



## IMAGINING TOMORROW: ALTERNATE ENERGY FUTURES

Presented by The Northeast Sustainable Energy Association



### Clean Energy Award Region III: Southwest MA

Elizabeth Gingras,  
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#### *"Wind Turbines"*

Elizabeth Gingras is 15 years old and a freshman at Bishop Feehan High School in Attleboro, MA. Mathematics is one of her favorite subjects, and she also enjoys art and drawing. As a freshman Elizabeth played three sports, volleyball, basketball, and softball. She is the youngest of four children who also attended Bishop Feehan High School. Elizabeth loves sports and is an avid Red Sox fan. When not participating in sports, she enjoys the beach on Cape Cod where she loves to skim board.

Elizabeth chose her Science Fair project entitled "Wind Turbines" because she is interested in the issues associated with global warming. Using wind turbines to produce energy could greatly help this cause.

**THE PROJECT/ABSTRACT:** The purpose of this experiment was to test if the size of a wind turbine rotor affected how much energy it produced. The experiment was carried out to see if a larger rotor lifted a load faster than a smaller rotor, or if a smaller rotor lifted a load faster than a larger rotor.

In this experiment, two different sized rotors were used to test the effect that they had on energy production. There was a load attached to the wind turbine, and a fan was placed directly in front of the rotor. As the rotor spun from the wind of the fan, the load was lifted. This was timed from the moment the fan was turned on until the moment the load touched the shaft of the wind turbine. This was repeated many times with each rotor, three times with the fan speed on high, three times on medium, and three times on low.

The results of the experiment showed that the smaller rotor lifted the load faster than the larger rotor. The larger rotor had a bigger circumference, so it took more time to go around than the smaller rotor with a smaller circumference. It took 26 rotations of the shaft to lift the load from the floor to the top. Because the larger rotor took a longer time to make one rotation of the shaft, then it took more time to lift the load.

The configuration of a rotor, especially its size, had an affect on how much energy the wind turbine produced. In the case of this experiment, it showed that the smaller rotor did more work than the larger rotor.