The Investigation of the Evaporation Effect on On-Demand Cooling of Solar Panels

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Last year's research determined that improvements needed be made to the past cooling manifold. The purpose of the past manifold was to cool a solar panel effectively in order to produce an increase in power output. The characteristic that causes a change in power output as temperature changes is known as the temperature coefficient. Despite a result of a power increase of 10-12% there was still issues with water runoff and the manifold construction itself. Therefore, it was hypothesized that by creating a manifold with interchangeable parts as well as decreasing its water consumption, its economic value could be raised. In order to achieve a decrease in water consumption, an experiment that focused on the theorized evaporation effect of water was conducted. In order to utilize the evaporation effect, the manifold worked on a set duty cycle. The duty cycle ensured a period of time that the misters were off in order for the water on the panel to evaporate. To determine if the evaporation effect was actually cooling the panel, faster power measurement as well as a visual temperature measurement system were required. This led to the implementation of current and voltage transducers that created 1 second power data. A thermal imaging system was used in order to view the evaporation effect. It can be concluded that the hypothesis was proven due to a 10% power increase that was similar to the prior manifold's power increase while decreasing the water consumption .

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