

ATMOSPHERIC WATER GENERATOR AND SEGREGATION

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ABSTRACT

- Water scarcity is one of the burning issues of today's world
- The acute problem of water shortage, is mainly faced by the countries with long coastlines and the island nations, which do not have adequate fresh water sources like rivers and ponds.
- Most of the countries meet their water demands by desalination of sea water which is a very costly affair.
- This device is capable of converting atmospheric moisture directly into usable water for multiple purposes.

1. INTRODUCTION

Atmosphere contains large amount of water in the form of vapour, moisture etc. Within those amounts almost 30% of water is wasted. This amount of water can be used by implementing a device like Atmospheric Water Generator[1]. This device is capable of converting atmospheric moisture directly into usable and even drinking water.

The device uses the principle of latent heat to convert water vapour molecules into water droplets. In many countries like India, there are many places which are situated in temperate region; there are desert, rain forest areas and even flooded areas where atmospheric humidity is eminent. But resources of water are limited. In the past few years some projects have already been done to establish the concept of air condensation as well as generation of water with the help of peltier devices, such as harvesting water for young trees using Peltier plates that are powered by photovoltaic solar energy[2] , etc. So, this project will be helping to extend the applications of such devices further in the near future. According to previous knowledge, we know that the temperature require to condense water is known as dew point temperature. Here, the goal is to obtain that specific temperature practically or experimentally to condense water with the help of some electronics devices. This project consists of a thermoelectric peltier (TEC) couple[3], which is used to create the environment of water condensing temperature or dew point, indeed conventional compressor and evaporator system could also be used to condense water by simply exchanging the latent heat of coolant inside the evaporator. The condensed water will be collected to use for drinking purpose and various other uses.

The water generated is segregated and filtered through for multiple purposes. Using microcontroller, the pH level of water is found and the water level indicator is used to indicate the amount of water stored.

2. HARDWARE AND SOFTWARE IMPLEMENTATION

2.1 Methodology

Air capacity of holding water-vapour varies according to the temperature of the air and humidity. The warmer the air, the more water-vapour it can hold. The moisture air is pumped first into the tube thus the cold side of the Peltier element helps to decrease the air temperature. So, as the air cools down, its capacity of holding water decreases and water moisture starts condensing. The air is then passed through to the hotter side of TEC that cools the temperature of hot side, as shown in below figure. This is necessary to keep running of peltier device; otherwise the temperature will increase at hot side so much that the device could be damaged. This warm air can be sent to the cooler side to increase the water generation, as described earlier. The condensed water falls into a reservoir then passes through a filter.

When testing an assembly of this type it is important to monitor temperature and relative humidity. Measuring the temperature and the humidity of the cooling inlet and outlet air as well as flow rates is necessary to build a closed loop control unit. It is built using TC1046 Sensor and a PIC16F872 or ATmega series microcontroller to control the system and keeping the temperature of the circulating air above the water freezing point. It senses the temperature of two sides of TEC1 by using two temperature sensors and accordingly follows an algorithm to control the fan's speed as well as system safety.

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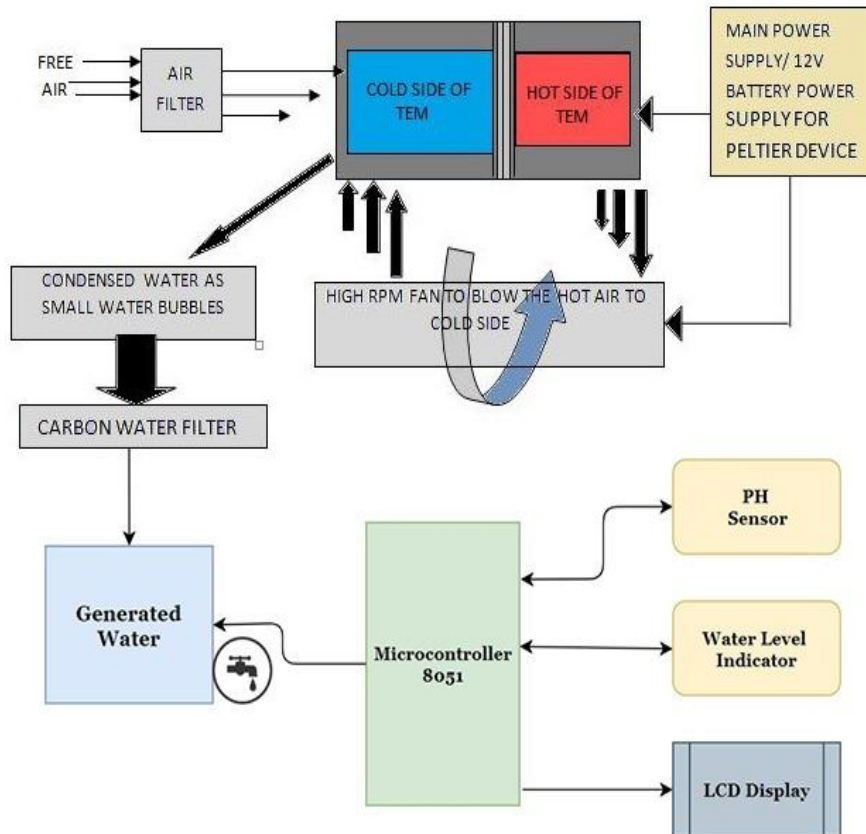
2.2 HARDWARE COMPONENTS

1. Peltier Device
2. pH level sensor
3. Temperature Sensors
4. Batteries
5. Heat Sinks [Aluminium and anodized]
6. Fan
7. Activated Carbon Filter
8. LCD display

2.3 SOFTWARE IMPLEMENTATION

Microcontroller

3. BLOCK DIAGRAM



Conclusion:

The device is portable for its simple design and endurance capability. So, the Atmospheric Water Generator is the device which can be implemented for extreme situation, to use during flood, in desert areas, and in rural areas. It has great advantages as it works like a renewable source of atmosphere water and doesn't need a heavy power source. It can be implemented for Industrial development where the water is a matter of crisis.

According to our estimation, this system can produced approximately 1 Litre of condensed water per hour during the day light, when it is running at its optimum working condition. So, we are expecting more amount of water with low power consumption

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