CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)

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Project Number

J1022

Project Title

Potential Effectiveness of Solar vs. Wind Energy in Private Generation Systems

Abstract

Objectives/Goals

My objective was to determine weather solar or wind is a more dependable energy source for private generating systems in Riverside,California, over a specific period. My hypothesis stated that for the period of November 10, 2008-January 31, 2009, solar power would be more dependable in this area because our climate is more sunny than windy.

Methods/Materials

To test the dependabilty of solar versus wind for residential power, this experiment used VLDPE solar panels and a Windmonitor II device. First, an appropriate location was identified. For wind the location had to be 30 ft above natural or manmade obstructions; for solar the location had to have clear exposure of the southweast sky. the VLDPE panels were already in place on our roof and were connected to a Jandy Aqualink pool moniitor which displayed the water, ambiant, and solar temperatures. the Wind Monitor II was placed on my roof near the panels.The solar panels heated the 188,908 pounds of pool water each day and i calculated the solar energy produced using the daily rise in the pool water temperature The Windmonitor data (windspeed) was reported via download to an Excell program on my desktopcomputer Windspeed was recorded each half hour. To calculate the potiential wind energy, I used this formula: (the radius of the windmill blade) squared X the(windspeed) to the 3rd power = kW. The solar calculation was: (weight of water) X (pm pool temp.-am. pool temp.)=Btu. To compare the Btu's to kW, I used the following formula: Btu X .002931=kW.

Results

Solar: The average, the daily pool temperature rise (using solar heating)was 5.2 degrees F daily over my data period. 68 daily power generation was a total of 6,469,524 Btu or 18,960 kW.

Wind- Daily average speed was 2.3 M.P.H. over the data period. 68 day power generation was 0.590 kW.

Conclusions/Discussion

Riverside,California is a better location for utilizing solar than wind. Wind speed was insufficient to drive a turbine capable of producing a usuable amount of kW. This is because of the very limited range(6-38 MPH for private towers) when wind will produce usable power. Sunlight can always produce some power.

Summary Statement

My project compares the potential of solar versus wind energy generation for private residences, and further indicates the currently limited capabitlies of these alternative generation systems, especially when they are retrofit.

Help Received

My father mounted my Windmonitor II on roof of my house. My uncle helpeed me solder the light system for my dislay board marquee.