

# Lab 04: Building a Wind Turbine

## Physics and Mathematics of Sustainable Energy

Thursday, October 6, 2023

College of the Atlantic

The **goals** for today are for you to:

- Gain a further understanding/appreciation for how electricity is generated.
- Have fun and feel a sense of triumph when the turbine turns and the bulb lights up.
- Optionally: Learn more about alternating current and electricity.

### Guidelines

- Please work in pairs if at all possible. When you are done, please take a photo of your wind turbine and upload it to google classroom. Be sure your photo includes the names of everyone in your group.

1. Find the generator you built last time.
2. Turn your generator into a wind turbine by making turbine blades. There are a variety of materials to choose from. You will be faced with some decisions: how many blades? what size and shape? what material? Discuss and strategize, and then build. (When using the utility knife, please be careful not to cut yourself. Knives are sharp. Also, please don't slice up the tables. Thanks.)
3. Optional, but recommended if you're in the mood: decorate your wind turbine.
4. Test your wind turbine in the "wind tunnel". If possible, determine the power of the turbine by measuring voltage  $V$  and current  $I$ . The power in a circuit is given by  $P = IV$ . A Volt of voltage times an Amp of current is a Watt.
5. If time/interest, (and if I can get it working), I'll have an oscilloscope set up so we can see what AC current looks like.