**Infinite Water**

Southern California community is now aware of sets of sustainability issues that are imminent in near future –providing reliable water and clean energy to growing population. Even though we all agree with the needs of water, energy, and clean community, there hasn’t been a major effort to reveal the interconnectivity of energy and water and the human community. At the Santa Monica Pier project site, in the city of Santa Monica which aims to demonstrate the sublime art of sustainable infrastructure as a leading green community, the Infinite Water, the proposed project, will exhibit the feasibility of sustainable and infinite loop among renewable energy, water resources, and human activities. The project itself will function independently and also dependently with Santa Monica community with its water and energy resources would feed and consume infinitely without imposing any harm to the environment but rather supporting clean energy and clean water productivity for the community.

**Water**

One of the most probable solutions to the California’s severe drought is desalination of seawater, which is expected to drop in cost and to increase in efficiency. Because the seawater is the most abundant source of water in the earth, comprising more than 95 percent, if used efficiently with appropriate technology, it is possible to be the key to the drought and water shortage. The Infinite Water demonstrates the sustainable method of desalination to the community. Not only the system would produce portable water for the community, it would not harm the ecosystem as typical desalination plants usually do. Since the source of drinking water is from the nature, the Pacific Ocean, the outcome of the system should also be of nature.

**Energy**

One of the biggest downside of desalination is the consumption of energy to pump water for Revers Osmosis process, in which salt is separated from seawater. However, the Santa Monica Pier project site encompasses various and abundant sources of renewable energy given to be used, including wind, solar, and tidal energy. Considering the degree of advancement of technology at the current point and the feasibility of construction, solar power is chosen to be the most efficient and abundant sources to produce energy for the desalination plant and also for the community of Santa Monica.

**Community & Culture**

The most important feature of the Infinite Water is to provide community with the public space where people can experience, learn, and feel the meaning of the project –the sustainability of water-energy connection. The project will be mainly composed of three sections: the desalination section, MPHI theatre, and the water garden. When entering the site through the deck, people would first face the water garden, irrigated with rain-harvested water and filled with water from desalination plant. As they cross the section and step toward the Infinite Water, they would face MPHI theatre and the water tanks from desalination plant. While enjoying the water-surrounded garden and ocean-facing theatre, everything surrounded by solar-panel, visitors can experience and learn that energy is embedded by this ocean which can be made drinkable and livable.

**Green Technology**

The sublime value of the Infinite Water is that it integrates the up-to-date green technology to enable the sustainable and infinite loop of the water-energy. Even though the individual technology of each component has been developed rapidly, the Infinite Water would stand as the standard of ‘system’ sustainability where practical and most advanced green technologies altogether enable the function and the flow of the system.

**Environmental Impact & Technology Summary**

The project would produce renewable energy and portable water as a connected system. The entire energy used for generating clean water would be provided from solar panels of the Infinite Water, and the entire irrigation and gardening water used will be from the desalination plant and the rainwater-harvesting unit. Because of the curvature nature of the project, rainwater unit would be efficient to be installed and those could be directly used for gardening. The shortage will be filled up with water from desalination plant.

The project will be not only energy independent, but also able to provide clean, renewable energy to the community. The Infinite Water project materials will be composed of Building-Integrated Photovoltaic (BIPV) solar panels, which have advantage due to usability as a replace of building materials as building envelop. It would be cost-efficient as well in terms of building material cost and labor for construction of conventional buildings. The BIPV of the Infinite Water will have DC system size of 11819.2kW with average inverter efficiency, which would generate 18,824MWh per Year.

The desalination plant will have 13MGD capacity with Sea Water Reverse Osmosis system which has the most efficient system to be used with solar powered energy. With the California regional seawater characteristics, it would take up to 9.8khW/kGal energy consumption, which is generously covered by the solar energy system component.

The desalination would also include the energy recovery unit, the Energy recovery pump. The reciprocating piston pump would help drive the membrane feed flow from the opposite side. It is the simplest energy recovery device and appropriate for smaller systems with capability of 3kMhm3 or less energy consumption.

The downsides of typical desalination plant, the impact of marine ecosystem and that of brine of outlet, will be solved by subsurface pumping system and the use of effluent of treatment plant of Santa Monica City to dilute the brine, respectively.