Portable Wind Power

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Purpose

Wind energy will play a key role in the decentralization of renewable energy. Our team aims to design a small-scale, portable, and cost-effective turbine that efficiently harnesses the wind resources at UCSD. In the process, we hope to use the turbine as an outreach tool to teach younger students the utility of CAD and Arduino

Methods

We utilized Fusion 360 to design the turbine components. Parts were machined by a laser cutter, 3D printed, and hand-cut.

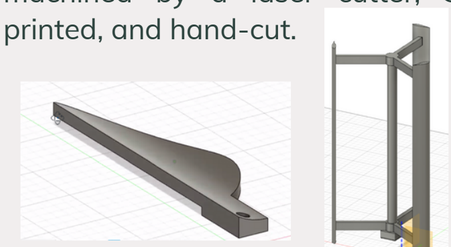


Figure 1. Horizontal axis blade and vertical-axis turbine design in Fusion 360

Our Design

Our design features a universal base that will attach to both horizontal and vertical-axis wind turbines:

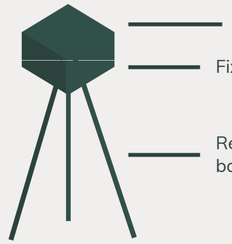
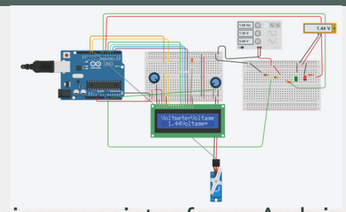


Figure 2. Universal base design



The electronics consist of an Arduino LCD that displays voltage generated and a servo motor that orients the turbine to be perpendicular to the wind.

The turbine will be able to route power to a battery to charge small electronic devices.

Horizontal and vertical-axis teams

Horizontal-axis

The traditional wind turbine with removable airfoil blades and a center hub

Figure 3. Basic design for horizontal-axis turbine

Vertical-axis

Simple design is based on a Darrieus rotor and rotates around a vertical shaft

Figure 4. Basic design for vertical-axis turbine

Future Work

Build

We will finish constructing our base, both turbines, and wiring the circuitry as soon as quarantine is lifted!

Test

Both designs will be tested in different locations on the UC San Diego campus

Optimize

We will choose one of our designs to further develop for our final turbine

Acknowledgements

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