Overview

The objective of this project was to show the public that sustainability and engineering share many core values.

- We strove to accomplish this by highlighting different forms of actuation, like linear and rotational, and powering them through renewable resources such as solar and kinetic energy.

The design we created was inspired by the simple elegance of a tree, though mechanized and modernized to best convey the blending of machine and nature.

Why a Sculpture?

A kinetic sculpture is arguably the most artistic medium that still shares roots with mechanical engineering. By pursing an artistic project we were given the freedom to design as creatively as possible.

Most importantly, we believe that art allows us to connect with people at a deeper level, which allowed us to promote sustainable energy in a more meaningful way.

Power Systems

Two Main Subsystems:

I. Solar Panels

Four 100 W high efficiency solar panels were installed symmetrically atop the canopy. The panels were wired in parallel to a deep cycle solar battery. In full sunlight, the panels charge the battery in 3 hours.

II. Hand Crank Generator

People can interact with the sculpture through the hand crank, which was attached to a generator. The power generated charges the battery and powers several LEDs. More LEDs turn on as the person turns the crank faster.

Design

Three Main Subsystems:

I. Centerpiece (Linear Actuation)

The dynamic centerpiece was installed on the top of the sculpture. Four-bar linkages were connected to a linear actuator. The linkage was designed to create an interesting, symmetric path. The linear actuator utilizes an internal power screw.

II. Canopy (Rotational Actuation)

The tessellated canopy provides shade in an interesting pattern for people sitting on the bench below. The canopy was constructed out of ⅛" steel. The pattern was cut into the metal using a laser cutter. A geared down DC motor turns the canopy at a low speed.

III. Frame

The frame was constructed with 1½" square steel tubing. The canopy had polycarbonate installed between the tubing to provide protection for the moving parts. A bench was added to the design at the bottom of the sculpture.

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