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Solar Water Pump Irrigation with Different Time Slots

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Abstract: *With the water necessities in water system being expansive, there is a requirement for a brilliant framework that can spare the water and increment the beneficial of product. This paper goes for sparing time and keeping away from issues like consistent cautiousness in water system field, it likewise concentrate on water preservation via naturally giving water to the field contingent upon their water prerequisite at diverse phases of product development. Solar based energy is changed into electrical energy by utilizing photovoltaic cells. Amid the day time, the energy put away in the batteries can be used to run water pump for agriculture. This project goes for mounting a controlled charging system on condition that securities for over charge condition, profound release condition and under voltage condition of the battery. This proposed framework will be contained a DC pump which diminishes the utilization of inverters and so on, accordingly dropping the cost of the venture. Utilizing the charge controlled system; the water pump can be worked at different diverse schedule openings*

Index Terms: Solar Panel, Battery, Regulator, Timer, Relay, Potentiometer, DC Motor, Switch, Resistor, Capacitor, LED

I. INTRODUCTION

Form olden days we are using nonrenewable sources of energy in excess amount for our needs. As this type of minerals like coal etc. are exhausting so we have to depend on the renewable sources of energy like solar, wind, etc. For smaller application it is better to use renewable energy. As this project is based on water pump and required AC supply. So for this particular application we are using solar panels to charge the DC battery and the power from the battery can be used for this application. This project is an innovative solution to operate a machine / motor / liquid pumps for a small duration. Irrigation is a well-established procedure on many farms and is practiced on various levels around the world[4].

Typical irrigation systems consume a great amount of conventional energy through the use of electric motors and generators powered by fuel. Solar powered Automated Irrigation System provides a sustainable solution to enhance water use efficiency in the agricultural fields using renewable energy system removes workmanship that is needed for flooding irrigation.

A. Objective

The main objective of this project is to contribute to the socio economic development. It is the solution for the energy crisis for the Indian farmers and also it conserves electricity by reducing the usage of grid power and easy to implement and environment friendly solution for irrigating fields.

B. Existing System

The sunlight contains energy. When light hits the photovoltaic cells the energy turns into electric -current. An indicator is used which glows 'ON' in the presence of sunlight and 'OFF' in the absence of sunlight. With the solar panel, a charging switch is connect, which charges the battery. The battery is connected to the timer and potentiometer. With the use of timer and potentiometer the water pump can be operated at different time slots. This timer is connected to the relay circuit. When we turn 'ON' the switch. Relay starts the DC motor and DC motor starts pumping.

C. Proposed System

Our proposed system consist Solar Panel, Battery, Regulator, Timer, Relay, Potentiometer, DC Motor.. Our proposed system block diagram is in fig.1.

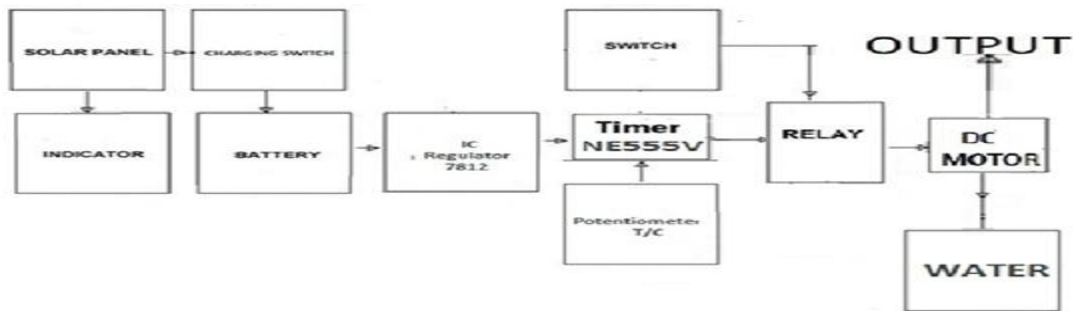


Fig.1 Proposed system block diagram

D. Module / Component Description

1) Solar Plate : Solar panels absorb the sunlight as a source of energy to generate electricity or heat. A photovoltaic cell or the solar cell is an electrical device that converts the energy of light energy into electricity by the photovoltaic effect[1]. The photovoltaic effect is the creation of voltage and electric current in a material upon exposure to light and is a physical and chemical phenomenon. In a crystal the bonds are made of electrons that are shared between all of the atoms of the crystal. The light gets absorbed, and one of the electrons from one of the bonds gets excited up to a higher energy level and can move around freely and we get a current[3].

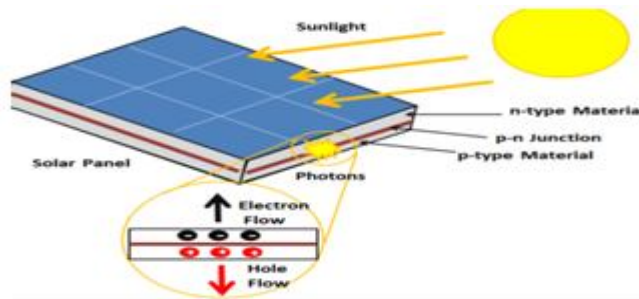


Fig.2 solar panel

- 2) **TIMER** : The 555 timer IC is an integrated circuit (chip) used in a variety of applications such as to provide time delays
- 3) **Regulator IC** :A voltage regulator generates a fixed output voltage of a preset magnitude that remains constant regardless of changes to its input voltage or load conditions.
- 4) **Relay**: Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically[2]. Relays can be used to interface between an electronic circuit to an high voltage electric circuit based on the principle of electromagnetic induction, for example a 230 V AC main can be switched by a relay operated 5V battery . In this way we can use relay circuits to drive our above said appliances efficiently according to our requirements. Input section of a Relay has a coil which generates magnetic field with implementation of a very small voltage from an electronic circuit, called the operating voltage. Commonly used relays with operating voltages are- 6V, 9V, 12V, 24V. There are mainly three connectors in a basic relay normally open (NO), normally closed (NC) and Common (COM). At no input state COM is connected to NC.

E. Dc Motor Water Pump

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. All the module & components finally assemble together and was developed and then finally we have reached to our goal of this project[2].



Fig.3 DC Motor

Real hardware of our proposed system is shown in fig. 8

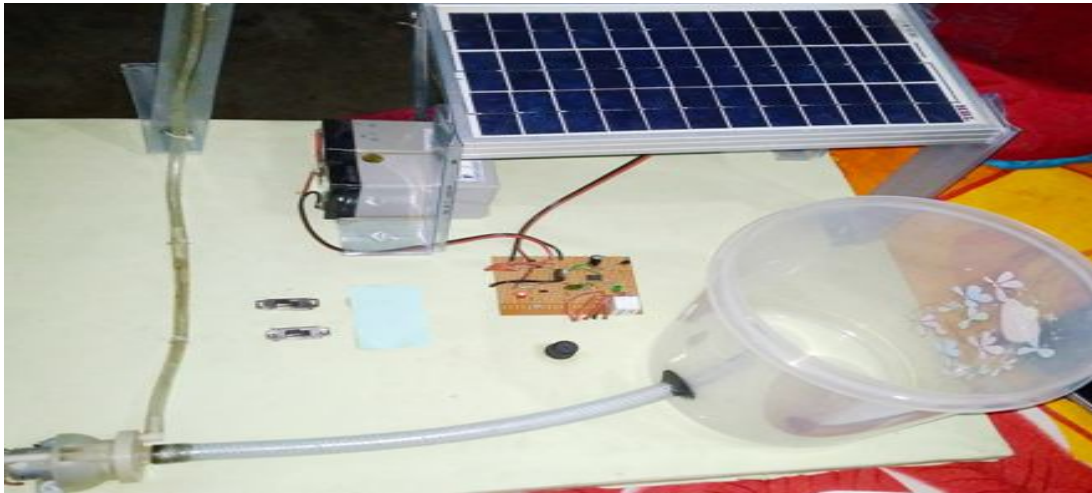


Fig. 8 Final hardware of our proposed system

II. CONCLUSION /FUTURE SCOPE

In conclusion, photovoltaic power for irrigation is cost competitive with traditional energy sources for small ,remote applications, if the total system design and utilization timing is carefully considered and organized to use the solar energy as efficiently as possible. In future, when the prices of fossil fuels rise and the economic advantages of mass production reduce the peak watt cost of the photovoltaic cell, Pumping Water for Irrigation Using Solar Energy.

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REFERENCES

- [1] <http://www.edgefxkits.com/solar-water-pump-control-with-four-different-time-slots-for-power-saving-applications>
- [2] https://www.researchgate.net/publication/315113027_Different_Time_Slots_Operating_System_of_a_Solar_Water_Pump_in_an_Automated_Irrigation_System
- [3] http://www.ijaerd.com/papers/finished_papers/IMPLEMENTATION%20OF%20SOLAR%20WATER%20PUMP%20CONTROLLED%20WITH%20FOUR%20DIFFERENT%20TIMES%20FOR%20POWER%20SAVING%20APPLICATIONS-IJAERDV04I0570985.pdf
- [4] <http://www.renewableenergyfocus.com/view/44586/solar-powered-irrigation-a-solution-to-water-management-in-agriculture/>



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