Portable Sea- water Desalination

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Abstract

Now- a- days there is a shortage of drinking water and also the water that we used in our day-to-day life. The availability for the drinking water on the earth is only 1% and only 0.5% is usable freshwater. And about 97 % of earth water is in the ocean. So, to increase the availability of drinking water my team has decided to make portable sea water desalination Machine My machine will provide you a fresh drinking water this Desing of the machine is a best choice in
Future life

Introduction:-

Portable sea water desalination is a process which converts salty ocean water to

A fresh drinking water its works on the principal on reverse osmosis

This is a high technology Machin which provide us fresh water

This type of plant are only exist in south Korea, America and many other countries

So my team is creatin this Machin which is portable less in cost and easy to use this device will provide you a fresh drinking water

This Machin will work on solar panel

live most of them being modest towns. For instance, Solar energy can be easily converted into thermal or electrical energy, the two main energy types consumed in desalination plants. In addition, its environment friendly and almost inexhaustible. Solar energy, water desalination and the merger of both solar desalinations can produce technological solutions for these issues. In the figure (3) you can see the annual solar insolation.

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Objectives

We have benefit directly or indirectly from Solar energy for seawater and brackish water desalination using certain technologies. For instance, the main aim for the project is to save the life by producing more sea water desalination plants for the countries who suffer from not having a pure water. Hence, this technology will give us a new and different alternative for providing more water in the middle east which is the point behind the project. Moreover, this will not only provide water for the poor countries, but we will also protect their health. In addition, uncleaned water can damage the plants life as we talked before. Therefore, the provided water can be utilized for the farms. As we can have more plants and green area in these countries which can also help our environment.

Overview of Design Process:

Any project of the life needs a design processes and specifications, to design it in the best possible way. So, for this project as it has been discussed desalinate water is one of Since tis not enough time for a prototype. Only thermal calculations for the two thermal and membrane processes will be determined the main motive is this device is portable.

Related Coursework:

As a mechanical engineering student, I have studied a lot of useful courses and subjects that I can connect with the content of the project. An example of these courses is Thermodynamic I and II, which can be extremely beneficial for the thermal calculations of the methods that we will cover during the project. Furthermore, Heat and mass transfer and Fluid mechanics can be helpful for measuring the temperatures the energy and the amount of heat transfer if needed for each method. In addition, for benchmarking and background study we can use our knowledge for QFD that we took on the Introduction to mechanical engineering course.

PROJECT FORMULATION

Background Study:

The earth is covered by 70% of water, and that is a huge amount of water that can be benefited from. Even though water covers the majority of the earth's surface, most countries throughout the world have acute drinking water shortages. These countries are the poorest countries among the worlds. Also, GCC countries which have large areas

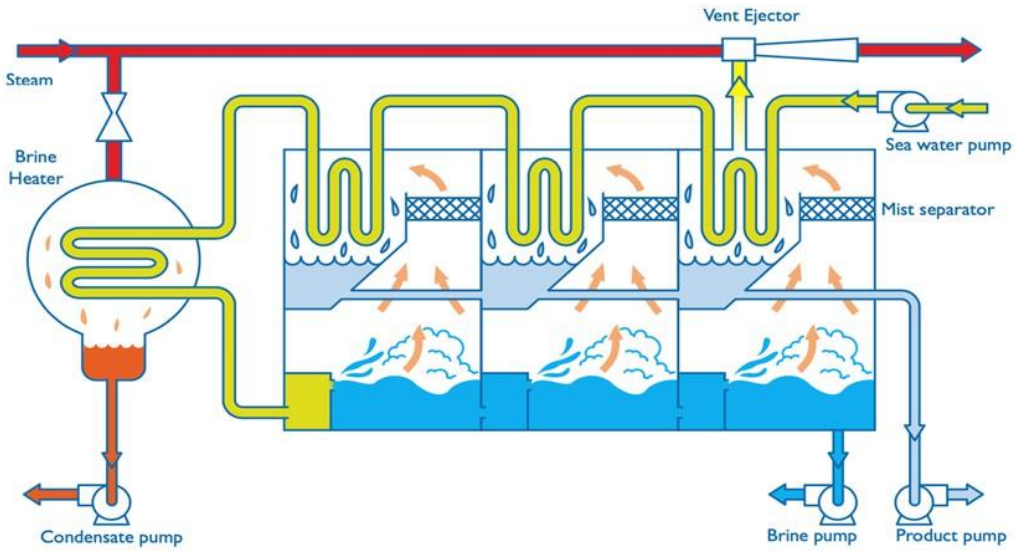
of desert and high temperature which may affect the freshwater. Therefore, GCC countries are planning to raise the demand of seawater by desalinating. As a result of their planning and studies, GCC countries has made an extremely significant step to enhance the usage of the sources of their water also they will produce new ones by constructing desalination plants. Further, the GCC countries have taken significant steps in terms of water cooperation, adopting several water policies and programs, and working to strengthen the methods, ways, and steps that lead to water security.

Due to the rapid increase in demand for water and the quick development of various area of
(PORTABLE SEA WATER DESALINATION)

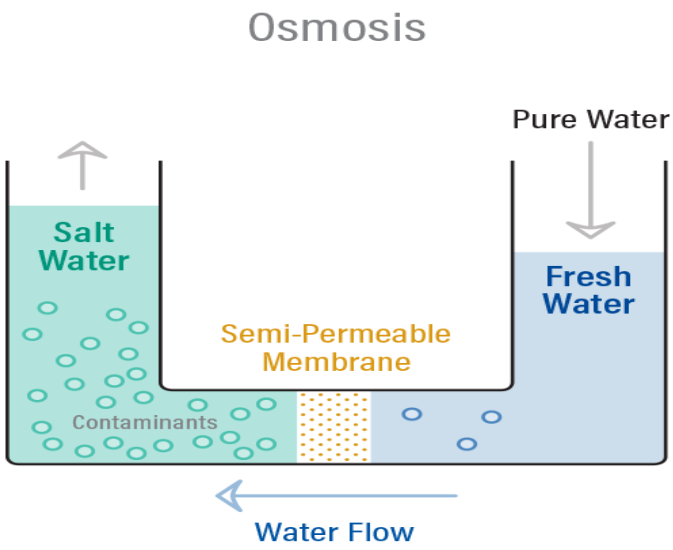
social, construction, industrial, and agricultural infrastructure, the GCC countries have made huge and constant efforts to improve their water resources and introduce new resources in this regard. Desalination is basically a traditional old method to have a freshwater from the sea water. Although, desalination is described as any method that eliminates excess salts and minerals from water that converts seawater to potable water. These methods can be applied in municipal, industrial, or commercial settings. The feed water is processed in major desalination ways, and two streams of water are obtained. (*Chapter: Desalination of Water*. Intech Open.,).

The GCC nations are found in the southwest portion of the Asian continent, which is considered as a parched and semiarid range which endures from shortage of fresh water. In this zone, the individual share of renewable water does not exceed 500 m3 /year. The tremendous majority of GCC arrive is made up of deserts, in which the surface waters such as rivers and lakes don't exist. The precipitation is rare and sporadic with a normal of 100 mm/year around. It

Multistage flashing is also one of the thermal process methods. Its main principle of working is to heat sea salted water; it usually needs temperature range between 90 to 120 C in brine heaters. The MSF method is one of the commonly used methods in all GCC countries. Salt water is pumped into an arrangement of low-pressure chambers, which are beneath vacuum, to create water vapor at entering temperature of each chamber. The rising water vapor from the chambers gets condensed on the surface of bolster water tube bundle, creating desalinated water. This preheats the bolster water some time recently entering the brine radiator which is able decrease the vitality required for warm



RO is one of the processes that needs membrane to work. It is basically a method of turn around exchange of water from a tall concentration solution to a law concentration arrangement through semi permeable or penetrable membrane under the impact of weight higher than the osmotic weight connected in the high concentrated arrangement. The layers of RO are made of several sorts, but there are two widely used sorts which are Winding Wound and Hollow Fine Fiber. These two sorts are used to desalinate both brackish water and ocean water.



Electrodialysis (ED):

ED successfully purifies water with low salinity (up to 2000 ppm) - that is accomplished with the aid of using making use of a positive voltage on poles one nice and the alternative terrible; so, the feed water passes among the poles. Negative and nice ion receives interested in nice and terrible poles respectively even as the water passes outdoor the unit with decreased salinity to an appropriate limit. Desalinated water accounts for 80% of total drinking water in GCC nations. The desalination procedures in the GCC nations vary. The MSF method is the

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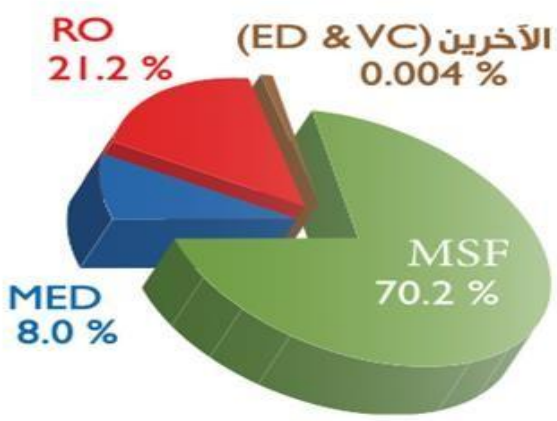

Figure (7): Desalination processes used in GCC countries' percentage contribution (2012)

2.1. Customer Requirements:

As with any project we need to specify and define our customers and their own needs to make the project in perfect way. So, for the seawater desalination the main customer can be classified as the Kuwait government. In addition, the Ministry of electricity and water can be our customer. That's because of the Kuwait region there are not many options and sources for the freshwater, and they have restrictions and responsibly for getting fresh water. Moreover, the agricultural crops can be considered as our customer, and farms as our customer since they need fresh and clean water to grow properly and healthily. For instance, civilians can be take

2.1.1 Technical Requirements:

Design requirements:

Durability of the system.

Amount of the producing water per day.

Specifying the cost of the process (lower is preferred).

Engineering specifications:

The location of the desalination system.

Reusing the power used (heating) to operate the system. The clarity of water and the amount of salinity within it.

Reducing the amount of lost water during the desalination process.

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