HeatLeaf: A Small Scale Hybrid Renewable Energy System That Incorporates Biomimicry

Koh, Hanah (School: Harmony Science Academy - El Paso)

As global warming and climate change intensify, our planet continues to deteriorate. One of the most well-known ways of combating this problem is renewable energy sources. In many cases, renewable energy sources are highly restrictive and disadvantageous in terms of cost, land usage, environmental damage, inaccessibility, and inefficiency. My project combats these issues and is an innovative way of dealing with such a prevalent problem that exists globally regardless of the environment or class. To solve such a problem, I first researched and developed a 3-D model of my system. The most reasonable sources to use were solar, thermal, and wind energy due to their rising levels caused by climate change. As for the design itself, I wanted to implement biomimetic principles from different species of plants. After that was completed, I needed to confirm my data. To determine the energy outputs, I first checked the amount of energy predicted and then compared that information to the actual energy produced from prototype components. It was determined that every test trial would produce approximately 85 watts. The data was proportional to the predicted energy output, and it was proven that if scaled up, it would have the capability to power many homes. Overall, the results of this project aligned with predicted outputs and showed consistent energy generation. This method of producing energy was proven to require less money and space. HeatLeaf represents a step toward developing efficient and innovative renewable energy while promoting environmental sustainability for all.

Awards Won: