CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)

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Project Number

38315

Project Title

Does the Type of Wind Turbine Affect Energy Produced?

Abstract

Objectives/Goals

My experiment is addressing the following question: Does the Type of Wind Turbine Affect Energy Produced?

Methods/Materials

Construct the four turbines (Savonius VAWT, Giromill VAWT, Modern HAWT, and Pinwheel HAWT). Set Up: Place the D.C. motor over the small hole on the long platform, with the shaft pointing down. Tape the D.C. motor to the platform. Connect the wires of the multimeter to the D.C. motor. Place the platform with the hole hanging over the edge of an elevated platform. The hole must be about 7 in. away from the edge. Tape the platform to the elevated platform. Procedure for testing the Wind Turbines. Connect the pen refill that is on a turbine to the D.C. motor shaft. Place the fan 1 foot away from the turbine and turn it on. For the HAWTs place the fan lying down on the floor still a foot away from the turbines using a shoe box if needed. Check the multimeter every 30 seconds and record the amount of energy being produced.

Results

The result of my investigation on which type of pinwheel design will produce the most energy showed that the pinwheel with four blades (square shape) was the best, using both the homemade model and the ev3 LEGO Mindstorm machine.Four Blade Pinwheel (square)
Homemade model results: Quickest time = 6.6 Slowest time = 7.76 Ev3 LEGO Mindstorm machine results: Most energy produced = 2.6v Least energy produced = 2.1v
Discussion: This pinwheel produced the most energy using both machines.

Conclusions/Discussion

After completing my investigation on different pinwheel designs and how much energy they would produce, I found that my hypothesis for the pinwheels was not supported. My hypothesis stated that the pinwheel with five blades would produce the most energy. However, the pinwheel with four blades produced the most energy. I learned that the pinwheel with four blades produces more energy than any of the other pinwheels I have tested. It is possible that the four blade pinwheel is the best at producing energy, because its blades have the biggest surface area. Since this number of blades on pinwheels produces the most energy, they may be a very efficient way to make energy using wind turbines. This is similar to how scientists test wind turbines in real life. They build prototypes of a wind turbines and see which ones can produce the most energy just as I have done.

Summary Statement

My investigation showed that the pinwheel with four blades produces more energy than any of the other pinwheels I have tested.

Help Received

Preliminary