CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
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Project Number
J1035

Project Title
Water Down the Drain ... or Is It? Converting Water Waste into Usable Energy

Abstract

Objectives/Goals
My objective was to determine if energy could be produced from water run off through a household drain and, if so, what factors influence the energy output.

Methods/Materials
I constructed a stand to hold a generator and impeller, a pipe to direct the water flow, and used a voltmeter to measure the peak energy output. First I poured water directly onto the impeller using 3 different water containers (2-quart container without holes, 2-quart container with holes and a 5-gallon bucket). Then I poured water onto the impeller through a pipe, to simulate a drain, using the same water containers. Each time I poured water, I measured the peak energy output. I performed this test with each water container five times without the pipe and repeated the procedure five times with the pipe.

Results
Energy was produced in each trial. The water poured through the pipe consistently produced greater energy. The highest energy output was achieved using a two quart container with holes in the bottom.

Conclusions/Discussion
My hypothesis was partially correct. Energy was able to be produced in a household drain. I believe this was due to the fact that the kinetic energy of the falling water was transferred to the motor, thus producing energy. The pipe helped produce more energy because it focused the kinetic energy onto the impeller. The higher speed of the water also effected the energy output in a positive way. One aspect that surprised me was that the 5-gallon bucket produced a lower peak voltage than the 2-quart container with holes. I thought that the 5-gallon bucket would produce a higher peak energy because of it's greater volume. This may be due to a design error. The water from the 5-gallon bucket was poured into the pipe through a funnel whereas the 2-quart containers were poured directly into the pipe. This may have caused it to lose some of it's kinetic energy.

I believe this experiment has the potential to revolutionize the future of green technology. This project could be improved by using an impeller specifically designed for water applications and a gear system to increase the revolutions of the generator. It could be engineered and mass produced to fit into any standard household drain pipe.

Summary Statement
The goal of my project was to utilize wasted water in a household drain and to convert it into usable energy.

Help Received
My father helped pour the water while I recorded data. He also helped me find the parts for the pipe and stand.