

SWELL

At the very end of Colorado Avenue sits the Santa Monica pier. This popular attraction draws over 3 million people a year, and is known for its spectacular ocean views as well as its iconic Pacific Park. With its scenic views and variety of entertainment, the pier offers something for everyone.

Swell is a dynamic installation that will be located on the far side of the breakwater, and will be constantly manipulated by the tides and the waves of the Santa Monica coastline. The dynamic structure resembles the wave-like shape of the West Coaster, the large roller coaster that wraps around through the park. The large arches of the structure highlights the tension between man and the natural environment. Swell relies on the water to function, as do we as humans. The production of energy is dependent on the natural rhythm of the waves. In order to produce energy, Swell uses Powerbuoy 3 (PB3) technology, it is an uninterrupted power supply which constantly creates energy through the undulating motion of the waves. With the rise and fall of the waves, the shaft of the PB3 expands and contracts to generate electricity. The shafts and the generator are located below the surface of the water, leaving the two arches as the only portion that is visible above the water. The structure is a sheet of aluminium and is 20m long and 3m wide, and a thickness of 5cm. To prevent the aluminum from corrosion, the structure will be coated in a clear zinc-phosphate paint, similar to that would be used on boats. The four points of the arch are connected the the buoys that keep the structure afloat. Branching off of the buoys is the power take-off shaft. The shaft extends and compresses based on whether the buoy of located on the crest or trough of the wave, and is

attached to the base by a hinge. The hinge allows the structure to fold and release based on the tides. Essentially there are two main movements of the Swell, the up and down of the waves to create the energy, and the bending and the flattening of the structure in response to the tides. The structure is designed to move and undulate with the rolling waves. From the motion of the rolling wave, the generators are able to produce energy.

Environmental Impact

Electricity is a resource that is often taken for granted. By harnessing the abundant power of the waves, Swell creates a renewable energy source with an incredibly low environmental impact. Swell is dependent on the the ocean as the source of its energy, and so too is every individual that encounters it.

The average home in California consumes 6876 kWh/year. By harnessing the power of the waves, Swell has the ability to produce up to 150 kW per generator shaft. The generators are creating energy roughly 4400 hours a year, which is 660000 kW/year. Swell has a total of 8 generator shafts, so the structure as a whole creates roughly 5280000 kW/year. Using the average energy production Swell it has the ability to power 768 households for a year. This is a substantial amount of energy considering that the structure only utilizes a maximum of 120m².

Two looming arches float above the surface of the water. From afar the structure appears to be static, with only slight movement from the rolling waves. As the hours pass, ferris wheels turn and rollercoasters fly, the structure begins to transform. What was once two arches sitting above the water is now two thin bands sitting on the horizon.