CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
J0234

Project Title
We've Got the Power!

Abstract

Objectives/Goals
The objective is to determine if hydroelectric power would be the most efficient renewable energy compared to wind power and solar power.

Methods/Materials
Measured water power by duct-taping the apparatus so that Motor #1 was resting on a platform and the water wheel was hanging off it under where the fountain would run water, simulating a stream. Steadied it with a clothespin that has a hole between its teeth large enough to let the water wheel spin freely.
Measured wind power by building a miniature wind turbine out of PVC pipe and balsa wood and setting in the general direction of the wind for the day.
Measured solar power by leaving a solar turbine out in the sun.
Wired multimeters to each generator, and recorded the voltage generated every five minutes for one hour over seven days.
Each generator's efficiency in voltage output was found by taking the percentage of the voltage that was generated to the maximum voltage each generator was able to output.

Results
Solar power was the most efficient renewable energy and wind power was the most efficient. Solar power was the most efficient in energy output at 95.1%, hydroelectric power had 16.3% efficiency, and wind power had 0.4% efficiency.

Conclusions/Discussion
My hypothesis that hydroelectric power would be the most efficient renewable energy was not supported. Though it was shown that water power had 16.3% energy efficiency, solar power was the most efficient in its voltage output, with 95.1% energy efficiency. This shows that the most efficient renewable energy source that should be utilized in our geographical location is solar power.

Summary Statement
The goal is to determine if hydroelectric power is the most efficient renewable energy compared to wind and solar power by using self-built miniature generators.

Help Received
Mother helped supply tools and equipment; Father helped cut PVC pipe; Mr. Gavin Gladding helped find blueprints of a miniature wind turbine