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The Study of Solar Still Coupled with Parabolic Trough Collector

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Abstract

The renewable energy sources were explored and the solar energy is adjudicating the best option. With abundance of solar energy in many of the poorest parts of the world where access to drinkable water is a challenge, it is reasoned that it is the best and most viable option

In this paper, we preheating the water while using the parabolic dish collector and parabolic trough collector. With the use of these, the performance and efficiency were improved. The effect of sun tracking on the design and operating factors such as solar radiation ambient temperature parabolic dish water while using parabolic trough collectors. The was evident from the results that the solar intensity impact on the productivity directly and positively. An arrangement was explored to determine how this affects the performance of the water. In the parabolic trough we use the copper coil to show some significant improvement while preheating the water. So, this arrangement for solar water heating is better for preheating. While using this arrangement a better improvement in water temperature.

Keyword- Solar energy, Solar Water preheating, Parabolic Dish Collector, Parabolic Trough Collector, Copper Coil.

1. Introduction

A parabolic trough collector system consists of a reflecting surface which resembles a parabolic shape. This reflecting surface is mostly made of reflecting mirrors or anodized aluminum sheets. The solar radiations falling on the reflecting surface is concentrated from the absorber tube which is utilized later in the desired way. The temperature in this type of system, depending upon the type of reflecting surface, absorber tube materials and heat transfer fluid. A parabolic trough collector system must be positioned in agreement with the sun's position so that it can reflect the incoming beam radiations to the absorber tube. Concentrating ratio is an important term when talking about concentrating collectors. This is defined as the ratio of the area aperture area of collector and absorber tube's area. A parabolic dish collector is a type of point focusing concentrating collector. The incoming beam radiations falling on the surface parallel to the axis of the dish concentrated at the focal point of the dish. This system uses a dual axis tracking which clearly means that it had to follow sun throughout the day in order for high efficiency.

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Khare et al. [1] its uses don't contribute to emission of greenhouse gases and other pollutants to the environment. It is sustainable since it cannot be depleted in a time relevant to the human race. The potential for the solar thermal system for hot water generation has been studied. They were designed with principal focus at 0.3m so that the receiver heat loss was minimized the microstructure and a low number of defects. Dramatic technology breaks through to make parabolic-trough solar water heating economically attractive in areas with less sun or for facilities they have low cost conventional. Brooks et al. [2] an evacuated glass shielded absorber and an unshielded absorber tube were used for the purpose of study. Water is used as the heat transfer fluid with both type of absorber tube. It was observed that the maximum thermal efficiencies for both the evacuated glass shielded and unshielded were 53.8% and 55.2% respectively. It was also observed that the absorber tube with evacuated glass shield was superior under maximum test temperatures also reducing the overall heat loss coefficient by half. Zhiyong et al. [3] as the absorber tubes accounts for about 30% of the cost of a solar parabolic field this study was focused on the reason behind the bending of the receiver tubes used for carrying heat transfer fluids causing the failure of the system. The study also showed that the important causes for the failure of the receiver tubes are improper installations along with operational practices of the system. The maximum working temperature of the system.

3. Parabolic Dish Collector

Yosra et al. [4] the design of parabolic solar dish collector in order to be operated with a given data of environmental conditions, such as Tunisian conditions and the technical documentation of Stirling engine chosen to be used. The optimal configuration and dimensions of parabolic solar dish concentrator suitable with Tunisian metrological conditions were fixed. Due to its high solar potential, Parabolic solar dish concentrator with smaller dimensions to get the same electrical power output. Garg et al. [5] the important components of such technology are cavity receiver as it affects the efficiency of the entire power plant. The solar cavity receiver is a photo- thermal conversion component of solar power plants, which heats the working fluid contained in it by absorbing solar radiation. An effort has been created to review the work dole out by various researchers on different cavity receiver designs. It has been initiating that hollow geometry takes a significant effect on overall flux distribution. The flow rate also has a considerable influence on the thermal performance of the cavity receiver. It has been realized that here is still scope for developing designs of an efficient hollow receiver which could minimize the losses and hence, enhances the overall efficiency of the plant. Salah et al. [6] the experimental devise consists of a dish of 2.2 m opening diameter. Its interior surface is covered with a reflective layer and equipped with a disc receiver in its focal position. Experimental measurements of temperature distribution on the receiver have been carried out. Its experimental results describe correctly the awaited physical phenomena. A solar concentrator design has been installed. This equipment is based on a reflector dish and a receiver disk. Experimental measurements of solar flux and temperature distribution on the receiver have been carried out. The solar flux concentrated on receiver has been experimentally determined. Kumar et al. [7] the Concentrated solar power is a hopeful area of research for higher efficiency sun heat extraction. Due to this it has attracted the attention of researchers and scientist in last few years. It can be operated in the clear sky

condition for good performance. It's difficult to operate in cloudy days and off sunshine hours. It can't give energy in night hours except using thermal storage system.

4. Conclusion

Preheating is done to improve the solar water temperature and its efficiency. The solar parabolic trough collector system is used for generation of power as the system is capable of producing high temperature. This system is also employed for water heating, process steam application and air heating as well. In this present study a parabolic trough collector with stainless steel reflecting surface is used for the parametric analysis is used. During the experimental investigation receiver rubes of three different diameters and two different materials are used. Here in the parabolic trough collector we use the copper coil to obtained better preheating the solar water. It is obtained from the observation that the heat transfer rate and a collector efficiency is strongly depends on solar radiation.

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