Team PRESSURE

Abstract

Over the course of the last decade, the development of renewable energy harvesting devices has become a pressing matter. The vast majority of current energy producing systems in the United States rely on the burning of fossil fuels, leading to high greenhouse gas emissions. Research has shown that a link exists between high levels of greenhouse gasses in the atmosphere and climate change. In order to mitigate the harmful effects caused by climate change, resources are now being apportioned in order to produce effective and efficient means of producing alternative energy. Unfortunately though, not all sources of energy are equally available for harvesting. Energy sources, particularly the wind, vary by region. Locations subject to low wind velocities simply cannot harvest energy through the use of the standard wind turbine. In order to advance the field of research in wind energy harnessing, this paper proposes a methodology for both assembling and testing a piezoelectric energy harvester device. The components of each subsystem of the harvester will be selected through experimental testing. The subsystems that will make up a complete harvester include the piezoelectric harvesting structure, the energy conditioning system, and the energy storage system. By integrating the highest performing component combinations, a piezoelectric harvester capable of harnessing energy from low wind velocities will be produced. By comparing the theoretical yield of the device to the results obtained from both field and lab testing, the efficacy of the overall device will then be determined.