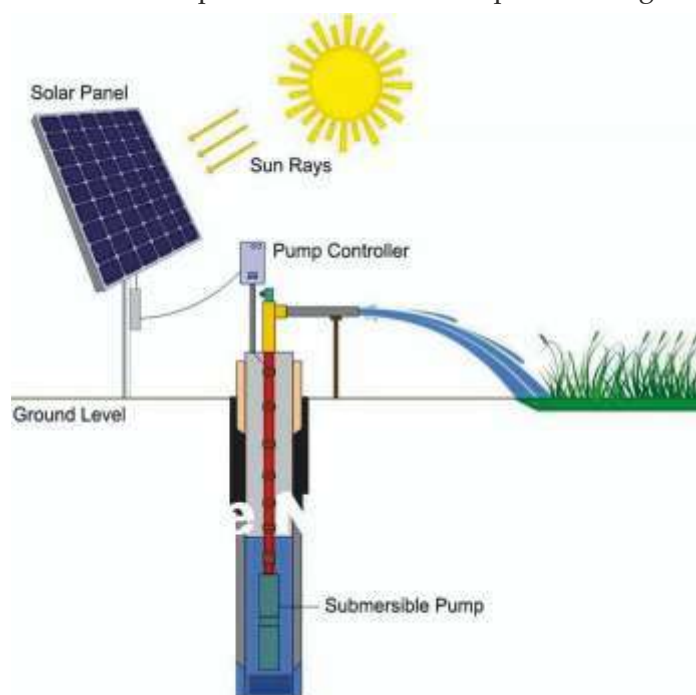




## Technical Details and Specifications of Solar Water Pumping System

The SPV water pumping system consists of following major parts:

- i. **PV ARRAY (SPV PANELS):** The Solar PV array contains specified number of same capacity, type and specification modules connected in series or parallel to obtain the required voltage or current output. The SPV water pumping system should be operated with a PV array minimum capacity in the range of **2700 Watts peak to 9000 Watts peak**, measured under Standard Test Conditions (STC). Sufficient number of modules in series and parallel could be used to obtain the required voltage or current output. The power output of individual PV modules used in the PV array, under STC, should be a minimum of **300 Watts peak**, with adequate provision for measurement tolerances. Use of PV modules with higher power output is preferred.



ii. **MOTOR PUMP-SET (AC/DC):** Pump sets generally comprise of the motor, which drives the operation and the actual pump which moves the water under pressure.

a. **AC Motors:** AC Motors require inverters to convert DC to AC. Solar pumping systems use special electronically controlled variable-frequency inverters, which optimises matching between the panel and the pump.

b. **DC Motor:** The DC Motors with permanent magnet are generally more efficient. DC Motors may be with or without carbon brushes. DC motors with carbon brushes need to be replaced after approximately every 2 years. Brushless designs require electronic commutation. Brushless DC (BLDC) Motors are becoming popular in the solar water pumps. Solar pumps under PMKUSUM have AC Induction Motor or DC Motor.

The SPV water pumping systems may use any of the following types of motor pump sets of capacity 3 HP to 10 HP:

i. **Surface mounted motor-pump set (mono block pumps) :** Surface pump are suitable for areas where the water level is within 7m below ground level. A surface or centrifugal pump is normally placed at ground level. The pump is suitable for pumping from shallow bore wells, open wells, resereservoirs, lakes & canals. These pumps are designed for high flow rates and low heads



ii. **Submersible motor-pump set :** A submersible pump is one that is immersed in water in a bore well. Submersible pumps are suited both to deep well and to surface water sources. These pumps are designed for high head and medium flow application. Bore size depends on size of the pump. Normally, 3 inch to 8 inch dia bore is required for pumps of 3 HP to 10 HP size.



iii. **CONTROLLER** : The Controller is an electronic device which matches the PV power to the motor and regulates the operation of the pump according to the input from the solar PV array.

All cables used are as per IS 694. Suitable size of cable is used in sufficient length for inter-connection between the SPV array to SPV Controller and the SPV Controller to solar powered pump set. Controller is integrated with GSM/GPRS Gateway with Geo tagging.



iv. **MODULE MOUNTING STRUCTURE**

**(MMS)** : The PV modules are 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 module mounting structure are hot dip galvanized. The firms may use MMS design of MNRE, GoI or may also get the design of MMS approved from any of the reputed institutes like IITs, NITs etc.



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

vi. **EARTHING ARRANGEMENT AND LIGHTENING ARRESTOR** : For safety purpose, earthing and lightening arrestor shall be provided with every SPV Water Pumping System.

## WARRANTY

The PV Modules are 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/ surface pumps is warranted for 5 years.

## INSURANCE

5 years insurance for natural calamities, theft & burglary etc. shall be provided by the supplier

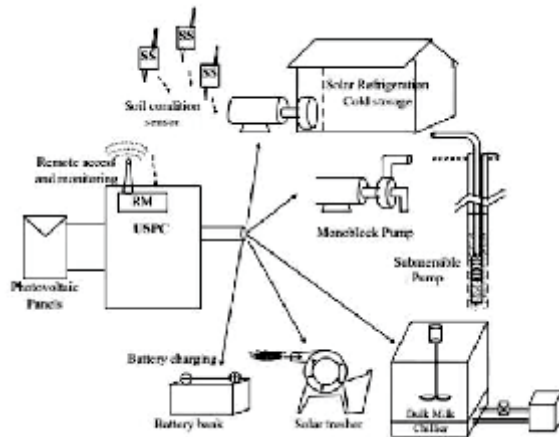
## REMOTE MONITORING SYSTEM (RMS)

Remote monitoring System (RMS) is a collection of information technology tool that is loaded to Installed Solar Pumps and servers. 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 is used 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, pump location.

## UNIVERSAL SOLAR PUMP CONTROLLER

The Solar PV pumping System costs too much but is utilized only for half of the days in a year (around 150 days per year) on an average. Thus the energy generated by the solar panels during rest of the time is not utilized. Therefore, the controller supplied for installation of solar pumping system should be such that it is able to act as a power source round the year for several other appliances required in agricultural and for other needs of a farmer. This will increase the productivity of agriculture sector and income of farmer. Such a controller is known as Universal Solar Charge Controller (USPC).

The solar pumping system with USPC 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-fridge/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. Further, the applications are not limited upto the few shown in the figure.



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.

*\*This is an optional item and the subsidy on solar pumping system with USPC will be made available according to the benchmark price of solar pumps without USPC, even if the price discovered for solar pumps without USPC are less than benchmark price.(MNRE OM13.11.2020).*

## SPACE REQUIREMENT FOR SOLAR PUMPS

- For 03 HP Pump: Shadow free space of about 30 square meter.
- For 05 HP Pump: Shadow free space of about 60 square meter.
- For 7.5 HP Pump: Shadow free space of about 75 square meter.
- For 10 HP Pump: Shadow free space of about 100 square meter.





## Important Points to be Taken Care of

### BEFORE/WHILE APPLYING

- Read scheme guidelines and technical specification of the pump (available at [hareda.gov.in](http://hareda.gov.in)) carefully.
- You should not have electric pump in your name at the proposed site/land.
- Ensure that you have Parivar Pehchan Patra.
- Apply online only on [www.saralharyana.gov.in](http://www.saralharyana.gov.in) portal
- Payment of User share is to be made online only.
- Choose right type and capacity of pump as per water table condition of your field.
- Area where solar modules are to be installed should be south facing and shadow free

### WHILE SITE SURVEY

- Ensure that survey is being done through Mobile App (HAREDA-Site Survey of HKRP Innovations LLP) by the survey team
- Ask for Name, Mobile No., Name of the firm etc. of the survey team to ascertain their identity.
- Ensure that survey is conducted at site of solar pump to be installed and photographs, consent etc. are taken at site
- Provide complete details of the site/field to the survey team

- Ensure that Water table depth, bore size etc. has been measured accurately to decide the head of the pump

### **WHILE RECEIVING THE MATERIAL**

- Ask for list of material (along with their make) to be supplied by the firm
- Ensure that the make and quantity of material is as per the list of material supplied by the firm

### **DURING INSTALLATION**

- Ask your supplier firm for design of Module Mounting Structure.
- Ensure that the installation is being done as per the design
- Ensure no wire/cable, nut bolts are loose
- Earthing arrangements are proper
- Do not pay for any material to the firm.
- Operating manual and Service Center details have been provided by the supplier firm.

### **POST INSTALLATION**

- Ensure that the firm which has installed the system gives you Operation and Maintenance Manual. Follow the instructions for any trouble shooting.
- Keep your solar modules clean. Clean modules generate more power and thereby increase performance of the pump.
- Do not relocate/ shift the site of pump without permission from the Department.
- Do not mishandle the system.
- In case of any issue in working of pump, lodge complaint with the supplier immediately.
- In case of theft, natural calamity etc. during 5 year warranty period, immediately inform the supplier firm for insurance claim.





## Frequently Asked Questions

**1 What is subsidy on solar water pumps in Haryana ?**

Solar water pumps will be provided on 75% subsidy in Haryana. Farmer has to pay only 25% of the cost of the pumpset.

**2 What capacity of solar pumps will be provided on subsidy?**

Solar water pumps of capacity ranging from 3 HP to 10 HP will be provided.

**3 What is the procedure for applying for solar pumps on subsidy?**

One have to apply online on SARAL portal i.e. [www.saralharyana.gov.in](http://www.saralharyana.gov.in) for solar pump.

**4 What are the document/information required for applying online?**

1. Land record paper
2. Pariwar Pehchan Patra (PPP)
3. Other information like address, location of land, irrigation details etc. are required to be filled online.
4. The farmer must not have electric connection based Pump

**5 What is the cost of solar water pumping systems?**

The cost and subsidy pattern of solar pumps is given in Table 1

**6 Whether applicants have to deposit 100% of the cost initially?**

No, the applicant have to deposit only 25% of the total cost of the solar pump along with his application online.

**7 What is the discharge of these solar pumps like 2", 3", 4" pressure?**

The discharge of solar pumps varies in accordance with the solar insolation. So, it is not guaranteed that how much discharge a solar pump would provide at a given time.

However, the discharge table of various solar pumps under test conditions is given in Table 2 A

**8 Is the discharge of solar pump of same type and capacity installed by different firms is same?**

No. The discharge of solar pumps of same type and capacity supplied by different firm may be different. However, the discharge of pumps should meet the minimum technical specification under standard test conditions as given in the Table 2 A.

**9 What capacity and size of solar module (solar plates) is to be provided by the firms?**

Solar modules of minimum 300 W capacity each is required to be installed by the firms. The firms may use combination of minimum 300 W modules for solar pumps. Each type/capacity of solar pumps have different module capacities but the total array capacity should not be less than that given in Table 2 B

**10 Is the design of module structure (stand) is same for all the empanelled firms?**

No. Though the type of module mounting structure has been defined in the tender, but, the firm can change the design of structure, after getting its design approved from technical institutes like IITs, NITs etc.

**11 Do we get the solar pumps installed from open market and claim subsidy from the Department?**

No

**12 After submission of application, how much time it takes to install solar pump by the Department?**

It normally takes 4-5 months for installation of solar water pumping systems after submission of application as per the following tentative time line:

Mile stones	Approx. Time
Scrutiny of application	15-20 days
Issue of work orders	15-20 days
Supply, Installation and commissioning by firms	90 days

**13 Does the Department pay any interest/penalty on delay in installation of solar pump to the applicant?**

No.

**14 What material will be provided by the firms to the beneficiary?**

The firms who will install the solar pumps, provide solar modules of required capacity, Pump-motor, pump controller, wire & cables of required length, suction and discharge pipe of required size etc.

**15 Does the firm who install the solar pumps also provide the borewell?**

No. The applicant has to provide the required size bore well, water tank etc. for installation of solar pumps at his/her own cost.

**16 What is the bore size required for the solar pump?**

Normally, 6" size bore well is required for up to 5 HP, submersible pumps and 8" size bore well is required for pumps of capacity 7.5 HP submersible pump or more.

**17 Is solar pump insured under the scheme?**

Yes. Solar pumps are insured for five years and the cost of insurance is included in the total cost of pump.

**18 Can a farmer select firm, capacity of pump of his/her choice?**

Yes. An applicant can select a firm and pump capacity of his/her choice while applying online. However, the Department can change the selected firm as per the requirement under the scheme.

**19 Will the Department provide solar pump to all of those who apply?**

No. Though a target of 22,000 solar pumps of different capacity has been fixed for the year 2021-22, but, the Department reserves the right to withdraw/amend/annul the implementation process of the scheme at any time in view of the change in the Government Policy or any other reason.

**20 Can the site of solar pump be shifted by the beneficiary?**

No. The site of solar pumps cannot be shifted by the beneficiary at his own level. However, in rarest of the rare case, the site may be shifted only with the prior approval of the Additional Deputy Commissioner-cum-Chief Project Officer, NRE of the concerned district.

**21 Can a beneficiary get installed make of material of his own choice?**

No. The make of material will be as per the make mentioned in the test report of the solar water pumping system of the supplier firm.

**22 How an applicant get the details of eligibility, scheme guidelines, technical specifications of the solar pumps etc.?**

An applicant can get the details of eligibility conditions, scheme guidelines, technical specifications etc. of the solar water pumping systems on the official website of the Department i.e. [hareda.gov.in](http://hareda.gov.in). They may also contact to the Additional Deputy Commissioner-cum-Chief Project Officer, NRE of the concerned district as per their contact details at Table-3..

**23 Is there any criteria for minimum agricultural land required for applying solar pumps.**

No.

**24 What is the site and space requirement for installation of solar pumps?**

The solar pump modules are installed on south facing shadow free site. As a thumb rule, 10 m<sup>2</sup> land is required for 1 kW of solar modules e.g. approx. 50 m<sup>2</sup> land would be required for 5 HP pump.

**25 What is Universal Solar Pump Controller (USPC)?**

Universal Solar Pump Controller is a controller devise which can be used to operate small house hold loads like chaff cutter, atta chakki etc. in addition to the solar pump.

**26 Is there any subsidy on Universal Solar Pump Controller (USPC)?**

No. The applicants who wish to install these USPC have to deposit full cost of the USPC in addition to the applicable solar pump cost.

**27 Whom to contact for further information**

Our district officers may be contacted for further information as per detail given at Table 3.

# Tables

Table - 1

## WATER FILLED PUMPS WITH NORMAL SOLAR PUMP CONTROLLER

Pump Capacity	Type	L1 Rate for Haryana	GST @ 13.8%	Total Cost	Farmers Share @ 25% of the cost	MNRE Share @ 30% of the cost	State Share
3 HP DC	Surface	1,58,435	21,864	1,80,299	45,075	54,090	81,134
3 HP DC	Submersible	1,64,000	22,632	1,86,632	46,658	55,990	83,984
3 HP AC	Submersible	1,59,500	22,011	1,81,511	45,378	54,453	81,680
5 HP DC	Surface	2,27,000	31,326	2,58,326	64,581	77,498	1,16,247
5 HP DC	Submersible	2,27,500	31,395	2,58,895	64,724	77,668	1,16,503
5 HP AC	Submersible	2,27,000	31,326	2,58,326	64,581	77,498	1,16,247
7.5 HP DC	Surface	3,23,000	44,574	3,67,574	91,894	1,10,272	1,65,408
7.5 HP DC	Submersible	3,23,400	44,629	3,68,029	92,007	1,10,409	1,65,613
7.5 HP AC	Submersible	3,25,000	44,850	3,69,850	92,462	1,10,955	1,66,433
10 HP DC	Surface	4,06,000	56,028	4,62,028	1,15,507	1,10,272	2,36,249
10 HP DC	Submersible	3,99,000	55,062	4,54,062	1,13,515	1,10,409	2,30,138
10 HP AC	Submersible	3,99,000	55,062	4,54,062	1,13,515	1,10,955	2,29,592

## WATER FILLED PUMPS WITH UNIVERSAL SOLAR PUMP CONTROLLER

Pump Capacity	Type	L1 Rate for Haryana	GST @ 13.8%	Total Cost	Farmers Share	MNRE Share @ 30% of the cost	State Share
3 HP DC	Surface	1,79,600	24,785	2,04,385	66,477	56,774	81,134
3 HP DC	Submersible	1,84,000	25,392	2,09,392	68,634	56,774	83,984
3 HP AC	Submersible	1,79,500	24,771	2,04,271	65,817	56,774	81,680
5 HP DC	Surface	2,47,000	34,086	2,81,086	84,740	80,099	1,16,247
5 HP DC	Submersible	2,49,000	34,362	2,83,362	86,760	80,099	1,16,503
5 HP AC	Submersible	2,47,000	34,086	2,81,086	84,740	80,099	1,16,247
7.5 HP DC	Surface	3,55,300	49,031	4,04,331	1,27,600	1,11,323	1,65,408
7.5 HP DC	Submersible	3,65,000	50,370	4,15,370	1,38,433	1,11,323	1,65,614
7.5 HP AC	Submersible	3,56,000	49,128	4,05,128	1,27,372	1,11,323	1,66,433
10 HP DC	Surface	4,55,000	62,790	5,17,790	1,70,218	1,11,323	2,36,249
10 HP DC	Submersible	4,55,000	62,790	5,17,790	1,76,329	1,11,323	2,30,138
10 HP AC	Submersible	4,55,000	62,790	5,17,790	1,76,875	1,11,323	2,29,592

Table - 2A

**DISCHARGE TABLE OF SOLAR PUMPS WITH VARIOUS DYNAMIC HEADS**

S.No.	Type and capacity of Pump	Discharge Liters Per Day at various Head (m)			
		30	50	70	100
1	3 HP, DC Submersible	114000	69000	45000	--
2	5 HP, DC Submersible	--	110400	72000	50400
3	7.5 HP, DC Submersible	--	155250	101250	70875
4	10 HP, DC Submersible	--	207000	135000	94500
1	3 HP, DC Surface	297000 at 10 m	148500 at 20 m		
1	3 HP, AC Submersible	105000	63000	42000	--
2	5 HP, AC Submersible	--	100800	67200	43200
3	7.5 HP, AC Submersible	--	141750	94500	60750
4	10 HP, AC Submersible	--	189000	126000	81000

\* 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).

Table - 2B

**INDICATIVE TECHNICAL SPECIFICATIONS OF SOLAR WATER PUMPING SYSTEMS**

Pump Type and Capacity	PV Module Capacity	Motor Pump set type	Shutoff dynamic head
3 HP (DC, Surface type)	2700 Wp	3 HP with controller	25 metres
3 HP (DC, Submersible)	3000 Wp	3 HP with controller	45 metres
3 HP (AC, Submersible)	3000 Wp	3 HP with controller	45 metres
5 HP (DC, Submersible)	4800 Wp	5 HP with controller	70 metres
5 HP (AC, Submersible)	4800 Wp	5 HP with controller	70.0 meters
7.5 HP (DC, Submersible)	6750 Wp	7.5 HP with controller	100.0 meters
7.5 HP (AC, Submersible)	6750 Wp	7.5 HP with controller	100.0 meters
10 HP (DC, Submersible)	9000 Wp	10 HP with controller	100.0 meters
10 HP (AC, Submersible)	9000 Wp	10 HP with controller	100.0 meters

Table - 3

**LIST OF DISTRICT OFFICERS AND THEIR CONTACT DETAILS**

S.No.	District	Name of PO	Mobile No.	Office E-mail	Office Tel. No.
1	Ambala	Rajinder Kumar (AC)	8295045555	amb.nre-hry[at]gov[dot]in	0171-2535900
2	Bhiwani	Subhash Chand Saini (AC)	9416498347	bhw.nre-hry[at]gov[dot]in	01664-245061
3	Charkhi Dadri	Subhash Chand Saini	9416498347	dri.nre-hry[at]gov[dot]in	01250-221220
4	Faridabad	Varender Singh (AC)	9560018864	fd.nre-hry[at]gov[dot]in	0129-2227922
5	Fatehabad	Indraj Singh (AC)	9416309467	ftb.nre-hry[at]gov[dot]in	01667-230007
6	Gurgaon	Rameshwar Singh	9416100166	grg.nre-hry[at]gov[dot]in	0124-2339658
7	Hisar	Indraj Singh	9416309467	hsr.nre-hry[at]gov[dot]in,	01662-226384
8	Jhajjar	Subhash Chand Tanwar	9416577196	jjr.nre-hry[at]gov[dot]in	01251-252540
9	Jind	Subeer S Sangwan (A/C)	9050002108	jnd.nre-hry[at]gov[dot]in	01681-245320
10	Kaithal	Shri Om Goyal (A/C)	9896038960	ktl.nre-hry[at]gov[dot]in	01746-234203
11	Karnal	Shri Om Goyal	9896038960	krl.nre-hry[at]gov[dot]in	0184-2267351
12	Kurukshetra	Atul Singh Mohil (AC)	8901425341	krk.nre-hry[at]gov[dot]in	01744-226612
13	Mahendergarh (Narnaul)	Sandeep Yadav	9467538815	nrl.nre-hry[at]gov[dot]in	01282-251253
14	Nuh	Banwari Lal (AC)	9467395240	nuh.nre-hry[at]gov[dot]in,	01267-274603
15	Palwal	Varender Singh	9560018864	pwl.nre-hry[at]gov[dot]in	01275-248908
16	Panchkula	Rajinder Kumar	8295045555	pkl.nre-hry[at]gov[dot]in	0172-2582337
17	Panipat	Rajesh Kumar Hooda	9306372950	pnp.nre-hry[at]gov[dot]in	0180-2650881
18	Rewari	Banwari Lal (AC)	9467395240	rwr.nre-hry[at]gov[dot]in	01274-222444
19	Rohtak	Subeer Singh Sangwan	9050002108	roh.nre-hry[at]gov[dot]in	01262-247245
20	Sirsa	Sanjeev Kumar Nain	9467109849	srs.nre-hry[at]gov[dot]in	01666-247235
21	Sonepat	Rajesh Kumar Hooda (AC)	9306372950	snp.nre-hry[at]gov[dot]in	0130-2222700
22	Yamuna Nagar	Shri Om Goyal (A/C)	9896038960	ynr.nre-hry[at]gov[dot]in,	01732-237802





## Testimonials



पढ़ाई के लिए मैं निश्चित होकर उनके लिए अब समय भी निकाल रही हूँ तथा मेरे यहां सोलर वाटर पम्प लगाने से मैं पूर्ण रूप से सन्तुष्ट हूँ ।

विभाग ने अब मेरे ट्यूबवैल पर डीजल पम्प के स्थान पर सोलर वाटर पम्प स्थापित होने पर मैं अब सर्दी के मौसम की फसल जैसे गेहूँ, सरसों व चने आदि की फसल की बिजाई की है तथा अब मैं दिन में ही सोलर वाटर पम्प से अपने खेतों में फव्वारों से सिंचाई कर लेती हूँ । फव्वारों से खेतों में समान रूप से सिंचाई होती है जिस कारण फसल अधिक होने की संभावना है । रात के समय जंगली जानवरों का जो भय हमेशा लगता था । सोलर वाटर पम्प लगने पर मुझे जंगली जानवरों इत्यादि से निजात मिल गया । सोलर वाटर पम्प के रखरखाव में लागत भी न के बराबर है तथा सोलर वाटर पम्प को मैं सुबह चलाकर अपने खेतों में नलाई-दुलाई आदि का कार्य निश्चित होकर कर लेती हूँ । रात के समय बच्चों की

**संयोगिता देवी पत्नी स्वर्गीय श्री जितेन्द्र कुमार**  
गांव धौलेडा खण्ड नांगल चौधरी जिला महेन्द्रगढ़  
10 HP DC Submersible (REIL)



पहले मैं पंपरागत खेती करता था और गेंहू एवं धान की फसल की काश्त करता था परन्तु कुछ समय पश्चात मेरा रुझान बागवानी खेती की तरफ हुआ और मैंने अपने लगभग 2 एकड़ क्षेत्र में अमरुद का बाग स्थापित किया परन्तु कई बार खेतों में पर्याप्त बिजली की सुविधा प्राप्त न होने के कारण मुझे बाग में सिंचाई करने में कुछ दिक्कतों का सामना करना पड़ता था। एक दिन मैंने सोलर ट्यूबवैल के बारे में अतिरिक्त उपायुक्त, सोनीपत कार्यालय द्वारा प्रकाशित न्युज के बारे में पढ़ा, जिस उपरांत मैंने अतिरिक्त उपायुक्त, सोनीपत कार्यालय में जाकर सोलर ट्यूबवैल के बारे में जानकारी ली एवं इस उपरांत ऑन लाईन सोलर ट्यूबवैल हेतु आवेदन किया। सोलर लगवाने से मैं व मेरे पड़ोसी किसान भी सिंचाई कर लेते हैं, सोलर लगवाने से डीजल की बचत, वायु प्रदुषण, maintenance charge इत्यादि कुछ भी नहीं हैं। मैं अपनी दिल की भावानों से हरियाणा सरकार द्वारा चलाई जा रही इस योजना का आदर करता हूँ तथा इस तरह की योजनाओं से छोटे किसान धीरे-2 उन्नति की राह पर जा रहे हैं। मैं पुनः हरियाणा सरकार का यह योजना चलाने पर अभिनंदन करता हूँ।

**जय भगवान पुत्र स्व0 श्री चन्दन सिंह**

गांव रोहट, सोनीपत

7.5 HP AC Submersible( Shakti)





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