



Maryland Engineering Challenges™
2011
Eco-Power Guide

Supported By:

Technology and Engineering Educators Association of Maryland

Level:

Middle School—Grades 6 to 8

Important Dates:

Coaches' Information Session:
Thursday, November 11 2010
4:00 – 7:00 p.m.

Coaches' Hands-on Workshop:
January 29, 2011
10:00 a.m. – 2:00 p.m.



Registration Deadline and Written Report Due:
Friday, April 16, 2010
4:00 p.m.

Competition Date:
Sunday, May 1, 2011
12:00 p.m. – 4:00 p.m.

Important Information:

All Eco Power activities will be held at:
Baltimore Museum of Industry, 1415 Key Highway, Baltimore, MD 21230

For more information on Eco Power engineering requirements, please contact Mike Tedeschi at mteseschi@bcps.org

For registration information or general questions about the Maryland Engineering Challenges, please contact Melinda Cané at mcane@thebmi.org. Detailed information about the competition event will be sent to Coaches after the registration deadline.

To register a team, adult Coaches should go to <http://tp1.clearlearning.com/hshealey/EC.tp4>. Please note there is a \$5 PER COACH registration fee. Only one Coach is needed per team, although a team may have as many adult helpers as needed.

Two page executive summaries may be summated in two ways:
Hard copy to: Melinda Cané, BMI, 1415 Key Highway, Baltimore MD 21230 (STRONGLY PREFERRED) or electronic copy to: mcane@thebmi.org

The Challenge:

Setting the Scene

Worcester County Public Schools wants to determine the feasibility of using wind power to generate power for their high schools. The school system hired your team as consultants to determine the cost benefits, environmental effects, maintenance costs, and to identify possible public reaction. The school system also asked your team to develop a model of a turbine in order to understand how electricity can be created.

Engineering Team Requirement

Teams may have 1 to 4 students. A school may enter as many teams as desired.

Required Construction Elements

- *Turbine generator* - Turbine blades must be fitted on a 6V-12V-0.14A project motor [motor can be found at <http://www.kelvin.com>]. The wind source will be a 20” standard home box fan. The fan will be placed 12” from the turbine blade assembly.
- *Turbine Tower* - A turbine tower must meet the following specifications:
 - It must be constructed of recyclable materials.
 - It must not exceed a “footprint” of more than 16” x 16”. The platform may be constructed using 1/2” plywood or particle board.
 - The motor assembly must be 24” high.
 - The tower must allow the mechanism to rotate 180 degrees.
 - The tower must support the turbine mechanism.
 - The tower must be free standing and self-supporting, with no human contact during operation.

Evaluation Standards:

1. EXECUTIVE SUMMARY (*Competition value: 20%*)
 - Students will write a summary of their findings to the school board in two or less pages.
 - Students will use the [“Executive Summary Guide”](#) to create the summary.
2. ORAL REPORT (*Competition value: 20%*)
 - Students must be able to communicate...
 - how wind is created. (specifically, in the location of their turbine)
 - the process of generating power from wind.
 - feasibility of wind power. (specifically, in the location of their turbine)
 - their design process of the turbine ([Click here for an example design process model](#)).
 - Students will identify the strengths of their turbine.
3. DESIGN AND CONSTRUCTION (*Competition value: 25%*)
 - Turbine design and construction
 - Tower design and construction
4. PERFORMANCE DEMONSTRATION (*Competition value: 35%*)
 - Power Output

Executive Summary Guide

An executive summary is a snapshot of the main ideas of a detailed report; it is written for non-technical people who would not take the time to read the full report. The executive summary grabs the reader's interest and provides enough information to get acquainted with the research or report idea without reading the whole report. The goal is to create enough interest to want to read the full report.

The format of your executive summary is to maintain one inch margins all around the white page with double spaced 12 point type within two pages.

List the main point the summary will cover, referring to the process and results you experienced.

- Introduction
 - Claim/ Recommendation
 - Design/Build
 - Testing
 - Conclusion
 - Recommendations
 - Summary (Closing)
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- Write a simple declarative sentence for each of the main points listed.
 - Add supporting or explanatory sentences as needed, avoid getting technical but be descriptive.
 - Does it clearly state all key points, conclusions and recommendations? If readers skim this summary will they get the “big picture?”
 - Proof read for spelling, grammar, punctuation and style.
 - Final check – read it from the position of first view; does it confuse or bore you as a reader, or do you want to know more?