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PORTABLE WATER PURIFIER WITH HOT AND COOL WATER

¹B. Nirmala, ²D. Jyothsna priya, ³G. Pavithra, ⁴P. Navitha, ⁵M. Maruthi Varaprasad, ⁶K. Ramu

^{1,2,3,4,5}students, ⁶Assit. Prof of EEE

^{1,2,3,4,5,6}Department of Electrical and Electronics Engineering

^{1,2,3,4,5,6}Sanskriti School of Engineering, Puttaparthi, Andhra Pradesh, India

Abstract:-

Water is the most important element for all living organisms on the earth. Without water nothing can survive. As a matter of fact, there is only 1% drinking water available on earth. Specially for human being pure water for drinking purpose is very essential as contaminated water cause number of diseases. Our project is basically to purify water for drinking purpose which is based on ultrafiltration method along with cooling and heating based on Thermoelectric Peltier effect using the Solar panel. We have used Activated carbon filtration & ultrafiltration(UF) method to purify water which is the most useful technique for water purification. We are using solar panels for charging the battery and used the RC circuit for controlling Peltier module and the pump. As we know that solar energy is renewable source of energy and It does not affect the environment.

Key words:- sediment filter, carbon filter, UF membrane filter, peltier, heat sinks, pump, solar panels

Introduction:-

In different weather condition like in winter season people need warm water and summer season cold water. So, we have designed such a system which first purifies the water and then perform the function of heating or cooling as per requirement. For purification, we have used carbon filter and ultrafiltration membrane. This filter filtrates the contaminants present in the water. We have achieved a good quality of water by using this method. After purification, it performs the function of heating and cooling. For heating and cooling effect, we have used the "Peltier Effect". Solar energy is used to supply power to run the pump and Peltier plate. By means of pump water from the purified tank is pumped to cooling or heating tank. Peltier plate works on Peltier thermoelectric principles.

OBJECTIVE AND SCOPE:-

The Objective is to design and develop a solar water treatment and hot ,cool water separator that has the ability to purifying water and it separate the warm water and cool water by using a Peltier.

Scope:- The sedimentation ,carbon filter and ultra filtration membrane are able to converted the water as purified water .

=>It could help us to reduce the scarcity from more diseases. This helps in the reduction of chemicals ,biological poisons, suspended solids and gases from the contaminated water.

=>To use a renewable source of energy , which is cost effective and easy to maintenance.

=>There is no movable parts to generate sound pollution.

Existing project:-

There is only either purification or cooling project are there. In existing project are purification of water using carbon filter and sediment filter and the cooling of water is by refrigeration. By this cooling process CFC gases are released. By this gases ozone will be damage. And also we are using renewable energy sources like solar.

PROPOSED PROJECT:-

In this project we are combining both the water purification and the Peltier effect for hot and cool water. And there is we are using solar energy for source to the system. There is no CFC gases because we are using Peltier for cooling process. Solar energy is used as input to system by using solar panels.

Components:-

- Carbon filter.
- Sediment filter.
- UF membrane.
- Solar panels Or Battery.
- Peltier.
- Water pump.
- Heat sinks.

Carbon filter:-

Carbon filtering is a method of filtering that uses a bed of activated carbon to remove impurities from a fluid using adsorption.

Carbon filtering works by adsorption, in which pollutants in the fluid to be treated are trapped inside the pore structure[1] of a carbon substrate. The substrate is made of many carbon granules, each of which is itself highly porous. As a result, the substrate has a large surface area within which contaminants can be trapped. Activated carbon is typically used in filters, as it has been treated to have a much higher surface area than non treated carbon. One gram of activated carbon has a surface area in excess of 3,000 m²



SEDIMENT FILTER:-

Ensuring that drinking water is pure and safe is a necessity in every household. The water purifiers in our homes consist of various water filters that remove unwanted dirt, impurities and other harmful particles and chemicals.

There are multiple filters used in a water purifier and each of these filters play a different role in the purification of water. Sediment filter, being one of the pre-filters, plays an important role in the initial stages of the filtration process.

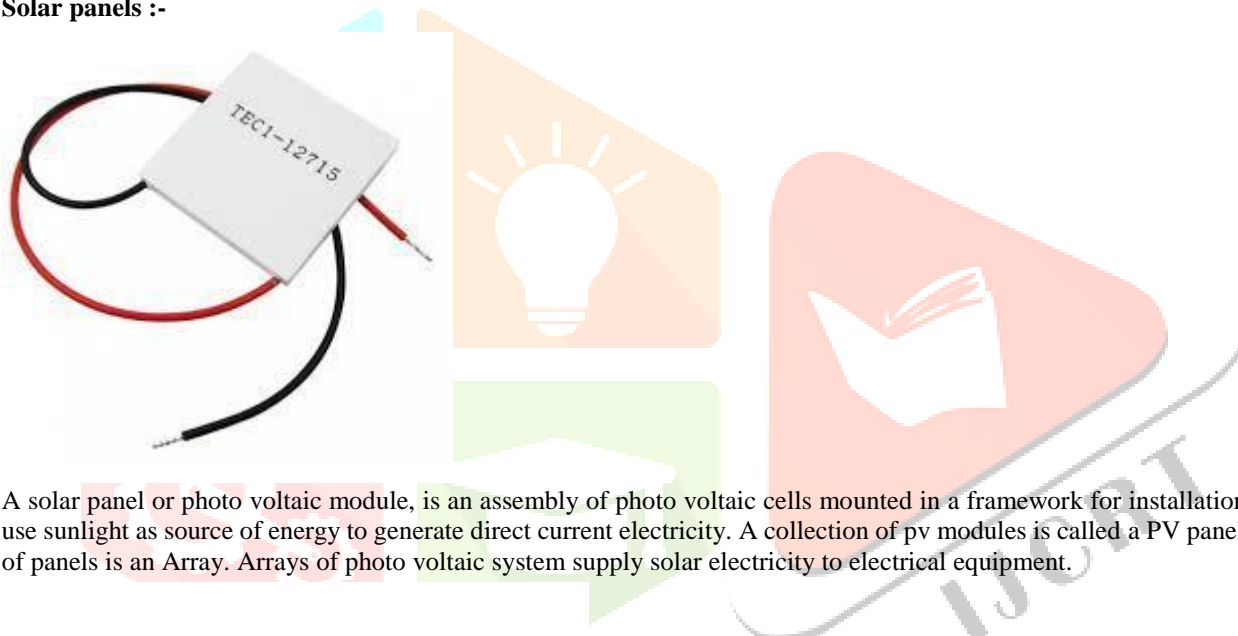


UF membrane filter:-

Ultrafiltration (UF) uses standard home water pressure to push water through a semipermeable membrane and remove any contaminants. Unlike reverse osmosis, ultrafiltration retains minerals in the water, while filtering out bacteria, viruses, and parasites.

Peltier:-

The thermoelectric effect is the direct conversion of temperature differences to electric voltage and vice versa via a thermocouple.[1] A thermoelectric device creates a voltage when there is a different temperature on each side. Conversely, when a voltage is applied to it, heat is transferred from one side to the other, creating a temperature difference. At the atomic scale, an applied temperature gradient causes charge carriers in the material to diffuse from the hot side to the cold side.

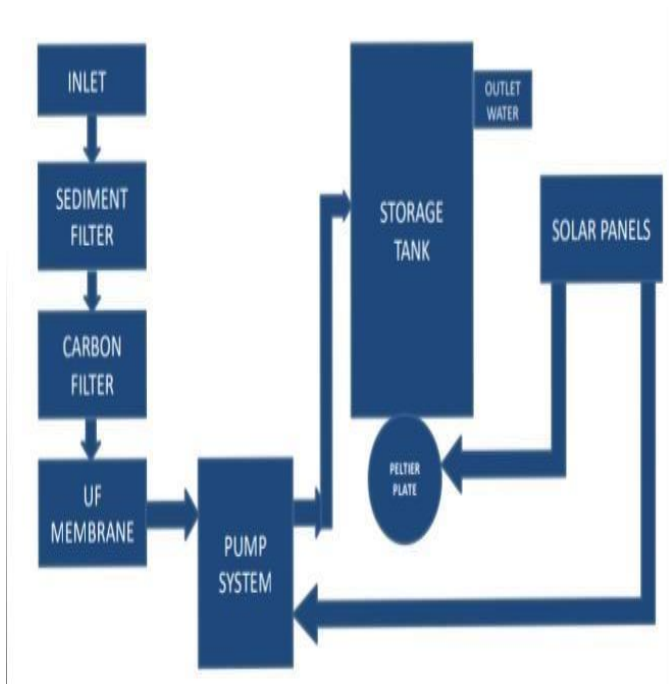
Solar panels :-

A solar panel or photo voltaic module, is an assembly of photo voltaic cells mounted in a framework for installation. Solar panels use sunlight as source of energy to generate direct current electricity. A collection of pv modules is called a PV panel, and a system of panels is an Array. Arrays of photo voltaic system supply solar electricity to electrical equipment.

**WORKING:-**

Waste water is flow through each filters. Sediment filter as the name suggests, a sediment filter acts as a barrier against different types of sediments or suspended solids. It sieves or holds back physical impurities like dust, dirt, sand, silt, clay, and other solid particles. Mostly the particles that are visible to the naked eye are treated by sediment filters during the process of water purification. Carbon filter works by adsorption, in which pollutants in the water to be treated are trapped inside the pore structure of a carbon substrate. Ultrafiltration (UF) uses standard home water pressure to push water through a semipermeable membrane and remove any contaminants. Unlike reverse osmosis, ultrafiltration retains minerals in the water, while filtering out bacteria, viruses, and

parasites. This purified water is flows across the Peltier which sides are connect by heat sinks the water is cooled by one side and hot by other side.



CONCLUSION:-

This paper explain the portable water purifier using some filters like carbon, sediment filter and UF membrane filter and there is using Peltier for cooling process and solar panels for source for the system.

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