

POTABLE WATER GENERATOR FROM AIR

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Abstract - Water is the most important element to support life. Water scarcity is the major problem faced by many countries in recent days. Even though two-third of the world is covered by water, fresh water available to fulfill the day-to-day needs remains scarce. During the last century global human population increased above 6.3 billion. This drastic increase in human population leads to the severe shortage of water supply which in turn greatly affects the food production. In addition, Due to the increased use of ground water, ground water sources are depleting which affects the nature drastically. The death rate due to water scarcity increases nowadays. There is an importance to find the alternative fresh water sources immediately. Atmospheric air usually contains more number of gases like nitrogen, oxygen, hydrogen, water vapors and 1% to 4% of water molecules. The goal of our project is to create a portable device which serves as a suitable method to obtain the fresh water. This device extracts the water molecules present in the air and condensing them to produce the drinking water.

Keywords-
Isenthalpic process, Compression,

Enthalpy value, Condensation, Evaporation.

I. INTRODUCTION

During the last century human population increased rapidly creating imbalance between the human life and ecosystem. The use of fresh water also increased causing demand for water supply.

Hydrologists today typically assess water scarcity by looking at the population-water equation. This is done by comparing the amount of total available water resources per year to the population of a country or region. A popular approach to measuring water scarcity has been to rank countries according to the amount of annual water resources available per person. Water scarcity has dramatic effects on the society such as decrease in the water quality causing increased disease and greatly affects the food production. Although a mere 0.014% of all water on earth is both fresh and easily accessible (of the remaining water, 97% is saline and a little less than 3% is hard to access) technically, there is a sufficient amount of freshwater on a global scale, for humanity to get by. However, due to unequal distribution (exacerbated by climate change) resulting in some very wet and some very dry geographic locations,

plus a sharp rise in global freshwater demand in recent decades, humanity is facing a water crisis, with demand expected to outstrip supply by 40% in 2030, if current trends continue. In order to balance the ecosystem there is an urgency to find the alternative source of fresh water which should be ecofriendly. The atmosphere usually contains large amount of gaseous components such as hydrogen, oxygen, carbon-di oxide, nitrogen and large amount of water vapor. Water generator from air is used to take the humid air present in the atmosphere and converting them into the fresh water. The atmosphere readily contains above 3.4 quadrillion gallons of water in it.

During the natural evaporation process about billions of gallons of water in the atmosphere are evaporating every day. This has an ever ending continuous supply of fresh water accessible almost everywhere in the world. This could greatly help people in almost all the aspects such as agricultural purposes, military applications, during disasters and natural calamities. Water generator from air produces water similar to the way rain is made and is an eco-friendly water producing system. A water generator from air is a device that extracts water from humid air. Water vapor present in the air is condensed by cooling the air below its dew point. Water from air are very useful in locations where pure drinking water is difficult or impossible to obtain, as there is almost always a small amount of water in the air. Atmospheric water generator technologies can address the need for drinking water without any health or environment concerns.

II. GENERATION OF WATER

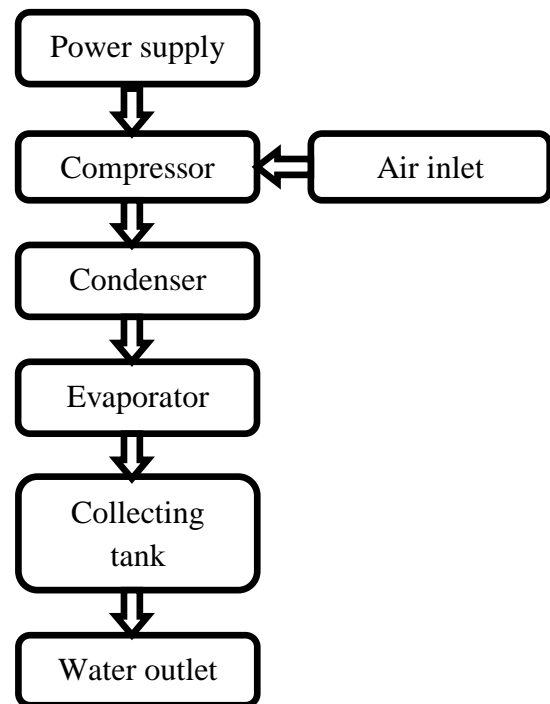


Figure 1 : Block diagram of water generator from air

III. HARDWARE REQUIRED

- Compressor
- Condenser
- Evaporator
- Collecting tank

IV. WORKING PROCESS

The atmosphere is filled with air particles. The air present in the atmosphere is collected by means of air inlet which in turn is fed into the portable device. The collected air is then compressed by means of the compressor. The compressed air is then fed to the condenser by means of the collecting tube. The humid air is condensed by increasing the relative humidity of the air to reach 100%. After this the humid air is then allowed to pass through the evaporator in which the water is formed which is then collected by the collecting tank. Then the water can be taken out by the water outlet.

A. Air Inlet

The atmospheric air is collected initially by means of air inlet which in turn fed the air inside the portable device.



B. Compressor

An air compressor is a device that converts power into potential energy stored in pressurized air. An air compressor forces more and more air into a storage tank, increasing the pressure. This causes the air to be passed to the next chamber through the metal tube. When tank pressure reaches its lower limit, the air compressor turns on again and re-pressurizes the tank.



C. Condenser

A condenser is a piece of apparatus or equipment that can be used to condense, that is, to change the physical state of a substance from its gaseous to its liquid state. Here the condenser is made of copper through which air or other cooling fluids can pass to reduce the temperature of the gasses to afford the condensation.



D. Evaporator

Evaporative cooling is the conversion of liquid water into vapor using the thermal energy in the air, resulting in a lower air temperature. The energy needed to evaporate the water is taken from the air in the form of sensible heat, which affects the temperature of the air, and converted into latent heat, the energy present in the water vapor component of the air, whilst the air remains at a constant enthalpy value. This conversion of sensible heat to latent heat is known as an isenthalpic process because it occurs at a constant enthalpy value. Evaporative cooling therefore causes a drop in the temperature of air proportional to the sensible heat drop and an increase in relative humidity of air. When it reaches 100% the air can no more hold the water molecules hence obtaining the required fresh water. It is then collected by means of the collecting tank after which it can be taken out whenever required.



V. LITERATURE SURVEY

VI. CONCLUSION

The aim of this project is to find the alternate source of freshwater to be used for the daily needs. Finding the suitable ecofriendly device for the production of water is very important for solving the water crisis. In our project, the portable device was developed and thus finally the water is obtained successively.

VII. FUTURE SCOPE

In our project, we developed the portable device which works on the basis of the power supply. We hope that alternative supply of power using renewable resources such as solar energy, wind energy, soil energy could be used to make the device more efficient and environment friendly.

VIII. REFERENCES

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Date	Temperature (°C)	Humidity	Water Per Hour
13 -02 -2018	28	8	150ml
14 -02 -2018	32	6.5	100ml
15 -02 -2018	31	5.8	100ml
16 -02 -2018	29	7.7	150ml
17 -02 -2018	32	6.59	105ml

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