**The saline oases**

**Sustainable vision & Considerations**

The vision of these oases is to reflect the cultural spirit and the strong connection between the UAE man and the water which is an essential desire for life, and it became now a great opportunity to generate electricity as well.

These ponds are integrated with the oasis-like palm trees and the hill design that will absorb evaporation from the surroundings. The design approach is aiming to mimic the beautiful features explored in the Arabian Desert oasis and reflect it in the middle of Masdar City.

**Energy technology**

**Solar ponds**

Such water bodies are inspired by the essence of the UAE oasis in the desert. Since the type of land in Abu dhabi coastal side is “Sabkha” –which is a salt flat land- so we can harvest this land to generate electricity. The 1.5~2 meter deep Solar pond will have different layers of concentration of salinity –the deeper layers will have more Nacl or mgcl2 particles- and this where the lower convective storage zone will be heated up to 80~90 degrees Celsius. Then Pipes are connected from the zone to an evaporator to heat up an organic fluid that will steam and run a turbine. The steam continues to a condenser which gets the benefit from the pond cold water to run around the hot vapor and condensate it, then its pumped back down to the lower convective zone. This will be consistent all the daytime and be harvesting the power of the sun to generate electricity.

We have along the site and area of 11,500 m2 from the salinity gradient type of water in the 4 water bodies to create the solar pond effect. It will be exposed to the solar energy radiation at the daytime. Each hectare is capable of producing 219,000 kWh/yr. So, we will have the capacity to generate an annual electrical production of 251,850 kWh/yr. This method will generate a descent and reliable amount of energy to serve 2200 of the surrounding villas and apartment.

**Inflatable solar concentrator balloon**

We have a clear sky and constant solar radiation for at least 8 months annually. This motivates using new technology such as the Inflatable concentrator balloon to harness solar energy. It will create a land-free environment, as they are very light and can be fixed on the cone-shaped emblem. The 2 meter balloon is half-transparent and half-concentrator-film will make a good radiation that can collect between 500w-1Kw. It will have a minimal impact on the land use, easier and cheaper than the typical PV panels. We have an amount of 2,500 balloons which can generate up to 2500 KW/day from the energy of the sun with a total of 912,500 kWh annually produced.

**Condensation protrusion & ventilation effect**

This emblem will have 2 types of elements, the lower type is condensation protrusion & the ones upwards are ventilation protrusion. They ventilation type will be connected via suspension wires to host the BAWT and control its movement. Yet, it will have a mechanism to bring the BAWT again for maintenance purposes and whenever no wind to harvest. The Condensation protrusion will also attract ventilation and improve the lower walking area which includes the condensed water from the condensation effect.

The lower Condensation protrusion should be able to collect the condensed water from the surrounding air and ponds, then collect it in the lower pure ponds; to irrigate the surrounding palm trees. Both elements should have a unique material of the fabric which is smooth and durable to wind and doesn’t tear, yet it collects water efficiently.

**Buoyant airborne wind turbine (BAWT).**

These flying turbines are inspired from the kites using suspension cables. They will be filled with helium and fixed with the condensation cone tips; to allow it to reach to the maximum eligible low altitude height –which is 45 meters- and it will collect energy from the passing wind through the blades. In this experiment, we are introducing a sensor to allow the BAWT to return to its station whenever there is a weak or no wind. BAWT will harvest the motion energy of wind to spin the blades of the turbine using the northern west prevailing wind which has a mean maximum speed of 25-27 km/hr. Each BAWT is supposed to produce 1.875 kw, as we have 11 units, so the total will be 20.625 KW/day. And an annual production of 7,530 MWh

**environmental impact** our design considered the future expansion and building construction will be surrounding the site; that why it’s more humane in scale and the experience to walk through the oases will emphasize that impression. The fresh environment with original palm trees enhances the microclimate, reduces CO2, and provides descent shading at the noontime.

Awareness of the wind direction and sun path has productive and direct consequences of the main design layout. It features many points to harness the potential usage of the natural renewable resources, and achieve the maximum advantage of generating electricity from the site in a clean and efficient approach.

**Conclusion**

This land will serve the community a “pure palm trees green & oases” new hub where habitant can enjoy a fresh breeze while they are exploring the features of this artwork. The architecture of this land and the integrated technology will encourage future generations to be engaged in living the Spirit of the desert and Experience the memories of ancestors in an efficient image. The total annual energy production from all technology is 1,171,880 kWh.

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