



PURIFICATION OF WATER USING NON-CONVENTIONAL METHOD

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Abstract:- In this paper, a water purifier is designed which works on Non-Conventional Method like solar with the help of PV panels. The process of water purification is eliminating harmful chemicals, biological poisons, suspended solids and gases from polluted water. This project is based on the principle of reverse osmosis. The radiations of solar are collected by PV solar panel. After this the collected energy is further stored in a battery. The battery is connected to the purification unit with the help of switch. 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. Through this process we obtain the purified water in the water tank.

Keywords:- Solar energy, Water filtration, Compact filter, Natural ingredients, Sustainable development.

1 INTRODUCTION

The highest essential natural resources within the world are water and therefore the secure beverage chance could be a high lead concern for quality of life and human existence. The decreasing handiness of water has necessitated within the seek for recent sources of beverage. The offered water in several areas within the country is salt, saline or impure. Salinity could be a major downside within the coastal areas. In our country pure beverage could be a major downside in tribal/rural space. There are several processes offered for purification of beverage like gas tablets, Pot chlorination of wells, Slow and speedy sand filters, halide removal, Reverse diffusion plants, etc. In this project, we tend to creating a water apparatus that works on alternative energy. The fundamental principle behind this project is reverse diffusion. We tend to mistreatment alternative energy that could be a renewable supply, luxuriant and low cost. Just in case of power failures, this apparatus can still work as alternative energy are often keep. This apparatus are often utilized in remote and rural areas wherever there's no electricity. It may be utilized in places stricken by natural disasters. It additionally reduces the salt content in ocean water. It provides pollution free operation. The use of water has been doubled because the greatest challenge of the twenty first century (Asano, 2002), and, as such, nice

stress is being place into the event of recent technologies for the treatment of waste product for use. In general, the strategies used embrace physical processes like filtration, geological phenomenon and distillation, biological processes like slow sand filters or biologically active carbon, chemical processes like natural action and chlorination and therefore the use of electromagnetic wave like actinic radiation. There live} several parameters which may be wont to measure the standard of water, of that a standard one is turbidness, the aim being to live impurities within the water. In sense of physical, turbidness could be a reduction within the clarity of water thanks to the presence of mixture particles or suspended, and unremarkably it's used as an indicator of the final condition of beverage. what is more, turbidness has been used for several decades as AN indicator of the potency of beverage filtration and clotting processes, in order that it's a vital operational parameter for this reason. The highest essential natural resources within the world is water and therefore the secure beverage chance could be a high lead concern for quality of life and human existence. The decreasing handiness of water has necessitated within the seek for recent sources of beverage. The offered water in several areas within the country is salt, saline or impure. Salinity could be a major



downside within the coastal areas. In our country pure beverage could be a major downside in tribal/rural space. There are several processes offered for purification of beverage like gas tablets, Pot chlorination of wells, Slow and speedy sand filters, halide removal, Reverse diffusion plants, etc. In this project, we tend to are creating a water apparatus that works on alternative energy. The fundamental principle behind this project is reverse diffusion. We tend to mistreatment alternative energy that could be a renewable supply, luxuriant and low cost. Just in case of power failures, this apparatus can still work as alternative energy are often keep. This apparatus are often utilized in remote and rural areas wherever there's no electricity. It may be utilized in places stricken by natural disasters. It additionally reduces the salt content in ocean water. It provides pollution free operation. The use of water has been doubled because the greatest challenge of the twenty first century (Asano, 2002), and, as such, nice stress is being place into the event of recent technologies for the treatment of waste product for use. In general, the strategies used embrace physical processes like filtration, geological phenomenon and distillation, biological processes like slow sand filters or biologically active carbon, chemical processes like natural action and chlorination and therefore the use of electromagnetic wave like actinic radiation. There live} several parameters which may be wont to measure the standard of water, of that a standard one is turbidness, the aim being to live impurities within the water. In sense of physical, turbidness could be a reduction within the clarity of water thanks to the presence of mixture particles or suspended, and unremarkably it's used as an indicator of the final condition of beverage. What is more, turbidness has been used for several decades as AN indicator of the potency of beverage filtration and clotting processes, in order that it's a vital operational parameter for this reason.

1.1 Block Diagram

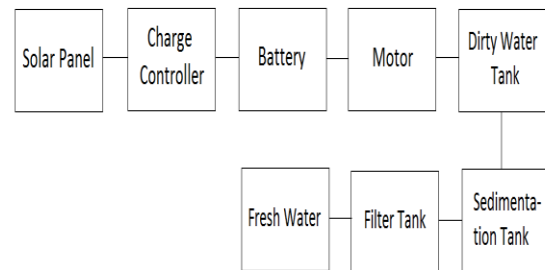


Fig 1 - Solar Water Purifier

2 COMPONENT DISCRIPTION

2.1 Solar Energy

Solar energy is that the richest provider of energy at intervals the globe. Energy is not entirely associates were (a solution) to today's energy crisis but in addition. Associate in Nursing environmental friendly sort of energy. Physical phenomenon (PV) generation is associate economical approach for exploitation the choice energy. In addition cited as star Cells or PV Cells, a tool that converts daylight directly into electricity. Star Cells were first developed at intervals the 19 Fifties to be used on USA house satellites. They're the merchandise of conductor, a special kind off melting sand. Physical phenomenon cells square measure devices that collect the sunshine and convert it into electricity. The cells square measure wired serial, sealed between sheets of glass or plastic, and supported at intervals a metal frame. These frames square measure cited as star modules or panels. They are accustomed power an expansion of applications ranging from calculators and wrist-watches to end home systems and big power plants. PV cells square measure product of thin conductor wafers, a semiconductor nearly like that used in computer chips. Once daylight is absorbed by these materials, the choice energy knocks electrons loose from their atoms, allowing the electrons to flow through the material to supply electricity. This technique of adjusting light-weight (photons) to electricity (voltage) is termed the "photovoltaic effect". The electrical cell operates on the principle of the physical phenomenon impact - the creation of a charge carrier at intervals Associate in nursing extremely material by the absorption of energy from



the incident radiation. The efficiency of star cells in dynamic incident energy into electricity depends on the illumination spectrum intensity, materials of construction and magnificence of the cell, region temperature and dustiness of the sky.

2.2 Solar Array

A photovoltaic cell behaves sort of a low voltage battery whose charge is incessantly replenished at a rate proportional to the incident radiation. Connecting such cells into series-parallel configuration leads to electrical phenomenon modules or star arrays with high current and voltages. The power developed by a solar battery ranges from eighty to a hundred and twenty watts per area unit of the panel. The photovoltaic power is used to control standard electrical appliances, together with DC electric motors. The solar battery is mounted on a straight forward frame that has provision for adjusting the array manually against the position of the sun.

2.3 Solar Panels

Solar panels are devices that convert light into electricity. They are referred to as solar once the sun or solar light as a result of the sun is that the most powerful supply of the light accessible to be used. They are sometimes referred to as electrical phenomenon which suggests "light-electricity". Solar cells or PV cells deem the photovoltaic result to absorb the energy of the sun and cause current to flow between two oppositely charged layers. An electrical device could be a assortment of solar cells. Though every electric cell provides a comparatively tiny amount of power, several solar cells cover an outsized space will offer enough power to be useful. To induce the foremost power, solar panels have to be compelled to be pointed directly at the sun. The development of electric cell technology begins with 1839 analysis of French man of science Antoine Cesar Antoine Henri Becquerel. He observed the electrical phenomenon result whereas experimenting with a solid conductor in associate electrolyte solution. After that, he saw a voltage developed once the

sunshine arrived at the electrode consistent with reference work Britannica, the primary real for the electrical device was engineered around 1883 by charlesfritts. He used junctions fashioned by coating chemical element (a semiconductor) with a particularly skinny layer of gold. Crystalline silicon and gallium chemical compound are typical decisions of materials for solar panels. Gallium arsenide crystals are grown especially for photovoltaic use; however silicon crystals are accessible in less-expensive normal ingots, which are produced in the main for consumption within the electronics trade.

3 WORKING PRINCIPLE

Basically 2 vital steps square measure concerned within the principle of operating of a cell.

This square measure as follows:-

1. Creation of pairs of positive & negative charges (known as electrons hole pairs) within the cell by absorbed radiation.
2. Separation of positive & negative charges by a possible gradient with in thee cell.

A cell may be a sandwich of n-type semiconductor (blue) and p-type semiconductor (red). It generates electricity by mistreatment daylight to form electrons hop across the junction between the various flavors of silicon:

1. Once daylight shines on the cell, photons (light particles) bombard the side.
2. The photons (yellow blobs) carry their energy down through the cell.
3. The photons hand over their energy to electrons (green blobs) within the lower, p-type layer.
4. The electrons use this energy to leap across the barrier into the higher, n-type layer and escape out into the circuit.

3.1 Purifier Working

The Water Purification Station allows pumping, purification, and disinfection, and incorporates a huge potential of carbon emissions reduction by avoiding boiling water with fuel or charcoal. The



target groups are poor households living in off-grid areas with severe health, water, and sanitation issues. The system also aims to form local entrepreneurship and enhance local communities' ownership on a development project, among a public-private partnership initiative. It's well documented that solar power may be a good means that of cleansing contaminated water. This can be as a result of ultraviolet (UV) light-weight destroys the formation of polymer linkages in microorganisms, thereby preventing them from reproducing and therefore rendering them harmless. The globe Health Organization lists star medical aid in clear bottles by the combined action of ultraviolet radiation radiation, similarly as thermal medical aid (pasteurization) in opaque vessels with daylight from star cookers or reflectors and combination systems using chemical coagulation-flocculation as a number of the foremost promising and accessible technologies for house water treatment.

4 DESIGN SPECIFICATIONS

The Purifier is made of the accompanying parts:

4.1 Tempered Glass Plate

Glass has the property of specifically permitting just the higher vitality radiation to go through furthermore, obstructing the more extended wavelengths. This specific property helps in the distiller as it catches the vast majority of the approaching higher vitality radiation yet does not enable it to emanate back. This moreover fills in as a consolidating surface being available to the environment it will dependably be at a lower temperature than the water inside. It is made inclining so any water beads that are shaped at long last move along the slope where they at last store the condensate into an authority.

4.2 Top water reservoir

Water is put away on top simply under the glass plate. This water should be revived ordinary. The floor of the holder is painted dark to boost the light catch. The paint should be not water solvent and dried in sun before use to keep any kind

of oil or unpredictable substance. The side repository dividers are protected and the base is directing.

4.3 Staged Water Reservoirs

Beneath the highest repository lie two additional phases of water stores and side dividers protected also, the base divider leading. The shape is with the end goal that all condensate moves down to a point also, drops into the gathering tubes which run right crestfallen of the distiller into capacity.

4.4 Lowermost Reservoir

The lowermost supply is planned uniquely in contrast to the over 3. We have to make it unique with the goal that dissipation happens from this and afterward consolidates on the primary stage and conveys warm to it. At that point it rehashes with the second stage, etc. For accomplishing higher temperatures we have included cylinders covered with dark joining the more profound water level to the surface water. This will guarantee that the cooler water at base is warmed up by engrossing sun powered radiation and added to the surface where it can dissipate quicker. There is no need of a siphon for keeping up the flow regular convection incited as a result of thickness contrast will deal with that.

4.5 Turbine Pump

A water turbine is a turning motor that takes vitality from moving water. Water turbines were created in the nineteenth century and were broadly utilized for mechanical power before electrical matrices. Presently they are generally utilized for electric power age. They saddle a clean what's the more, sustainable power source. The siphon utilized is a customary cycle siphon with a couple of minor changes. We have presented three one way valves – a. one on the channel, b. one on the cylinder and c. one on the exit. There are two principal classifications of hydro turbines: drive and reaction, as depicted previously. The sort of hydropower turbine chose for a task depends on the tallness of standing water alluded to as "head" and the stream, or volume of water, at the site. The most



well-known kind of motivation turbine is the Pelton turbine. There are likewise Turgo turbine, Cross-stream turbine (otherwise called the Bánki-Michell turbine, or Ossberger turbine), Jonval turbine, Reverse overshot water-wheel, Screw turbine. On the other side, the generally normal response turbine is Francis turbine yet there is likewise Kaplan turbine, Tyson turbine, Gorlov helical turbine.

5 CONCLUSION

It was determined from the experimentation done that the most effective possibility for solar pursuit would be to use the light dependent resistors. Except for their power consumption, they are the most effective option as a result of they are clearly more sensitive; their optimum angle is at 30 degrees. Their sensitivity is followed closely by the amorphous solar cells with their optimum angle being at 50 degrees. To conclude there would be a more robust methodology for implementing the analog version of the feedback loop. What would be a rather higher style would be to use instrumentation amplifiers rather than comparators. Instrumentation amplifiers are used for amplifying tiny voltage variations, just like the difference between the solar cell voltages.

In addition the analog negative feedback circuit will cause chattering at the relay coils once the signal is too close to the turn on voltage. In our case the signal from the MOSFET to the relay is also round the 5V needed to show the relay on. During this case we'd get a chattering noise that is undesirable. There are 2 strategies that may facilitate influence this. One is to use a Schmitt

trigger that may only trigger comparators to go high and low once the solar cells have reached sure high and lower threshold voltages.

This way, anything in between is neglected. The opposite methodology, which is that the one used for the analog version, is to possess capacitors at the coils of the relays that forestall the oscillation at the activate voltage that causes chattering. What happens is that the capacitors keep charged (keep the contacts closed) till the solar cells. I learnt skills like tactical problem determination, managing human resources, equalization work, etc. in brief valuable skills. I might once more prefer to give thanks all individuals whom I even have met, because of them itself this training was successful.

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