

MEng Project #2

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Mini Turbines in an Urban Environment



Concept of Novel Mini-Turbines

We are conducting a comprehensive study of mini-turbines that mutually interact with each other to create positive interference. We are interested to design a different type of wind turbine than the classical windmills (horizontal axis). Our mini-turbine rotates about any axis and is on a much smaller scale. It is designed to operate in high density arrays in the urban environment

Our study investigates a new radical design of turbine blades. The effect of different turbine sizes (c/D ratio), pitch angles, cambered airfoils, and airfoil shapes (possibly delta wings) are analyzed

We are rapid prototyping our designs using our 3D printer for fast testing and to obtain results quickly. Power studies have found that turbines with larger blades extract far more energy than those with small blade. Drastically different designs are being considered from conventional blades used in standard wind turbines. In fact, conventional relative blade sizes simply do not work at the small scale.

Arrays of Turbines: Artistic Engineering

Arrays of mini vertical axis wind turbines can be put between buildings, on rooftops, in alleyways, between street lights, or as free standing sculptures. We are seeking to provide aesthetically pleasing energy harvesting. A blend of engineering and art in a public display of sustainability

This project will give the student exposure to research computational analysis, design of a fluid mechanics experiment, the use of various flow visualization techniques, photography, video and also fluid mechanics instrumentation in challenging and important problems.