SOLAR POWER



TANMAY MAZUMDER

Solar Energy based dual Water Pumping System (Solar Pump + Hand pump)

The article discusses the utilization of solar energy systems to pump water from sub soil to fill up HDPE/ Stainless Steel over head water storage tank.

n present day scenario, it is well understood that solar energy is the future energy source, which is freely available to generate cost free electricity. Installations of small and large Solar PV Power Systems are rising exponentially day by



day. People are well aware of the capability of disintegrated small solar power plants. Today many investments are being made in small and large scale Solar PV & solar Thermal Power Plants, Solar Powered Electronic items, Solar Water Heater systems. Solar panels are also being used for the power supply of satellites.

There is vast scope in solar energy utilization in various efficient ways. With recent days efficiency enhancement and fall in price of solar panels, solar installations has become more economical and are being accepted as efficient renewable power resource.

Today many investments are being made in small and large scale Solar PV & solar Thermal Power Plants, Solar Powered Electronic items, Solar Water Heater systems

The article discusses the utilization of solar energy systems to pump water from sub soil to fill up HDPE/ Stainless Steel over head water storage tank. These types of projects are being approved and installed by various government agencies of India like OREDA, UP Jal Nigam, JREDA, KREDL and many for better utilization of Solar energy, to serve people without depending on the grid power supply & most im-

SOLAR POWER

Solar panel of suitable parameter according to the requirement of submersible Pump power supply is being selected and installed on the same steel structure to harvest maximum sunlight to generate electricity of desired parameters

portantly creating awareness and people alignment towards all possible utilization of solar energy, the clean energy.

System

Solar Energy based dual water pumping system (Solar Pump + Hand pump) is being installed and in progress under various indigenous projects for water supply in far flung areas, for irrigation etc.

The system consists of two major parts, Submersible Pump arrangement with Solar Panel & accessories, Hand-pump arrangement.

Construction

This system require a suitable DC motor driven vertical submersible pump deep in sump, powered by Solar panel directly through electronic controller.

Riser piping lines connected with the hand pump as well as the submersible pump, which further continues to over head tank kept on the Steel structural platform for water storage and utilization at night or whenever required.

Solar panel of suitable parameter according to the requirement of submersible Pump power supply is being selected and installed on the same steel structure to harvest maximum sunlight to generate electricity of desired parameters.

All electrical cables, control panel, automatic ON/ OFF and all safety protections for the Pump installed in the system. All GI,UPVC water piping and fittings, taps are considered.

System Drawing



Fig.1. Provisional drawing of Solar Energy based dual water pumping system (Solar Pump + Hand pump).

Indicative Technical Details

SUBMERSIBLE PUMP SET:

1	Гуре	Vertical Pump
(Capacity	1 hp
1	Flow Range	900 lph to 1500lph
I	Pump head	55 to 75m
I	MOC	Stainless steel
I	Rated Speed	500 to 3600rpm
(Capacity of Motor	900watt
۱	Working Voltage	24 – 48 V DC
I	Pump dia.	96mm (max.)
SOLAR PANEL:		
	_	Mono / Polycrystalline

Type	GL dual Hand Pump	
HAND PUMP:		
Frame Material	Anodized Aluminium	
Output Voltage	24 - 48V	
Wattage of each Panel	200 – 250Watt	
Wattage	1000 watt	
Туре	Solar Panel	

Type	ar adar nana i amp
Expected yield	15 lpm (@ 40 stroke/ min.)

Working

The submersible pump is suitable for pumping out subsoil water from 50m below the ground.

DC supply of required parameter is fed to the submersible pump directly from the solar panel for pump operation.

The pump is connected through all safety protections e.g. over voltage, over current, over flow trip etc.

This type of project can be utilized in many ways like household water consumption, irrigation water supply

In the day time when sunlight is available, solar pump operates continuously and its discharge fills the overhead tank. As the tank is filled up, pump will be stopped automatically as the level sensor installed in the control system and in same way pump starts automatically when the tank water level goes below pre set low level.

Stored water can be fetched at any time from the tap post located nearer to the arrangement.

Whenever there is no water in the tank and at night hand pump can be operated manually for water; this provision is kept to suffice the water requirement in order to handle any emergency situation.

Output Parameters

- Power from Solar Panel:1000W
- Pump yield: 900 to 1000lph
- Working hrs.: 7-9hrs/ day
- Max. water yield : 9,000ltrs/ day

Advantages

- No electricity charges, No running cost
- Independent of grid power supply
- Can be installed in far flung areas wherever no grid supply is available.
- System runs by renewable energy
- Low maintenance

Disadvantages

• Pump operating limitation only in day time.

Conclusion

This type of project can be utilized in many ways like household water consumption, irrigation water supply. The limitation of the system is prevailing by its variant utilizations in ground water pumping, and thus can effectively be installed and used.

High capacity Solar Panel and high yield Submersible pump may be installed for irrigation purpose to suffice complete water requirement in the crop field **«**