

## **SOLAR POWERED SELF-ACTIVATED WATER SENSING AND WATER PUMPING SYSTEM**

<sup>1</sup>T.SRINIVAS, <sup>2</sup>Dr.M.YOHAN

<sup>1</sup>*PG Research Scholar, Energy systems, Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, Andhra Pradesh, India,*

<sup>2</sup>*Professor of Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, Andhra Pradesh, India,*

**Abstract**—*The purpose of this project is to make an automated water directing framework to the overhead tanks in flats. This arrangement is equipped for detecting the water level in the tank and takes the insightful choice of exchanging ON/OFF the water pump contingent upon the water level present. Additionally, sunlight based vitality is utilized to control up the water pump. This framework also utilizes provision for storing solar energy, which can be used during nights to ON the water pump.*

**Keywords**— *Solar Panel, PIC16F72 microcontroller, water level sensor, crystal oscillator, LED .*

### **I. INTRODUCTION**

Power plays a great role wherever man lives and works. The living standard and prosperity of a nation vary directly with the increase in the use of power. The electricity requirement of the world is increasing at an alarming rate due to industrial growth, increased and extensive use of electrical gadgets. According to world energy report, around 80% of our energy from conventional fossil fuels like oil (36%), natural gas (21%) and coal (23%). It is well known that the time is not so far when all these sources will be completely exhausted. So, alternative sources should be used to avoid energy crisis in the nearby future. The best alternative source is solar energy.

The intelligent device which is capable of performing the task is a Microcontroller. Water level sensor, water pump through Relay is interfaced to Microcontroller. The energy from solar panel is given to water pump through Relay. Also, the solar energy is stored to a battery to which water pump is connected through a switch. The Microcontroller continuously monitors the water level and takes the decision to ON/OFF water pump depending on the water level. The microcontroller is loaded with an intelligent program written using embedded 'C' language.

### **II. LITERATURE SURVEY**

1. The utilization of solar energy to lift water for irrigation was first described 'by the French engineer Solomon de Coux in 1615. Improvements continued over the years up to World War I, after which there was a gap in research efforts because of the ready availability of cheap fossil fuels. Today, a modern system consists of a solar collector field, an energy storage facility, solar engine, water-pumping equipment, controls, and a water-storage area.

2. P. Roth et al., (2004), Renewable Energy Vol. 29, PP.393-402 portrays plan also, development of an electromechanical framework to take after the situation of the sun. It permits the programmed estimation of direct sun powered radiation with a pyrheliometer. It works naturally, guided by a shut circle servo framework. A four-quadrant photograph identifier detects the situation of the sun and two little DC engines move the instrument stage keeping the sun's picture at the focal point of the four-quadrant photograph identifiers. Under overcast conditions, when the sun isn't unmistakable, a processing program ascertains the position of the sun and takes control of the development, until the point that the indicator can detect the sun once more. It is conceivable to utilize this sort of tracker with bigger and heavier frameworks, as solarpanels and concentrators. Other less expensive following sensors could be utilized. Digital control ought to be utilized to show signs of improvement reaction.

3. To monitor water content dynamically in the tank, a sensor technique, which has high accuracy and rapid response, low energy consumption and cost, is desired. In early times, techniques for this purpose were a plaster sensor and tensiometer, but their response was unsatisfactory and there was hysteresis error. Since Topp presented a three-order polynomial equation to approximate the relationship between the volumetric water content (VSWC) and relative dielectric constant, many kinds of dielectric sensors based on TDR and FDR principles have been developed. TDR sensors take a number of seconds to complete a water content measurement. A more rapid response can be achieved by FD sensor, which only needs a fraction of a second.

### III. SOLAR PANEL

A cell or cell may be a device that converts solar power into electricity by the electrical phenomenon impact. typically the term cell is reserved for devices supposed specifically to capture energy from daylight, whereas the term cell is employed once the supply is such-and-such. Assemblies of cells area unit accustomed build solar battery, star modules, or electrical phenomenon arrays. electrical phenomenon is that the field of technology and analysis relating to the appliance of star cells for solar power.

1. Photons in daylight hit the solar battery and area unit absorbed by semi conducting materials, like atomic number 14.
2. Electrons (negatively charged) area unit knocked loose from their atoms, permitting them to flow through the fabric to supply electricity. because of the special composition of star cells, solely enable the electrons to maneuver in a very single direction. The complementary positive charges that {are also|also area unit|are} created (like bubbles) are known as holes and flow within the direction opposite of the electrons in a very atomic number 14 solar battery.
3. AN array of star panels converts solar power into a usable quantity of electrical energy (DC) electricity.

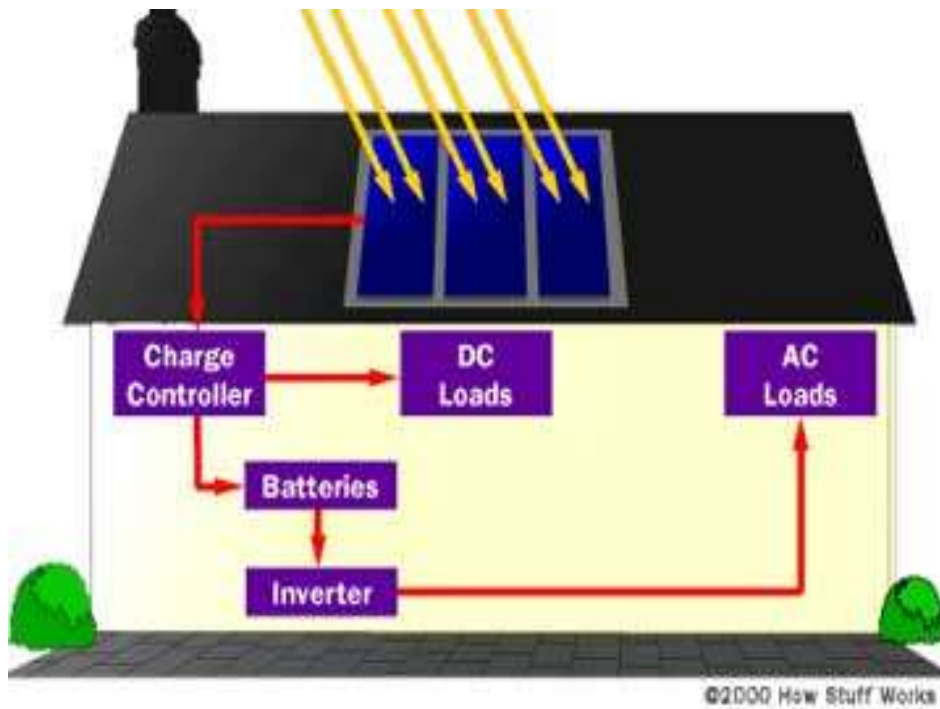


Fig. 1 WORKING OF A SOLAR PANEL

Solar battery chargers square measure higher for the setting in an exceedingly few ways in which. For one, with them, batteries are often recharged, thus not contributive to growing landfills. Also, batteries have probably harmful metals within them – we have a tendency to don't wish to be merely throwing them out into landfills!

The batteries of cell phones, PDAs, laptops, mp3 players, and additional are often charged by solar panel chargers. this implies that you simply don't need to think about electricity to charge these devices. this is often particularly sensible as a result of most electricity is made by non-sustainable, polluting strategies.

### IV. SOLAR POWERED SELF-ACTIVATED WATER SENSING AND PUMPING UNIT

The circuit utilizes customary power provide involving a step down electrical device from 230V to 12V AND four diodes framing a bridge rectifier that conveys throbbing dc that is then sifted by a capacitor of around 470 $\mu$ F to 1000 $\mu$ F. The sifted dc being unregulated, IC LM7805 is used to urge 5V DC steady at its stick no three no matter information DC unsteady from 7V to 15V. The directed 5V DC is to boot separated by a bit capacitor of 10 $\mu$ F for any clamor therefore made by the circuit. One LED is associated of this 5V point in arrangement with a present restricting resistor of 330 $\omega$  to the ground i.e., negative voltage to demonstrate 5V management provide accessibility. The unregulated 12V purpose is used for various applications as and once needed.

**Solar Powered self-activated water level sensing and water pumping system**

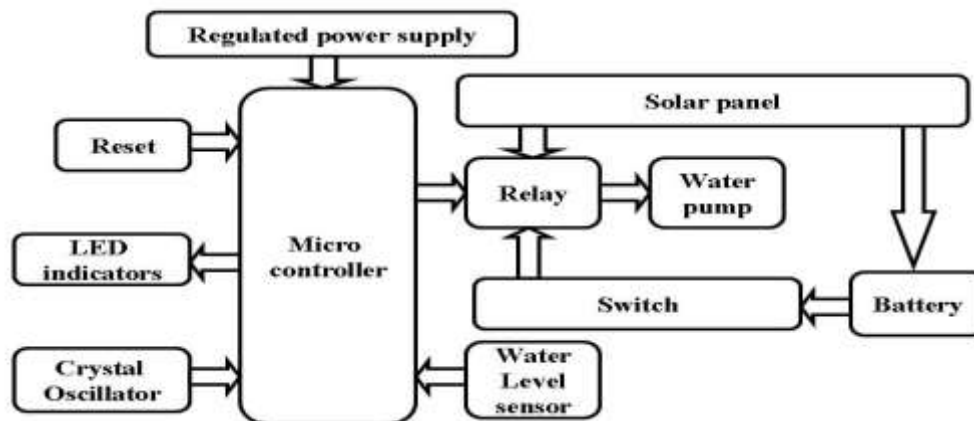


Fig. 2 Block diagram of solar powered self-activated water level sensing and water pumping system

The PIC16F72 CMOS FLASH-based 8-bit microcontroller is upward compatible with PIC16C72/72A and PIC16F872 devices. It features 200 ns instruction execution, self programming, an ICD, 2 Comparators, 5 channels of 8-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire SPI or 2-wire I2C bus, a USART, and a Parallel Slave Port. The LM324 series consists of four independent, high gains; internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

**V. EXPERIMENTAL SETUP**

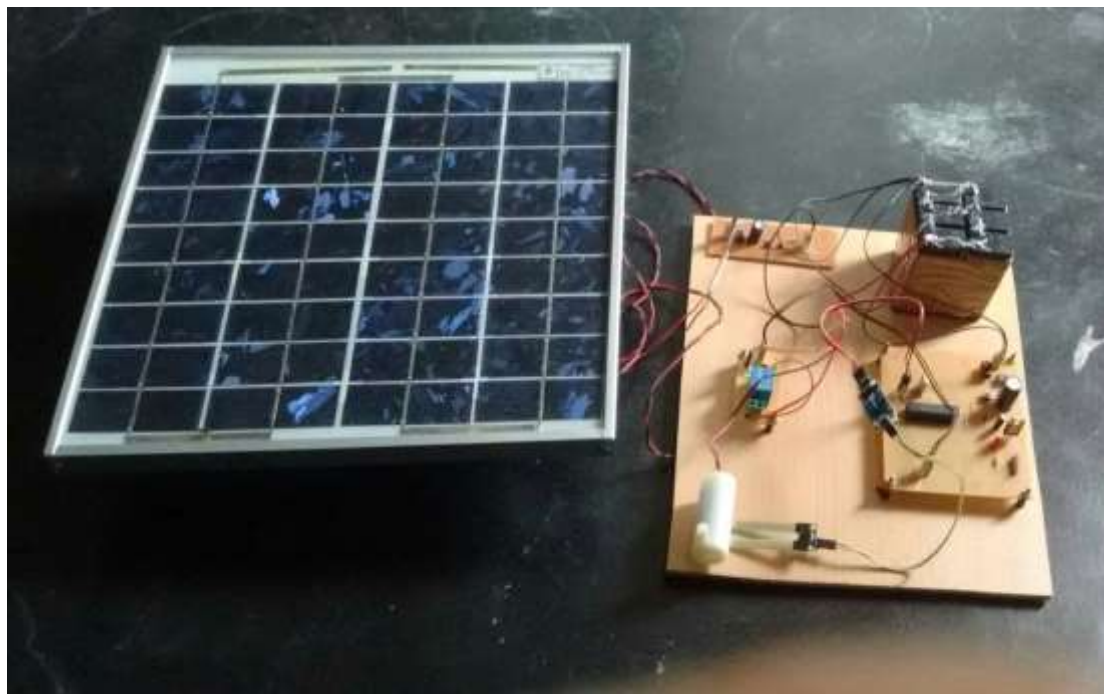


Fig. 3 Experimental setup of solar powered self-activated water sensing and water pumping system

Every one of the parts of the sun powered self-activated water sensing and water pumping system are combined, for example, solar panel, PIC16F72 microcontroller, water level sensor, DC motor are put deliberately on the board as appeared in fig. 3 experimental setup. The current model introduces an Integrating highlight of all the equipment segments which has been utilized and created in it. The Presence of every last module has been contemplated out and put deliberately.

## **VI. WORKING PROCEDURE**

The system consists of pump, solar panel, an inverter, battery, water tank, and three types of sensors namely temperature sensors, soil moisture sensors and water sensor and a microcontroller system. The photovoltaic solar panels will observe the solar energy from the sun which results in the generation of direct current which will be stored in the battery. The battery supplies the direct current to the inverter where it gets converted into AC for the operation of the pump. The pump will draw the required energy for its operation through inverter from the battery and will supply the water from the reservoir tank to the required and the water sensor is placed inside the water tank. During the operation water sensor sense the water level in the tank and gives the signal to the operator. This will help the operator to act accordingly to it. As per the information received, the operator can ON the system through itself. After the required water level is achieved, the system sends the signal, based on which can OFF the system through itself.

## **VII. RESULT**

The project "Solar Powered self-activated water level sensing and water pumping system" was utilized to make an automated water directing framework to the overhead tanks in flats. This arrangement is equipped for detecting the water level in the tank and takes the clever choice of exchanging ON/OFF the water pump contingent upon the water level present. Additionally, sunlight based vitality is utilized to control up the water pump. This system also provides provision for storing solar energy, which can be used during nights to ON the water pump

## **VIII. CONCLUSION:**

A solar powered water level sensing and water pumping system was outlined and executed. The required program was composed that predefined the different activities required for the undertaking to work. Thus, water level detecting and pumping is accomplished.

There are numerous points of this task portrayed as:-

- To continue detecting the water level.
- To make an electronic circuit to consistently screen the water level
- To gives the capacity of sun powered vitality

## **IX.FUTURE SCOPE**

project can be stretched out in sunlight based tracker rather than sun based board .sun powered tracker framework that takes after the sun course to produce most extreme out for sun oriented controlled applications.

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