dreamtime

The aboriginal dreamtime concept states that there are three parts to our world, the human world, the physical world and the sacred world. The human world encourages ceremonies of singing, dancing, teaching and painting. The physical world describes natural elements such as the sky, animals and land. The sacred world entails storytelling, healing and spirit. In all, the concept explains how one thing can transform into the next with a plant becoming an animal, an animal becoming a man and a man becoming a landform. Together, the three components were created from the same source and everything was created in our dreamtime.

Inspired by the aboriginal dreamtime theory of existence, this installation strives to encapsulate the three components. A ceremonial opening in the field of stalks allows for celebration and space for the annual Tanderrum event. The elongated promenade of the installation mimics the shape of the rainbow serpent of the aboriginal art. The interactive light elements of the night allow for transformation from body to spirit. The dreamtime installation becomes an art piece that flows through the St. Kilda Triangle site down towards the Port Phillip Bay. It becomes a visual phenomenon, enhancing the site and developing a sensation of serenity.

With a careful consideration of views, the stalks rise to 18 meters high allowing onlookers to still see the beautiful views of the bay while walking the site. The ribbons dance naturally in the wind above, mirroring the performance art of the Palais Theater adjacent. At night, the installation becomes an interactive spiritual performance. Charged by the wind energy, the stalks illuminate at night when touched. As the light travels up the stalk, the ribbons attached continue the light movement. As a person touches the sensors on the stalks, they see their energy transgress into something new as in the dreamtime concept. As many people begin touching the poles, the site becomes a light show inspired by the Aurora Borealis.

As the wind blows, the ribbon scoops up the wind harnessing the strength of the force, pulling the stalks, forcing them to move. The stalks are made up of piezoelectric rods that produce energy through electrodes when compressed. The more the stalks move, the more energy is produced. Alone, the stalks are aerodynamic making them inefficient for capturing wind energy. By studying the relationship of a flag to a pole, I observed that the fixed pole swayed back and forth slightly as the flag was pulled by the wind. In theory, designing a post made up of a carbon fiber resin should allow for the post to be more flexible, like a stalk in the wind. The added larger scale fabric acts as the flag did with the flag pole. The fabric itself is designed to utilize the triboelectric effect otherwise known as static electricity. The triboelectric effect is when two polar opposite materials are rubbed together, they produce energy based off the trading of positive and negative charges. The fabric is made up of layers of a stretchable conductive nylon fabric and carbon-based elastomer composites as electrodes. As energy is produced, it is transmitted through elastic wiring that connects the ribbons to the stalks. Cables run down the center of the posts carrying the charges from the piezoelectric elements and the triboelectric effect down towards an underground power grid.

The stalks taper from bottom to top to allow for greater flexibility where the ribbons are attached. The bottom of the stalk is 25.4 cm tapering to 2.54 cm at the top with an overall 18 meter height. The stalks are organized overall in an equilateral triangular grid system of 4.5 meters from stalk to stalk allowing for plenty of room for ground movement and activities. The ribbons are attached at the stalks at 1.5 meter increments and no lower than 3 meters from the ground for safety. The underground power grid connects to the overall Melbourne grid, the excess power is stored in underground batteries and used when needed to power the areas surrounding the St. Kilda Triangle. One square meter of the fabric has the potential to produce 867 µWH/year, with an total energy production of the fabric at 29.7 MWH/year. On site there are 463 stalks, each producing about 22 MWH/year, totaling 10,263 MWH/year. Overall, this proposal has the capacity to harness 10,300 MWH annually powering the art itself, street lights, the theater, and surrounding homes.

Environmental Impact:

An integral part of the design process was figuring out a way to conceptualize an installation that could harness energy but cause minimal disturbance to the site. The site previously was made up of a nonporous parking lot whereas the new site integrates the already designed master plan including large grassy areas and plants to soak up water runoff and flooding. The fabric itself captures high winds, reducing large impactful wind gusts in the area.

The stalks are made of carbon fiber resin which requires more energy to produce then typical steel, but it does not corrode, rust, degrade, or fatigue, therefore it has a longer life-cycle allowing for it to be produced once where steel would have to be replaced over time. The fabric can be made from recycled plastics such as water bottles and containers, reducing the amount of waste and landfills.

The overall energy production associated with the dreamtime installation is produced solely through wind power. Using this as a renewable source minimizes the carbon footprint of typical energy production through fossil fuel consumption.