Generating, storing and regulating energy for the Smart Grid Era.

Wattery is the new meeting place of St Kilda Triangle; an energy generating, grid regulating, energy storing, moving urban park. Our proposal is a sculptural urban meeting point, that creates spaces, informs people and engages the community in a very simple way.

The centerpiece of the project is a moving park (the heart) that is connected to the city by paths (the arms) that follow the heart as it moves. It is constantly moving up and down, responding to the production or consumption of energy. The piece generates energy in its arms and stores it in its heart.

As the piece moves up and down, the spiraling arms connect us to the different points in the neighborhood creating an ever-changing landscape and experience for visitors. At the same it is informing visitors of the status of the renewable energy generated and how the neighborhood is using it.

The height of the Park will signal to visitors the amount of energy stored, and a central fountain will show with a large green waterjet when it is charging and with several smaller red colored jets when it is discharging.

We made a piece of Land Art that is also the first energy storing and generating parking lot in the world!

The piece not only stores energy, interacts and informs people, but also has as a very simple but useful function: it is a 200 car parking structure!

How does it work?

Generation:

The connecting arms incorporate 72 vertical axis wind turbines that generate up to 3000W of energy each when the wind is blowing.

Storage:

The center piece is a moving landscape that rises when there is an energy surplus, storing this energy and generating it back to the grid. The heart of the piece is also a 200 car parking lot, accessible via one of the connecting arms.

The battery could also help regulate the city grid by storing energy surplus generated elsewhere, and export it back as needed.  It has a capacity of 532kw (0.5MW) of energy during an hour, meaning that if we empty the battery completely in an hour, we generate 0.5MW. Of course, the beauty of this system is that its power output can be regulated.

Technology:

Vertical axis wind turbines

Gravity activated hydraulic electricity generators

Energy Generation:

The piece generates enough energy to provide for 150 homes.

 The wind turbines generate 1800kWh/day (with 35% efficiency).

The battery stores 591kWh. It can provide different amounts of energy depending of the speed on which is discharged:

|  |  |
| --- | --- |
| Hours of discharge | kW delivered |
| 1 | 532 |
| 3 | 177 |
| 6 | 89 |
| 9 | 59 |
| 12 | 44 |
| 15 | 35 |
| 18 | 30 |
| 21 | 25 |
| 24 | 22 |

Dimensions:

The center piece has a footprint of approximately 3000m2, with 2 levels to store 200 parked cars.

The structures of the heart and the connecting arms are made of concrete steel and locally sourced stone.

Environmental Impact:

The heart is a simple concrete structure covered by a 2 m thick layer of dirt to be able to plant large palm trees. The hydraulic system to generate the energy requires no products or chemicals that could damage the environment, it is very low maintenance and does not lose capacity with time.

The paths will integrate interspersed palm trees and wind turbines along their length. The palm trees will have an obvious positive impact while the small vertical axis wind turbines are designed to be light and generate no noise or any other negative impact on the environment.

The project will replace the existing asphalt parking lot with plants and trees, highly improving the environment of the area.