PROPOSAL TO: FLY RANCH LAND ART GENERATOR (LAGI)

THE ORIGIN POD

Submitted October 28, 2020

THE ORIGIN POD STORY

Where there is water, there is life. Where there is life, all facets of humanity can grow, heal, rejuvenate and thrive. This simple but powerful idea is at the heart of the Origin Pod.

Situated in the arid environment of Fly Ranch, the Origin Pod is a water temple in the desert, an oasis that provides pure, great tasting drinking water in the middle of the beautifully harsh landscape. At first glance, a visitor is drawn in by the green lush dome. Once inside they feel a temperature drop in the cave-like space filled with moist air. At the far end of the water temple the explorer is lured toward the water shrine at the far wall where they can enjoy clean crisp drinking water. Defying all logic, beautiful pure water flows abundantly in the desert. "Water in the desert?" Yes - this water nurtures life in the middle of the desert, and is made possible by a revolutionary and innovative technology called a Hydropanel that harnesses the power of the sun to sustainably harvest water molecules out of the air, transforming it into pure, mineralized drinking water. As the visitor draws water from the faucet they glance through the transparent waterwall to the Hydropanels that have created this modern oasis in the desert. As the moisture in the air is constantly replenished, the water created by the Hydropanels becomes part of the nature cycle, creating a truly regenerative and renewable water supply to sustain and rejuvenate life for the Fly Ranch community and their guests to enjoy.

The Origin Pod is both high tech and elemental, of nature and of human ingenuity, of sacred geometry and cutting edge science bringing together contrasts and tensions in a harmonious way, reflecting the principles of the Burning Man community.

DESCRIPTION OF THE TECHNOLOGY

The proposed atmospheric water generation system is a solar-powered, renewable, infrastructure-free drinking water solution powered by an integral combination of solar photovoltaics and high- efficiency solar thermal. The electrical and thermal power is used to efficiently produce water in a modified psychrometric cycle even in some of the driest deserts in the world (as low as 7% humidity). While human existence in the desert leaves a mark on the environment through extractive water solutions or hauling bottled water, Hydropanels offer a "leave no trace" opportunity to produce water completely off-grid, without relying on a supply chain of bottled water or water delivery for daily drinking water access.

Solar power is utilized in two forms – photovoltaic energy and heat. The electrical output from the PV portion of the panel is used to operate fans, motors, a controller, pumps, ozone water sterilization system, and a battery for night-time dispensing. The solar power captured as heat is used to significantly increase the air temperature within the system, which allows for a higher absolute humidity, a higher dew point, and the ability to condense water without refrigeration. The PV power created is ~100W and the solar thermal power (heat) is ~1000W. The system will make clean drinking water with only 2 hours of sun; a full sun day will maximize output.

How does the atmospheric water generation system work?

1. Using solar PV, the Hydropanels take in ambient air via fans and absorb water vapor from that air onto an advanced hygroscopic material. The hygroscopic material acts as the doorway for water vapor to pass from outside to inside the system. Each air filter meets a Minimum Efficiency Reporting Value (MERV) rating of 5 or equivalent.

2. Heat generated from solar thermal drives process condensation, converting the adsorbed water into liquid water, made pure.

3. There is also a "Regeneration Air Flow" which recirculates inside of the Hydropanel. The pure water flows into the integrated 30-liter reservoir where it is mineralized with magnesium and calcium, and disinfected with ozone through a recirculation system.

4. The collected water is then pumped to the reservoir where it is mineralized and disinfected with ozone through a recirculation system. Deterministic and ML algorithms optimize the quality of stored water, ensuring the taste and health of water dispensed from the reservoir is the highest quality. Disinfection is monitored through a digital cloud-based system at a Network Operations Center (NOC) in Arizona. The disinfected water is dispensed through its own delivery system to a carbon filter for polishing which is located at the dispenser.

The separation of the airflow streams and the use of hygroscopic material ensures the water generated by the Hydropanels is already a clean source of water, free from external toxins and pollutants. By design, our atmospheric water generation involves multiple steps of adsorption and desorption of water to and from our hygroscopic material as well as the condensation of water from our process air into a controlled surface. Chemically, each of the transfers and the phase change of water (condensing) is limited to only the molecules of H2O and not contaminants. The process output is nearly identical to distillation, which is known to separate contaminants from water, resulting in a high quality drinking water, optimized for health. Water quality complies with WHO, US Food and Drug Administration and US EPA drinking water standards.

LIST OF ACTIVITIES THE ORIGIN POD WOULD SUPPORT

- Water is essential to support life. We have seen life that could exist without oxygen, sunlight, and other building blocks but, till date, we have not seen even a single organism that could live without water.
- Our atmospheric water generation system is part of the harmonious natural process to support human life. It transforms the desert from a place of water scarcity to water abundance; from extractive water to regenerative water; from centralized piped water to a decentralized process of creating water on site; and from dirty, contaminated groundwater to pure water from moisture in the air.
- The ORIGIN POD will provide renewable, resilient, pure drinking water to sustain guests who come to Fly Ranch for residencies, gatherings, and projects.

LIST OF SYSTEM INPUTS

The Hydropanels have very simple operations and maintenance requirements: Each unit requires an annual air and water filter replacement. The mineral cartridge is replaced every 5 years, per unit. At the dispenser level (water faucet), the polishing filter is replaced on an annual basis.

The system produces water using solar power and humidity from the local atmosphere.

LIST OF SYSTEM OUTPUTS

Pure, renewable drinking water: ~10 m3/year for 15 years

The construction outputs are: recycled cardboard and associated building materials. All materials will be removed and recycled to leave no trace behind.

LIST OF PRIMARY MATERIALS USED AND MAJOR DIMENSIONS

- Solar Panels and Hydropanels
- Glass
- Various NSF food grade materials
- Various Metals
- Concrete
- Motors
- Pumps
- Fans
- Rubber liners for the water features
- Plants
- Soil
- Solar panels
- Batteries
- Copper, and associated electronics
- PVC
- Wood
- Various food grade adhesives
- Stone and tiles

ORDER OF MAGNITUDE CONCEPTUAL COST ESTIMATE

$150,000

STRATEGY FOR ONSITE PROTOTYPE DEVELOPMENT

The estimated construction time is 10 weeks to deploy and install the Hydropanels, and to build the prototype. While the prototype is in construction the Hydropanels will be creating water to mix with the building materials, so the dome will be constructed using water from the atmosphere. In the meantime we will deliver to the site prefabricated sections of the dome to minimize on-site work and waste. Through the construction process we will be self-providing drinking water, water for concrete mixing, and cleaning all with our renewable Hydropanel water.

ENVIRONMENTAL IMPACT SUMMARY

The Origin Pod will provide an environmentally sustainable and renewable cooling center, a refuge from the desert heat, where you can take respite from the blazing sun and drink the cool, pure, water produced from sunlight and air. Hydropanels create an independent, low-cost, renewable supply of drinking water requiring no electrical or external water input. Producing water from air & sunlight, atmospheric water generation eliminates reliance on groundwater or surface water sources, lowering the risk of water contamination or pollution. Atmospheric water generation dramatically reduces CO2 emissions compared to energy-intensive AWGs and plastic bottles. The production of plastics from fossil fuels is the second largest and fastest growing contributor to industrial greenhouse gas emissions, and primary driver of climate change.

Groundwater Preservation: By 2030, water demand will outstrip supply by 40%, driving the vital importance of utilizing water resources from the atmosphere. The total water available in the atmosphere today is 6x the total volume of all the rivers on the planet, or 37.5 million billion gallons at any given time. That moisture is continuously replenished, so atmospheric water generation becomes part of the natural cycle. Because we capture water from the air and not the ground, the ever-shrinking groundwater supply is left untouched, and the result is a truly renewable water supply.

Plastic Offset: Each Hydropanel offsets up to 54,750 (500 ml) water bottles over its lifespan. Each step in the supply chain- accessing, cleaning, transporting and distribution - has significant energy costs. Hydropanel CO2 reductions are based on the offset of these energy expenses.

Greenhouse Gas Reduction: The Hydropanel system is emission free and therefore represents a dramatic reduction in CO2 emissions when compared to other drinking water alternatives, especially bottled water. Every two Hydropanels installed to replace bottled water consumption is the equivalent of removing one car off the road in CO2.

CO2 Footprint of SOURCE Hydropanels:

- Energetic and CO2 payback is less than 3 months vs bottled water
- Industrial Material Mass Offset occurs within 6 months
- More than 91% of the materials used to build the Hydropanels are mass bulk-recyclable