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Purifying Water with Solar Energy

The purpose of this project was to design a more efficient and less costly method of providing clean safe water. This was accomplished by using four Fresnel lenses to concentrate sunlight into a 4 foot glass tube containing water. In one trial, the tube contained only water while in the second trial a stainless steel mesh was added to improve the conversion of light to heat. A solar powered submersible pump was added to circulate water for temperature uniformity. Two temperature probes were used to measure the temperature of the water inside the reservoir and the ambient temperature. The resultant heat gain was calculated by the measured heat gained by the circulating water with a correction for the amount of heat lost to the surroundings.

The data showed that the tests with the stainless steel mesh collected 94% more heat as compared to the tests in which the mesh was not present. As a result of this experiment, it was concluded that the heat was absorbed more efficiently when the light was focused on the mesh submerged within the water. This allows for a more efficient and less costly method of acquiring heat energy for the production of steam, a necessary component for purifying water by distillation. The useful applications of this project would be for improving the availability of pure water at affordable costs to low-income areas which have poor water distribution and an abundance of solar energy.