**The “GROVE”**

***Abstract:***

Within **The “GROVE”**, kinetic art, landscape and sustainable energy work cohesively in a state of surrealism which looks to challenge the very nature of space and perception while generating clean renewable energy for the city of Melbourne. Comprised of 32 unique shapes, the design of **The “GROVE”** employs the idea of biomimicry in an effort to play on the idea of crown shyness, which is a phenomenon observed in some tree species where the branches of different trees do not touch each other, thus forming a canopy with channel like gaps. To translate this concept into a constructed built environment, the mathematical concept of a Voronoi diagram was utilized to partition the site at the St Kilda Triangle. In doing so, 33 unique seeds were generated with organic pathways between them. Within these unique shapes, 3 meter tall wind stalks were placed in accordance with a 1 meter by 1 meter grid, while 20 meter tall wind stalks occurred in a 4 meter by 4 meter grid. This density not only adds to the surrealism while you are in the space but it also causes the project to perform better because it relies on the nature turbulence that occurs with the wind.

Within the middle of **The “GROVE”** environment, one of these unique shapes was deliberately left without any wind stalks in order to create a space within which the local Boon Wurrung people could hold their traditional aboriginal celebrations and events. However this space is not entirely reserved for these specific events and has the potential to serve as the site to host a multitude of different functions which will serve to connect people to the site. Continuing this idea of connecting people to the environment, the smaller 3 meter tall poles act as a bridge between the human scale and the massive scale of the larger wind stalks. It is intended that as people walk through the site they will be able to pull on and bend the smaller poles themselves, thus drawing a mental connection between what they are doing and how power is being generated in the larger poles. This connection is important because it will help to directly facilitate peoples understanding of renewable power generation and the part they themselves can play in it.

***Construction/Energy Output:***

The wind stalks that comprise the grove are made of hollow carbon fiber reinforced resin poles. The larger of the two types, which stands at 20 meters tall, has a 1 meter diameter base which quickly tapers to 0.250 meters, 1 meter up on the pole. This then further tapers to 0.050 meters at the top. Within these hollow poles there is a stack of piezoelectric discs that have electrodes between them. When the wind moves the poles, the stack of piezoelectric discs and electrodes are forced into compression which generates power in the torque generator, which is housed beneath each pole in a concrete footing. The concrete footing would be poured on site while all of the other components would be built off site and transported when complete. Together, the poles at this size can produce up to 13,000,000 Kilowatts per year. The smaller, more human scale poles stand at 3 meters tall and are 0.050 meters thick with an imbedded 0.050 diameter LED band every half meter. These LED lights are not designed to be on all the time, rather just when somebody is walking in proximity to them or when they are programed for a special event thus minimizing the energy output.

***Environmental Impact Statement:***

The “GROVE” was designed to have virtually zero negative environmental impact on the site and its surrounding context. By utilizing bladeless wind stalks to generate power we can effectively eliminate the negative impact that traditional wind generating turbines have on the local bird and bat populations. This unique design also eliminates the noise pollution that is commonly associated with conventional wind turbines. The current parking lot site contributes heavily to poor storm water management because it is a non-permeable surface and by converting all of that into a permeable grassy area we can eliminate the vast majority of those negative storm water consequences.