

Micro Wind Turbine, 3/18/13

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Problem Definition

• Problem Statement

-To harness wind power and use it as potential backup power for a home or appliances within it

• Scope

-Phase 1: Build small wind turbine with lower powered generator and light to see how well design works and how much voltage is generated

-Phase 2: Continue with design, upscale it, use a bigger generator and apply it to a household appliance

--specific design updates should include better/more sturdy base, larger generator, adjusted blade size, etc.

• Schedule

-acquire new, more powerful generator

-make improvements to base (if needed)

-improve/change blade design (if needed) to adjusted body design

-test in suitable conditions to determine voltage, current, and power it delivers

• Resources

-Engineering classes at Clark College

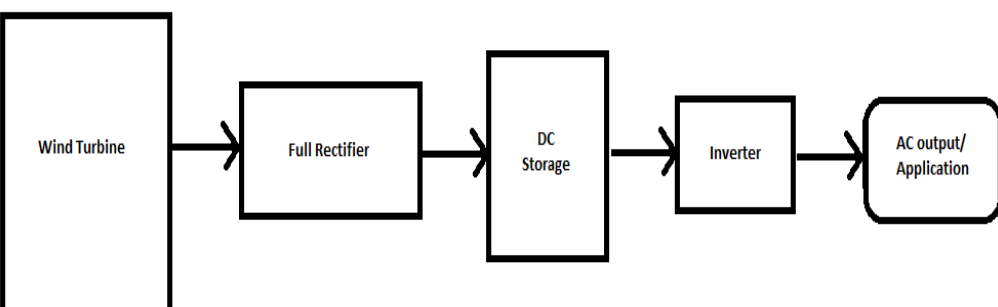
-about \$100-\$200

-materials from home improvement stores in the area

-online: research and hardware consideration

Solution Specifications

- When applied in windy conditions, wind pushes the blades clockwise, which turns the rotor and powers the generator
- The generator can be wired to power a small appliance within a home
- For this phase of our design, new testing will need to be done to accurately determine the output of the turbine with updated design/hardware
- Most appliances, even small ones, generally need over 10 volts to power them. Our main goal for this phase of our turbine is to achieve this output



Competitive Analysis

- The market for micro wind turbines like the one in this picture has exploded in last few years
- This one is in Australia, used to power various utilities in the area
- Various designs show strength and safety, along with different shapes and sizes depending on where it is applied
- Output can be anywhere from 12-24V
- Cost ranges from \$1000-\$10000



Potential Applications

- Useful when power goes out because of a storm
- Could be used for small, portable appliances while camping, boating, sporting events, etc. (i.e. lights, clocks, various kitchen appliances, small space heater, electric blanket)
- If multiple turbines were used, could power large parts of a home

Future Improvement Ideas

- More solid base, made of metal, possibly with a way to stake into the ground
- More ideal generator, to be able to get higher power output with lower cut-in speeds and less RPMs
- Possible adjusted blade size according to the new generator and power of wind being applied
- Integrate gear mechanism to increase RPMs at lower speeds and increase efficiency



