

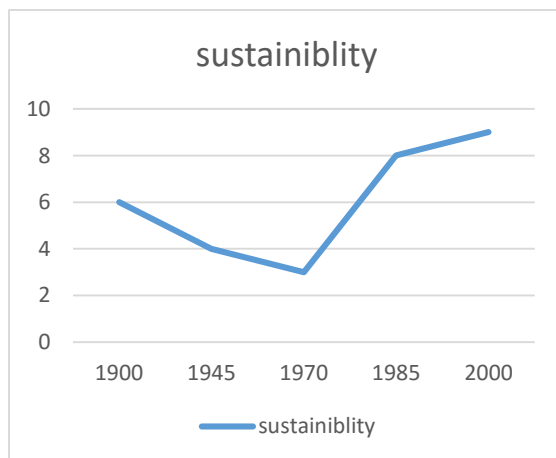
## Story of a wave

Waves, a phenomenal word that is used in our everyday lives from describing weather patterns for a climate report to explaining the changing numbers seen in demographics represented by waves. They come in all sizes representing different theories from microscopic vibrations seen in a tong to tremendous water waves seen in an ocean.

What makes this wave so unique and indigenous to the city of Santa Monica is that it is a narrative about its own history of wildlife, culture and water pollution established over the years. It is a story that needs to be heard by its inhabitants in order to create an atmosphere not only for the betterment of humans, but also for the rest of the flora and fauna that make the city a pleasant place to be at.

The city of Santa Monica, California is the second largest metropolitan city in the United States after New York. Being an excellent location to spot different types of wildlife in various habitats along with user-friendly and approachable transport options for its residence as well as tourists makes Santa Monica a growing city in terms of population. A multi-functional city that is so diverse can produce a large eco-footprint indirectly without realizing it. Although Santa Monica has seen a significant growth in economic development, environmental sustainability must always balance the former in order to maintain a healthy city.

If we recall the history of Santa Monica's water pollution level, we can see a distinct timeline set within the past hundred years from 1900 to 2000. A hundred years ago the city was inhabited by various indigenous groups, one of the many were the Tongva clan. As years passed by, development accelerated due to an increase in the number of people migrating into the city from 1945-1970 resulting in sediment run-off from industries and exploitation of water resource through the release of contaminants. 1985 was the prime time when the city became aware of its rising pollution and thus steps were immediately taken to reduce water pollution. Thus the past 20 years have been the most sustainable years that the city has seen.



If we plot a graph between time (in years) on the horizontal (x- axis) and level of sustainability on the vertical axis (y-axis) one can see a wave that is describing the environmental issue of the city through its years.

(Note: The numbers on y-axis are an approximation to understand the levels of sustainability)

The “Story of a Wave” is a design that makes people aware of their surroundings and how one’s lifestyle can have negative or positive impacts on the environments. Its dominant path that mimics the above graph that shows a relatively high point from the starting point of the existing pier which eventually dips down representing a lower level of sustainability. This tunnel (dip area) is surrounded by well-established kelp vegetation to promote the marine ecosystems. An addition of a kelp forest ensures both habitat and other human-uses like fisheries. The dip is followed by a rise that eventually comes to a constant.

The entire path is constructed with glass along with bracket shaped water-walks in designated areas. These water walks have been designed in a way that has 1 inch of water, undisturbed by any sort of external motion of the sea. This small amount of water creates a mirror-like quality for the person standing on it or sitting around it as if you are walking on water! To execute this design move, our goal was to contain water in those designated areas in a way that makes the visitor feel a part of the ocean and realize their connection with their environment.

Additionally, if one looks over the entire path, it follows another wave (horizontal in orientation) that connects thousands of fiber optic wires that light up during the evening. Another distinctive feature about these optical wires is exhibited by a computer software “WATSON by IBM” that allows the wire to change colors when marine life comes in contact with the art installation. The software is engineered in a way that studies motion and has the ability to capture it in different colors. Qualities exhibited from this design creates a memorable and a unique experience for the visitor.

Producing electricity for our light and water installation has been achieved by the use of tidal energy. Tides are infinite as the motion of Ocean’s water never stops, thus capturing energy from it is a reliable and renewable source as it is non-exhaustible. We decided to capture tidal energy by setting up turbines inside enclosed chambers that are placed underneath the installation, the only exception is the dipping point which doesn’t contain any turbines. These enclosed chambers will have two openings; one inside the ocean that can take the inflow and outflow of tides and one towards the sky or above the ocean that can take the inflow-outflow of air. The turbine proposed in this design is ‘Wells turbine’ designed and engineered by VOITH that turns the turbine in a singular direction irrespective of the direction of the wind. The way the turbine will work is that once the tide rises from one side of the chamber it will push the air up that will turn the turbine. This process is repeated as the tide will go down naturally that will pull back the air resulting in turning the turbine again. Now imagine the energy generated by this continuous and rhythmic process taking place in multiple locations underneath the path. To note, the curved path is an excellent breakwater along with capturing magnitude of forceful waves from multiple directions. This system has a potential to generate 250kW or more and has the capability to supply 6000 households with clean energy without the emission of greenhouse gases.

To conclude this design installation is a complete package of creativity with simplicity and sophistication that allows people to have a memorable experience. It is not a simple walk around the ocean, but a walk to remember with a conscious towards the environment.