



## SENIOR DESIGN ORGANIZATION SYNOPSIS – SPRING 2013

### HIGHWAY WIND TURBINES

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The objective of our project is to design a wind turbine to recycle wind energy from passing vehicles on the highway. Wind is considered the fastest growing clean energy source, however; it is limited by variable natural wind. Highways can provide a considerable amount of wind power to drive a turbine due to the high volume of fast moving vehicles. The energy generated from the wind turbines may be used to power streetlights and other such public amenities.

In order to design the most efficient turbine, an extensive amount of data is collected on the wind draft created by vehicles on both sides of the highway. From preliminary data, a vertical wind turbine design is selected because vertical turbines are capable of capturing wind in any direction, whereas, horizontal turbines need to be pointed in the direction of maximum wind velocity. The highway wind turbines will be placed on the medians to capture wind from vehicles on both sides of the highway. Additionally, it is capable of utilizing any natural wind that may be available in the placement area.

There are several important design considerations including energy storage, safety and environmental impact. An energy storage system is vital to the design because the energy produced by the turbines will be intermittent due to fluctuating traffic patterns. In order for the design to be useful, a constant output of energy is necessary. Safety is another major design consideration. Since placement is necessarily in high traffic locations, the turbines must be placed carefully to avoid injuries to the public. Warning labels are also used extensively.

The turbines can be installed on any highway, in any part of the world. The wind energy produced can help offset some of the damage caused globally by the burning of fossil fuels for energy. Wind turbines are traditionally installed in rural areas; highway wind turbines are an effective way of bringing the technology into major cities. The design of the wind turbine will continue to be useful in the future as it is sustainable and environmentally friendly.