**KUA**

*“Cycle: a series of events that are regularly repeated in the same order.”*

*KUA means food in nahuatl, the dialect of the aztec culture.*

KUA was inspired by the needs that the fly ranch has and one of the most important was the need for resource cycle that could be itself by itself just like a live organism that depends only of himself but can also take care for other organisms including the retribution to the mother nature that is the main source of the project. Also the project seeks to educate the community of the fly ranch to be capable of producing their own food, light and thermal comfort.

An ancient and an easy way to grow food learned by the Aztecs is the old method of “chinampas” . The basic principle of the chinampas is to grow the food above the water, by creating tiny mounds over the water where the plants will take place. This method is simple but not contrary to innovation and technology developed in the project. Sometimes the innovation could be found in ancestral knowledge.

The main cycle to focus on, by the project, was the food cycle, meaning that it starts with: sow, grow, harvest, cook, eat and compost. Accompanied by other technologies such as photovoltaics panels, absorption chillers and water caption systems. All of this to ensure maximum efficiency and comfort inside and outside the project.

The living organism is powered by photovoltaic cells from “Ertex” this are located on the south facade of the building for a better exploitation of the sun, they can produce up to 105 Wp/m2, but this are not only to produce electric energy, they also heat the water. The orientation of the building and its aerodynamics were thought for capturing the most possible air flow inside the building, taking into account that inside its a greenhouse, we needed to control the thermal comfort inside. The way we achieve this was with a system of Absorption chillers, this system just needs the constant flow of the air, and hot water.

The project will be a recreational space, where people will have the opportunity to work and learn about the processes involved in the production of food, water and energy. The inside of the greenhouse will be an early stage before the chinampas, this is where the plants get prepared to go on the outside and the space is called “chapines” A square grid of mud where the seeds are placed. Another way to grow the food on the inside is by the hexagonal modules, that are more vertical on the north facade, inside the modules, there are plants on an hermetic hexagonal box that turns condensation into water. There is also a bridge on the inside that allows people to manipulate the plants that are located on a higher space. The project also has a kitchen for the people to cook their own food, and spaces all around the inside for users to eat the food and feel a really natural connection.

A lift machine will be destined to clean the photovoltaic panels in an easy way, without putting in risk lifes and the structure itself. The operative machinery inside will be open but safe for people to understand how the organism works. Also we have to take into consideration that this is a Greenhouse on the inside and it requires attention to the crops in the chapines and the vertical crops, in each month there's a list of eatables that could be sown. And on the outside the crops in the chinampas do not require to water them, because that is the main function of the chinampas, that is the purpose of them to be above the water.

On an annual basis the project has the capability of producing 800 kwh of electric energy by the solar panels on the south facade, the energy is collected all over the structure and goes by the columns that besides being an structural element serve as water collectors, same water that is used to chill the inside of the Greenhouse with an HVAC absorption chiller system. The system just needs hot water that is heated by the solar panels and constant flow of the air, the organic form of the building helps to catch the wind better.

The chinampas produce 10.4 Tons of food every year and the waste produced by the food goes to the compost, and with this, the cycle ends and can start over and over again.

**Essentials:**

The primary materials used in the project are:

Low Carbonconcrete

Stainless steel

Wood

Photovoltaic cells (Ertex)

Glass

Aluminium

Dimensions: Wide =40m Long=60m Height=10m

**Budget:**

800,000 Watts annually $20 per watt equals to $20,000,000 for Budget

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Concept | Un | Quantity | $/un | Total |
| Watts installed | Watt | 800000 | $5.00 | $4,000,000.00 |
| Structure | M3 | 5,000 | $1,890.00 | $9,450,000.00 |
| Foundation | M2 | 1600 | $1,000.00 | $1,600,000.00 |
| Interior | M2 | 800 | $1,600.00 | $1,280,000.00 |
| Chinampas | M2 | 800 | $500.00 | $400,000.00 |
| Chapines | M2 | 250 | $160.00 | $40,000.00 |
| Vertical garden | M2 | 300 | $1,200.00 | $360,000.00 |
| Glass | M2 | 500 | $1,000.00 | $500,000.00 |
| Services | M2 | 800 | $2,500.00 | $2,000,000.00 |
|  |  |  |  |  |
|  |  |  |  | $19,630,000.00 |

**Construction:**

The steel structure has to be previously manufactured to reduce time and cost in the in situ installation, the goal is to just stick them like legos when the foundation is done, the photovoltaic panel comes from the factory so it is easy to install. The workforce will be occupied when the chinampas take place.

**Environmental Impact**

As a result from the design strategies KUA provides a complete cycle to the food and the energy feeding the Fly ranch, the whole intervention is connected by the paths that are generated all over the site, and the paths are the guidelines that connect all the electric energy from the project to the individual modules.

The project was designed to be applied specifically in the fly ranch but, this could be a multiplied module that could be attached in any surface that has water to grow food. The project has small dimensions but they could be scaled if the need is to produce more energy or food.

Also, every point of the building living challenge was taken into consideration for the design of the materials and the happiness. It was important to propose materials that were not in the red list in order to reduce the environmental impact.