**RAINBOW-DIADEMS**

The idea is to make a completely autonomous installation, which does not depend on any external resource for its proper functioning.

It is a self-sustaining design, capable of producing the necessary energy for its own operation. Both in the purely technical aspect of its corresponding facilities for the operation of any infrastructure, as well as all the necessary resources to fulfill the mission intrinsic to its existence as a artwork. We can define it, as a wake-up call to the conscience of the people who visit it:

- An initial impression of surprise and admiration for its scale and stylized forms.

- Continuing with the glamor of a futuristic and impeccable technology.

Essential information will be transmitted, to demystify the common and wrong ideas, about the new energies, making them see how they really are: Completely clean, ecologically sustainable, with a tendency to become soon, as a guarantee to conserve the planet, respecting it as the only place (until now) that we have to live.

The installation will show the public that besides being beautiful, it can guarantee the sustainability of the community and its environment. This artwork will generate enough electricity and drinking water for domestic consumption and deliver to the public network, in addition to other products.

RAIBOW-DIADEMS: is composed of seven diadems in decreasing size, on the same axis, forming a virtual volume, which will be the support of the photovoltaic cells. The structure will be of two parallel beams of microlaminated wood throughout, (specific weight 400Kg/m3), jointed perpendicularly to ribs of the same structural material, forming a rigid and lightweight assembly that will support its own weight, (the overload of the panels is very small). It rests on two points that in turn receive the supports from three different points, the central one receives the compression forces and the two lateral (hydraulic) receive compression and traction forces alternately, according to the movement required by the diadems. They will be oriented according to the Sun movement on the plot, and pivoted slightly through hydraulic systems, to ensure maximum efficiency.



The system will be able to generate the following products without external help:

• Electric power in DC and AC: The 651 photovoltaic cells (flexible monocrystalline, 200 w, 10 Amp, dimensions 1165x785x30 cm and 2 Kg) located on the Raibow-Diadems, will provide electrical energy for the self-sustaining of the entire design and to yield to the network public. The energy produced will be stored in the Visitors Center (2BYD B-BOX LV lithium battery banks/14 Kw, 48V, 42 kWh) and in the Main Battery Room, away from public access (8 banks, 188kWh). Raibow-Diadems will generate 390.6 Kwh, 93.7 Mw/year. Domestic consumption will be 17.6 Mw/year, yielding 76.1 Mw/year to the public network, which will favor the return on capital investment. The calculations were based on the solar radiation information of the Masdar Airport station, taking as the most unfavorable, the minimum radiation occurred in December of 3,973 wh/m2, for the calculation of the HSP (3.9 HSP, with a loss factor, due to the Sun's incidence of 1.3). The Kwpico of 112.9 Mw/year, based on the insolation of the months with average temperatures less than 25°C and optimum inclination of the structure (65% equinoxes, 85% summer solstice and 45% winter solstice). (Electrical System Scheme).

• Potable Water: Extraction of 50 m3/day of brackish water from the free aquifer in the plot that will be filtered, desalinated by reverse osmosis, through the operation of a desalination plant (Model GBW809/capacity 150m3/day), and then purified to produce water potable that will be stored in a tank of 50,000 liters, of which a small portion will be used for internal consumption (toilets, coffeshop, drinking fountains), for the use of vaporizers and most of it, delivered to the public network. It will produce 22.5 m3 of brine of similar concentrations to seawater, which will be used for mangrove maintenance. (Water System Scheme)

• Water for irrigation: The effluent water from the internal services will be treated in the treatment plant, through the process of biological purification and total oxidation and stored in the Irrigation Tank to irrigate the gardens and the mangrove area.

• Water for water mirror and mangrove: A portion of the water coming from the desalination plant will be conducted to the water/waterfall mirror and to the mangrove.

• Climate Effect: The system of vaporizers inside the headbands will add humidity to the dry atmosphere of the region generating a comfort zone, making a pleasant microclimate.

• Artificial Rainbow: The water emitted by the vaporizers will cause the process of light refurbishment, inside the headbands when at certain hours of the day, the sun's rays hit a prism of glass, conveniently placed that will decompose the light in the spectrum of colors and this will be projected in a cloud of water vapor.

• Brine: Coming from the brackish water desalination process, which will be used for the maintenance of the artificial mangrove. This brine presents similar concentrations to seawater, which is perfectly usable for mangrove subsistence.

• Information: It is fundamental that the ArtWork creates ecological conscience and contributes positively to the aesthetic and cultural value of the public space. The space has been designed to house:

o Theater: Structure with central stage and concentric stands, (capacity 192 people seated). Several daily functions are planned for presentations dictated by expert figures on environmental issues (conservation, clean energies, global warming), through hologram technology.

o Amphitheater: A Rotary scenario can be set up on the fountain that consists of half a circle for public shows. It allows the contemplation of the work of art, accompanied by the soft murmur of the waterfalls. (capacity 146 people seated)

o Coffeshop/Health Services: The ArtWork is complemented with visitor support services such as coffeshop and health services.

o Exhibition: Permanent display of the processes that take place in the Artwork System:

♣ Generation, Accumulation and Transformation of CC-AC energy.

♣ Desalination and potability of brackish water.

o Exhibition: Traveling exhibitions on various themes alluding to the theme of the ArtWork center and other related topics.

The commercial equipment used will be high technology and commonly used in the market, so that the visitor can feel identified with the design.

These products will be the necessary inputs destined to three areas:

1. In a particular sense of the artwork for its proper functioning.

2. In the sense of the human community that is endowed with drinking water and electricity.

3. In the sense of the natural ecosystem representation at the Mangrove scale (presented as a thematic and informative park) that will be maintained with the resources manufactured by the work of art.

**DECLARATION OF ENVIRONMENTAL IMPACT**

As a requirement of LAGI, the present sensitivity analysis is performed.

**Products:**

-Rainbow-Diadems

-Electric energy generated by photovoltaic cells in the diadems of the Rainbow-Diadems

-Humidity

-Water for system consumption and for the public network

-MANGLAR WALKWAY:

-Information

**Main effects:**

-**Rainbow-Diadems Height**: low sensitivity, it is located in an urban area, with buildings of similar heights around.

-**Electricity production**: high positive sensitivity, the system will self-sustain and deliver energy to the public network.

-**Space modification by mangrove**: positive medium sensitivity, creating a recreational and informative area in urban structure that will raise public awareness of the danger of its drastic reduction. Increase migration of fauna and flora to the mangrove.

-**Greater depletion of the underground water table and Intrusion of salt wedge in the aquifer due to the pumping of the underground well**: medium sensitivity, given the intense practice of this method to obtain drinking water that has diminished the capacity of the aquifers, however, the water is brackish and the flow of extraction is not very high, it is an impact that is minimized.

-**Brine production of the desalination process**: positive low sensitivity, the environmental impact is reduced because the liquid waste of the desalination with **brackish water** will have similar concentrations to the saline water suitable for the mangrove.

-**Marine fauna and flora migration to the mangrove**: medium sensitivity, the creation of habitats that contribute to the development of fauna and flora is positive.

-**Earth excavation**: low sensitivity, since the material produced will be reused in the building construction.

-**Community reactions against the project**: high sensitivity, Raibow-Diadems, apart from being pleasing to the eye, it will provide basic services, as well as a pleasant microclimate, entertainment, culture and information.

The Impact of this Artwork, will be from low to medium and mostly positive.