# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
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**Project Number**
**J1042**

**Project Title**
# Magnet Madness: Using Transverse Wave Motion to Propel Electromagnetic Induction

**Abstract**

**Objectives/Goals**
Can a windbelt, an alternative wind powered device using a ribbon belt instead of blades, generate enough wave energy to oscillate a magnet and coil induction circuit to power a 1.5 volt lamp and how do the position of the fan, coil and magnet affect the amount of wave motion needed to produce measurable power?

**Methods/Materials**
First I designed and built a windbelt structure to suspend a taut Mylar ribbon. I conducted multiple trials on the device to test the fan angle and magnet placement in different positions along the belt for determining the best placement to generate a rapid wave motion to move the magnets in an electromagnetic induction circuit. I then switched the coils position along the ribbon belt and tested by using a voltmeter to see if there is any difference in current output. After each trail I connected the 1.5 volt lamp to the coils.

**Results**
I found that a homemade windbelt could power a 1.5 volt light bulb. The best angle generating the most consistent wave motion was at a 90 degree angle. I found that the bottom portion of the ribbon belt near the securing tower was the most consistent wave. The fan did produce a wave motion in the ribbon belt sufficient to create a current in electromagnetic induction circuit. The ribbon belt tension had a great influence on the amount and "quality" of the motion.

**Conclusions/Discussion**
A Windbelt converts wind energy into movement (waves) of a ribbon that can be used to move a magnet past a set of coils to generate enough power to light a small light bulb. The amount of flutter and current is dependent on the amount of wind, the tension of the ribbon belt, the position of the magnets, the weight of the magnets, and the angle of the air flow. My windbelt was simple to prove the concept. Further work would need to be done to maintain the ribbon belt at the optimal angle relative to wind direction

**Summary Statement**
I tested the affects of wave motion and magnet placement on a ribbon belt to power an electromagnetic induction circuit.

**Help Received**
My mother helped me with the graphs and proofreading. My Father helped buy the materials. Richard Remillard of Fuel Solutions Inc. helped me with understanding the bridge rectifier solution.