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PROCESS OF RO's WATER REUSE AND WATER MANAGEMENT IN SOCIETY BY USING IOT AUTOMATION

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ABSTRACT

In this paper, we are making a water purifier which works on solar energy. The basic principle behind this project is reverse osmosis. The solar radiations are collected by solar panel. This energy is then stored in a battery. The battery is connected to the purification unit through a electromagnetic relay. The purification unit consists of highpressure motor, reverse osmosis system and the water tank. The high pressure creates the necessary pressure required to carry out reverse osmosis. The microcontroller keeps a watch to the level of water in the water tank and prevents it from over flow. Through his process we obtain the purified water in the water tank.

INTRODUCTION

The decreasing availability of water has necessitated in the search for fresh sources of drinking water. The available water in many areas in the country is brackish, saline or impure. Salinity is a major problem in the coastal areas of Kutch and Gujarat. In our country pure drinking water is a major problem in tribal/rural area .There are many processes available for purification of drinking water like Chlorine tablets , Pot chlorination of wells, Slow and rapid sand filters, Fluoride removal , Reverse osmosis plants, etc .In this project, we are making a water purifier which works on solar energy.[1-3] The basic principle behind this project is reverse osmosis. We are using solar energy which is a renewable source, abundant and cheap. In case of power failures, this purifier will continue to work as solar energy can be stored. Here, we use microcontroller 8051 which prevents the water from over flowing. This purifier can be used in remote and rural areas where there is no electricity. It can also be used in places affected by natural disasters. It also reduces the salt content in sea water. It provides pollution free operation. Water is one of the most significant resources on this earth. Earth is covered from water is 70% and 30% is land. Humans as well as animals are fully dependent on water to survive and to live healthily. Water purification is the process of removing undesirable chemicals, biological contaminants, suspended solids

as well as gases from water. As we Survey from doctors shows that to maintain a healthy lifestyle, an average intake of water in male/female approximately 3.7 litres/2.7 litres of water .In India near about 2439 peoples died in 2018 because of water borne disease such as cholera, diarrhea, typhoid and almost 1.5 million were diagnosed with this disease. A water resource should be safe and reliable but also affordable to people. The available water in many areas in the country is brackish, saline or impure. Salinity is a major problem in the coastal areas of thane and Mumbai district.RO is the Process available for water purification, and sunlight is one of the source of Conventional energy that can be utilized in our system as energy source.RO Filtration is most Stable method for purification of contaminated water the RO system has semi permeable membrane that filters excessive minerals and other soluble presents such as bacteria, Fungi, algae, viruses in the water. Particles as tiny as 0.0001 microns are effectively removed by the system while rotating the motor. In India pure drinking water is a major problem in urban/rural area .There are many traditional methods available for water purification of drinking water Chlorine tablets, pots chlorination of wells, Slow and rapid sand filters, Fluoride removal ,but this methods has very difficult procedure also purification level is less than RO. In this paper we are designing which is works on Solar panel to lift up the water in tank and provide electricity to RO system for Purification process .If any environmental problem or power failure will be happen such as flood or something then the solar purifier has store their energy in battery so this process will be continue to work as Solar energy. It is an portable purifier which is easy to assemble where you can use it on rural areas where there is lack of Electricity. This Purifier provides pollution free Working.

LITERATURE REVIEW

K. Dikgale, D.F. Ntobela, B.G.V. Mendes, et. al.[2], proposed that solar-powered water purification systems is thus regarded as an important means of producing clean water. Solar energy poses no polluting effect and has become a dependable energy source for usage. The design of a solarpowered water purification system is based totally on the thermal method by using the thermal heating system principle which converts sunlight rays into heat. The most vital aspect is the absorption of heat to induce evaporation of water. Research shows that flat plate collectors produce heat at relatively low temperatures (27°C to

60°C) and are commonly used to heat liquids. A solar-powered water purification system consists of a solar collector that absorbs sunlight to ensure vaporization, which is the first stage of purifying and a filter that removes contaminants. Four different concepts have been developed

Gazi Nazia Nur, Mohammad Ahnaf Sadat et al. [3] proposed that Conventional energy sources are limited and they cause environmental pollution. By using a renewable energy source as solar power to purify water, these problems can be avoided. Solar water purifier is an advancement of current water purification system. Design methodology of the solar water purifier is presented in this paper. Solar water purifier takes solar power as energy source and stores energy in a battery. Main components of solar water purifier are solar panel, battery, heating coil, filtering chalk, double layer condenser and several water vessels. This purifier uses filtering mechanism to remove dirt from water and boiling mechanism to kill organisms. Through this process, pure drinking water is achieved

Lamma OA & Abubaker M. Outhman et al. [4] proposed that impact of reverse osmosis on purification of water Raw water reverse osmosis technology has taken many leaps towards the development of energy efficient and high yielding systems. The reduction in energy consumption, improvement in membrane life and increase in energy recovery emerged as the primary criteria for research in this field. The key objective of the work involves the optimization of the variables involved in the pre-treatment process of different water sources (pond, canal and surface water) reverse osmosis plant which would lead to an increase in the membrane life by reducing solids content of the raw water. Experiments were carried out to ensure maximum total solids reduction and also reduction of different chemical parameters (BOD, TDS and Bacteria). These parameters were found to be desirable for the discharge from the pretreatment to be fed into the reverse osmosis part of the plant and RO water plant is used drinking purpose and free from contaminants.[4]

Yogita V.Gaikwad, PoojaV.Gavande et al. [5] proposed that a reverse osmosis purification process. This system contains mainly power supply circuit, purification circuit and control circuit. Power supply consists of solar panel, charge controller, battery and inverter. Purification unit consist of booster pump, Reverse Osmosis system and control circuit contains sensor,

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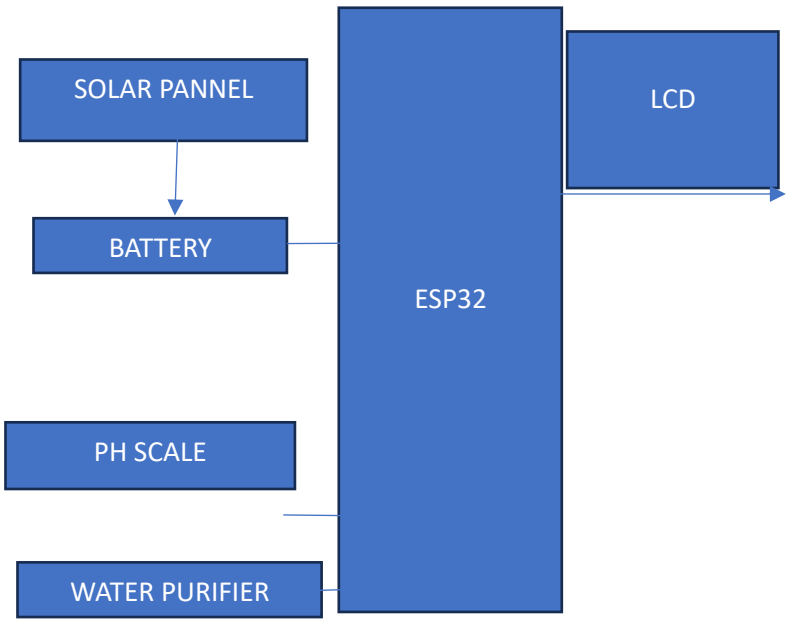
microcontroller and relays. High pressure is create by booster pump to carry out reverse osmosis process. The microcontroller keeps watch to level of the water tank and prevents it from the overflow. By using this process we obtain pure water in the water tank.

Dr.S.Prakash, Deepak Toppo. et al., (2017), [6] The basic principle behind this project is reverse osmosis. The solar radiations are collected by solar panel. This energy is then stored in a battery. The battery is connected to the purification unit through a electromagnetic relay. The purification unit consists of high pressure motor, reverse osmosis system and the water tank. The high pressure creates the necessary pressure required to carry out reverse osmosis. The microcontroller 8051 keeps a watch to the level of water in the water tank and prevents it from over flow. Through this process we obtain the purified water in the water tank.

EXISTING SYSTEM

Sourav Kumar Ghosh and Md. Mamunur Rashid et. al. [1], (2020), This research work uses solar energy as an energy source and stores it in a batteries which is a free source of energy. This energy is then used by inexpensive heating coils to heats the water to a specific temperature (below boiling points).After condensation, the cold water undergoes futher purification through the filtering chalk. At this stage, the water condenses again to give water room temperature. Through this process, we obtain clean drinking water. We went through almost at every stage of a product development process ,from gathering customer requirements to finalizing the design.

PROPOSED SYSTEM



HARDWARE COMPONENTS

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LCD (Liquid Cristal Display)

Introduction:

A liquid crystal display (LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. Each pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them, light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other.

PH SCALE

A pH meter is a scientific instrument that measures the hydrogen-ion activity in water-based solutions, indicating its acidity or basicity expressed as pH.[2] The pH meter measures the difference in electrical potential between a pH electrode and a reference electrode, and so the pH meter is sometimes referred to as a "potentiometric pH meter". The difference in electrical potential relates to the acidity or pH of the solution.[3] The pH meter is used in many applications ranging from laboratory experimentation to quality control **quality.** For instance, the use of a third electrode in differential sensors makes this sensor perfect for a variety of industrial applications such as wet scrubbers.

WATER PURIFIER

Water purifiers are devices designed to remove impurities, contaminants, and particles from water, making it safe and suitable for consumption. Different types of water purifiers use various technologies to achieve this goal. Here is some general information about water purifiers:

Types of Water Purifiers:

Reverse Osmosis (RO) Purifiers: These systems use a semi-permeable membrane to remove impurities and contaminants from water.

UV (Ultraviolet) Purifiers: UV light is used to kill bacteria, viruses, and other microorganisms present in water.

Activated Carbon Purifiers: Activated carbon filters trap impurities and chemicals, improving the taste and odor of water.

Gravity-Based Purifiers: These purifiers use gravity to filter out impurities, typically through a combination of mechanical and chemical processes.

SOFTWARE DESCRIPTION

Getting Started with NodeMCU using Arduino IDE

There's an add-on for the Arduino IDE that allows you to program the ESP32 using the Arduino IDE and its programming language. In this tutorial we'll show you how to install the ESP32 board in Arduino IDE whether you're using Windows, Mac OS X or Linux

Before starting this installation procedure, make sure you have the latest version of the Arduino IDE installed in your computer. If you don't, uninstall it and install it again. Otherwise, it may not work.

Having the latest Arduino IDE software installed
from arduino.cc/en/Main/Software,
continue with this tutorial.

CONCLUSION

This machine is the most convenient and accessible for the disinfection of water where power supply and ways to purify water is unmapped. The simple mechanism and integrated structure rhythmically converts the solar energy through motor and assists the filtration process devoiding water from bacteria, insolubles, minerals and other unwanted viruses giving potable water. It is inexpensive and uses solar energy to purify abundant water, so it can be used anywhere there is no electricity. This could be an area for future research in this era. This type of Water Purifier is not yet on the market. Therefore, We believe that if solar water purifier are effectively implemented by removing limitations so they will be able to attract customer from all sector living in urban and rural areas.

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