

Abstract

Solar Energy: The Effect of the Quantity of Solar Energy on Water Pump Efficiency
Energy Physical, 2, Carter

The purpose of the experiment was to test the effect of wattage alterations on a water pump's efficiency. This lab tested different quantities of solar panels to see how the efficiency of a water pump was affected by increased and decreased wattage. Before experimentation, the hypothesis was that if one solar panel is used, providing 0.14 watts of power, then efficiency will be at its highest because the solar panel's wattage will be closest to the rated wattage of the water pump (0.24 watts). To test this, a water pump was placed in a tub of water and pumped for one minute into a graduated cylinder for volume trials, and it was connected to a 1.5 meter vertical tube and pumped until it reached its max height for height trials. The pump was powered by one, two, and three solar panels, all generating energy from two 100 W incandescent light bulbs. Efficiency in volume trials was calculated in milliliters per watt, and in height trials, it was calculated in centimeters per watt. The results showed that one solar panel had the highest efficiency, supporting the hypothesis. The research predicted that as the wattage increased over the most efficient point, the efficiency would decrease, which was supported by the 13.4% efficiency decrease on average between one and two solar panels. The results from this experiment could be used by those developing solar water pumps to create the most efficient systems.