DEW DROP SYSTEM

**INTRODUCTION**

The “Dew Drop” is an artificial topography that produces both **drinking water** and clean **energy**. This is possible due to a system that during the day accumulates heat from the solar radiation, up to 960 W/m2 in the sunniest days in the case of Los Angeles. After the dusk, once the topography surface has cooled down, the complementary system starts running naturally, the topography refrigerates its superficial coating in order to condensate the water from the atmospheric moisture. This technique is suitable for Santa Monica since the daily average of relative humidity remains at around 77%.

**MORFOLOGY AND MATERIALS**

**Pneumatic Structure**

The whole topography seats in 16 pneumatic modules of 150 meters length extended all along the 660 meters, occupying all the proposed project area. This outstretched component is made of a rubber membrane that assumes both its own and external bearing loads. The membrane is coated in both sides with an elastomeric compound that facilitates the thermal accumulation, besides a black tint that contributes to absorb a wider range of the light spectrum.

To guaranty its stability the elements are anchored to the sea bottom by a system of pre-stressed cables that joins its radial substructure with the foundations. Moreover it is partially buried in the sand.

**Pipe Network**

All the pneumatic modules are wrapped with a translucent pipe network, laid in horizontal planes, aligned with the contour to ease the water flux. These pipes either recirculate hot water during the day or cooled water after the dusk to carry out the processes mentioned above.

**Superficial coating**

The outer coating is formed by a pressurized double layer subdivided in two connected chambers that contains respectively **water** and **air** in the inner part.

The **water chamber** would be made of an elastic polymeric porous material. This material would be responsible for the condensed water accumulation and water conduction. It is projected to permit the natural conformation of puddles when a weight is applied in its surface (visually it would be similar to the effect of placing an elastic trampoline on a swimming pool, if someone steps on it a puddle would appear), this implies that people could use this accumulation system to take a bath in a steaming dew water for recreational and health purposes. The size of these ponds would be proportional to the amount of people gathered; the deformation would be the balance between internal tensions and applied forces.

On the other hand the **air chamber,** made of ETFE (ethylene tetrafluoroethylene), a fluorine-based plastic; would be responsible for the rigidity of the topography on its surface by reading the data that comes from the pressure, temperature and humidity sensors.

An intelligent computerized monitoring would automatically maintain the necessary firmness to assure its efficiency and usability.

It is important to note that the lower part of the topography accessible to the public has to be coated with an insulation that prevents the user from suffering burns due to the high superficial temperatures. This could be achieved using “aerogel” (synthetic, porous and traslucent), a material based on alumina, chromia and tin dioxide.

**Inner radial Structure**

The inner radial structure is designed to modify the height of the pneumatic membrane that shapes the construction. This mechanical modification allows to obtain the best performance for thermal collection. The height of the membranes modifies the angle of solar exposure. The outer surface must be positioned with a perpendicular tilt to obtain the maximum exposure, according to the solar path that changes noticeably each season. Following the standard calculations it could be stablished an adequate tilt angle for the L.A. solar zone: Winter 32º, Spring/Fall 56º, Summer 80º). Depending on the season, the range of heights of “Dew Drop” contemplated goes from 25 meters (tallest areas) to 45 meters (this height is considered the limit to not cause a negative visual impact. The height variation could also be considered as a way to boost the vivacity of the construction in aesthetic terms.

**SUSTAINABLE IMPLICATIONS**

**Estimative annual production of solar thermal energy (KWh)**

Considering an effective average area of the 70% and a collector efficiency of the 40% the annual production capacity would be around 8000KWh.

**Estimative drinking water production**

It could be estimated 1000 cubic meters per day.

**ENVIRONMENTAL IMPACT SUMMARY**

The project’s design aims the best integration with the Santa Monica bay. It simulates a natural topography that can be assimilated as part of the natural scenery. The backlit vision of the topography would produce a dark mass similar to the natural ones, and a situation of direct illumination would foster its transparency blurring its color with the sea.

In addition, the 600 meters that separate it from the beach shore, minimizes considerably its presence, becoming a small glare in the horizon that attracts the attention of the pedestrian.