**Land Art Generator Initiative 2016**

**Santa Monica Pier**

**THE VIRTUAL PIER**

How does one appropriately install art of size, significance and function on an already iconic landscape? What opportunities exist to integrate new energy technologies, educational demonstration and visual appeal into a much beloved and highly successful historic site? Rather than imposing a monumental installation on the grand and vast canvas of Santa Monica Bay, is it possible to achieve these goals and exercise restraint?

The Virtual Pier project answers these questions and concerns by integrating site sensitive solutions with symbiosis to the existing iconic fixtures: the 1909 pier, circa 1934 breakwater, old carousel structure, newer illuminated Ferris wheel, pristine sandy beaches, surf and sea-life migratory patterns.

By mimicking the existing pier pile pattern and extending the footprint of the old Looff/Newcomb Pier to the full length of the Municipal pier, the new Virtual Pier installation finally creates one wholly integrated pier first envisioned by Charles Looff in 1915.

The new piles will be multifunctional. Visually, they will illuminate to continue the light show display offered by the amusement park adjacent. The lighted piles will be visible from miles away, fluctuating and changing colors with tidal and climatic influences. On the pier, informational placards will define the kinetic light display. In time, the city’s inhabitants may come to associate certain colors and light patterns with tidal influences, barometric pressure readings, swells, and even the rare tsunami warning. DMX-programmed light shows are also for proposed for holidays and celebratory events.

The Virtual Pier installation harnesses enough power to energize the 240 luminaires with eight vertical axis wind turbines (VAWT). Integrated into the light piles at the east end of the installation, they will be most visible to visitors from deck level where they won’t visually clutter the display in panorama. Operating in winds from 4 to 20 mph, the turbines will produce enough energy to power the entire display without supplemental energy. Flexible in design, more turbines can be incorporated to provide additional power back to the grid. Because of their compact size and lower-operational speeds, VAWTS are also considered safer for birds and wildlife than larger, more traditional wind turbines.

The educational component of The Virtual Pier demonstrates the potential of wind energy on larger canvases. With 3 million visitors to the pier annually, the display has the potential to reach many millions of visitors.

**THE VIRTUAL PIER**

INSTALLATION COMPONENTS:

224 Clear Acrylic Columns @ 20’ on center spacing

Each column: 12” diameter X 25’H (above mean low tide waterline)

Wind turbine: 4’ diameter X 30’H (above column top)

Total display footprint = 160’ X 560’

TECHNOLOGIES USED:

Nano Vertical Axis Wind Technology (VAWT)

Light Emitting Diode (LED)

Digital Multiplex (DMX) Controls

ENERGY GENERATED: approx. 24,000 kWh/yr

**ENVIRONMENTAL IMPACT ASSESSMENT**

Every effort has been made with current technology to create an environmentally friendly design. Materials are selected for their durability and efficiency, while the installation treads lightly on the water. No greenhouse gas emissions are created by the display.

The Virtual Pier mimics the existing pier piles in size and spacing and, therefore, poses little interference with the existing marine conditions. The dynamic light show is internal to the columns and, yet, provides a similar ‘water feature’ light show experience without water agitation that would adversely impact the bay’s natural systems

LED lighting is proposed due to its high efficiency, low energy consumption and long life expectancy. Part of LED’s efficiency is due to the minimal heat produced relative to traditional incandescent lighting. Water temperatures will not be adversely affected as a result. Relative to other technologies, LED is considered clean and green.

The material proposed for the columns is acrylic, a non-renewable petroleum-based product. At the same time, acrylic offers unparalleled, long-lasting performance, minimizing repair and replacement. Acrylic is also easily recycled.

The proposed wind-energy source is renewable and sustainable. Because nano vertical axis wind technology is activated by lower wind speeds, has shorter blades and is of vertical design, it poses low risk to birds and bats.1 Further, the pier site does not host any threatened or endangered species.2

Of all the components required for the Virtual Pier, the battery bank is the most environmentally detrimental. Batteries are, however, the industry standard for energy storage from sustainable sources and as such are moving toward less-toxic, more recyclable designs. As technologies continue to improve and evolve, so too will the inherent problems associated with battery longevity and sustainability.

1 <http://www.anew-institute.com/vertical-wind-turbine.html>

2 <http://www.wind.tnc.org/>