The Pipe.

Wrapped in your bathrobe, you breathe in the pure ocean air, contemplate the beautiful blue sea, and listen to the sound of the waves. Multiple pools of hot and cold, crystal clear salt-water invite you to a ritual that will let you forget the stress of your daily life and live a blissful moment.

You relax on the pool deck looking out to the ocean. Around you, the seamless and clean magic of technology is at work. Above, the solar panels are powering this beautiful, gleaming island of bliss. Below, the seawater comes through the pipes and goes through Electromagnetic Filtration; quietly providing your salt bath with crystal clear salty water, and the city with clean pure water. What you are witnessing is a change in the future of pure water.

From the Beach, a gleaming pipe floats in the horizon. Its a testament to our time. It reminds us about our dire dependence on water and on our need to appreciate and value this vital gift. It also teaches us that water is plenty and nature is kind. We just have to learn to work with it, keep it clean and appreciate it.

The Context

One of the most pressing issues today in California is the issue of drought.

Every resident of California has experienced the devastating reality of water shortage and climate change first hand. Every resident, has perhaps wondered about the future, and questioned around for possible solutions.

The issue is simple. Water never leaves our planet. Its simply displaced. Changed from drinkable water to one that is unfit for our consumption, because of impurities.

The impurities in the water consists of visible impurities and invisible ones. The visible part (i.e. mud) can be filtered with basic procedures. It is the invisible impurities in water (aka dissolved solids), that make it very hard and costly to filter.

Cutting-edge Technology

Conventionally sea water has been treated by the very unsustainable and cost heavy system of Reverse Osmosis which is over 60 years old. This process uses excessive electricity, generates unwanted industrial waste and polluted water, and requires very expensive machinery.

So here is the good news. A quick study reveals that %97 of seawater is pure water and only %3 of it is dissolved solids. The important information here is that all dissolved solids in water, become ionized. This means that all dissolved solids in the water can be controlled through electromagnetic energy. In Electromagnetic Filtration [EF] we use an isolated electromagnetic field on pipes circulating the seawater, separating the salts and impurities. The process is very rapid and extremely efficient.

This process creates two byproducts:

1. Pure drinkable water that is directed into the city’s primary water piping grid.
2. Clean water with %12 salinity. This supplies the thermal baths, but on the larger scale is redirected back to the ocean through a Smart Release system, which provides an eco-friendly system for returning the saline water to the sea.

Environmental Impact Summary

In the traditional methods of desalination, natural seawater with salinity levels around 30,000 ppm is filtered, producing clean drinkable water in one hand, and saline water (Brine) with salinity levels above 120,000 ppm on the other hand. The clean water is directed for consumption, but the brine has to be handled and reintroduced back into the ocean. What complicates the situation are a number of things. First are the chemicals that have been added to the brine water in order to maintain the brine and prevent biofouling, scaling, foaming and corrosion. Second is that from an environmentally responsible approach, the saline water cannot be simply added back to the ocean as it can adversely change the marine ecosystem below. Therefore, the brine is typically added to a power plant’s cooling water runoff and then added to the ocean. This presents another issue as the water from power plants have a much higher temperature than the ocean, and cause a local rise in the water temperatures, further affecting the marine ecosystem.

In Electromagnetic Filtration, we have completely re-engineered seawater purification. As EF works with the ionic characteristic of dissolved solids in water, it simply uses the magnetic field to cause the separation. The process is swift and seamless. No chemicals are ever introduced to the water and water temperature is unchanged. The salty water remaining is sent to our Smart Release system. This system dilutes the salty water with seawater in a controlled tank to reach natural salinity levels. The water is then sprayed over an area of 2000 squared meters, seamlessly reintroducing the water back to the sea in a slow and well distributed method, such that local water samples are indistinguishable from elsewhere in the pier.

Lastly, the electricity consumption for 300,000 Gallons of water, can go over 4,500 kWh for a traditional desalination plant. While for an EF plant only about 2,500 kWh is needed to produce the same amount of water.

Social Impact Summary

As mentioned earlier, the issue of drought is real and closely felt by the residents of California. Our objective is to showcase a few important points:

1. Water is available. Its simply displaced.
2. If we understand the characteristics of nature and work with it, we can attain what we want without causing damage.
3. With alternative energies, new concepts and public spaces can emerge, to create a space where leisure and learning come together.

The Build

The structure of the building is constructed of recycled stainless-steel. The maximum external dimensions of the building are 428 m x 60 m, with a max heigh of 50 m.

Photovoltaic panels line the roof and the sides, providing solar power to the entire building. Wooden Decks, located in the bottom tubes, provide lounge areas and a lookout in various directions. The water treatment facilities are located at the lower section of the building, with limited access. The estimated value of investment is at $150 mil, with projected annual sales of $200 mil. per year.

Conclusion

The unit:

> Captures and converts solar energy into electricity through its extensive photovoltaic roofing

> Creates a unique experience for the public: A place of leisure and learning. An Island of recreation and bliss that is also a silent, clean, state-of-the-art water purification plant.

> Offsets its construction cost and initial environmental footprint, as a self-sustaining, water purification unit providing drinkable water for the city.

> Impacts its environment positively; working with nature and changing age-old systems.

> Increases the livability of the Santa Monica Community, by creating a new space for recreation and wellbeing, very close to the city, and yet far away from the hustle and bustle.