Wind Turbine Proposal Project

ENGR 390 SPRING ’19 CARRIE THEUS
Goal

- Convert wind’s kinetic energy into electrical energy
- Generate power for a community that otherwise would not have power
- Renewable energy source
Background

- 20-100 feet tall
- vertical or horizontal axis
- Small, medium, and large
- Small Wind Certification Council - independent certification of wind turbines
- Access to lift?
- Grid connected - connected to the electricity distribution system; sell back power
Location- Nepal?

- Dept. of Energy recommends avg. wind speed of 10 mph for grid-connected wind turbine
- Average annual wind speeds in Kathmandu are about 5 mph < 9 mph
- Hilltops, plains, oceanfront
- 29 wind measurement stations
Fig. 1: Location of the 29 wind monitoring stations in Nepal in 2009

2. Wind zoning map of Nepal.
Examples

https://youtu.be/cNSm8QLvOLU
https://www.youtube.com/watch?v=qSWKoPGfx3w
Timeline

1. Determine location/partnering community/maintenance
2. Amount of wind and size
3. Power calculations
4. Cost estimation
5. Find generator and parts
6. Size and make blades
7. Build charge controller
8. Build hub, mount, and base
9. Paint all parts
10. Put it all together and attach electronics
## Parts and Cost

<table>
<thead>
<tr>
<th>Part</th>
<th>Origin</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor/Generator</td>
<td>Ebay</td>
<td>$26.00</td>
</tr>
<tr>
<td>Misc. pipe fittings</td>
<td>Homecenter Store</td>
<td>$41.49</td>
</tr>
<tr>
<td>Pipe for blades</td>
<td>Homecenter Store</td>
<td>$12.84</td>
</tr>
<tr>
<td>Misc hardware</td>
<td>Homecenter Store</td>
<td>$8.00</td>
</tr>
<tr>
<td>Conduit</td>
<td>Homecenter Store</td>
<td>$19.95</td>
</tr>
<tr>
<td>Wood &amp; Aluminum</td>
<td>Scrap Pile</td>
<td>$0.00</td>
</tr>
<tr>
<td>Power Cable</td>
<td>Old extension cord</td>
<td>$0.00</td>
</tr>
<tr>
<td>Rope &amp; Turnbuckles</td>
<td>Homecenter Store</td>
<td>$18.47</td>
</tr>
<tr>
<td>Electronic Parts</td>
<td>Already on hand</td>
<td>$0.00</td>
</tr>
<tr>
<td>Relay</td>
<td>Auto Parts Store</td>
<td>$13.87</td>
</tr>
<tr>
<td>Battery</td>
<td>Borrowed from my UPS</td>
<td>$0.00</td>
</tr>
<tr>
<td>Inverter</td>
<td>Already on hand</td>
<td>$0.00</td>
</tr>
<tr>
<td>Paint</td>
<td>Already on hand</td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$140.62</strong></td>
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</table>
Resources

https://smallwindcertification.org/
https://smallwindcertification.org/certified-small-turbines/
https://www.energy.gov/energysaver/installing-and-maintaining-small-wind-electric-system