Algal Forest

Algal Forest is a closed loop algal bioreactor containing an algal pond used as an open pond photobioreactor with a “forest” or a series of artistically designed bioreactors on an island inside of the pond.

Algae have become the latest feasible source being targeted for biofuel production capable of producing oil all year long. Microalgae can complete the whole growth cycle in limited days through a photosynthesis process that alters sun energy into chemical energy. grow in freshwater, seawater, wastewater or non-arable lands. The oil productivity of microalgae is greater compared to conventional crops.

Microalgae yield 15–300 times more oil for biodiesel production than traditional crops on an area basis, are non-toxic and greatly biodegradable. Microalgae can propagate at great rates which can be 50 times more than that of the fastest-growing terrestrial crop. Bioremediation using algal reactors is energy efficient as well as green, the waste from these reactors can be reused fin itself making it a circular process. The future of our energy is in biology and within the power of fission.

The vision

of this project is to inspire people to think about the artistic possibilities of renewable energy, and to see beauty in it. We aimed to create a fantasy world that has real applicable technology in order to showcase an idea of what the future could be.

Outside of the loop, the remaining portions of land are used for food production as well as natural habitat restoration. We believe that the future is symbiotic, and cities will be symbiocenes! For this reason, a large portion of the land is left to be terraformed, allowing native plants and animals to thrive. Due to the vast availability of site in the middle of the city this project is an urban intervention to address fresh food demand to cater to immediate neighbourhoods. This also reduces energy consumption created by transportation from long distances. The proposal has two types of bioreactors which cater to the energy demand on-site and also produce more energy to expand and grow in the area for future expansion without having to depend on outside sources. We would like to address the construction process as digital fabrication which reduces the expense of labour and also opens up possibilities to work with organic forms and shapes to emulate and simulate our nature at

its best. Within the project, we attempted to 3D fabricate one photobioreactor that we designed as a test subject and this was done using polylactic acid (PLA).

The overall design is extracted from the site and its contours to be able to create a huge algal pond and to maximise the energy production. The outer shell has huge opening to allow sunlight and to control the excess sunlight, a method of inflation has been used that is trigged by the sensors that keep track of direct sun hours. This kinetic façade's energy need is taken care of by the energy that is produced by the bio reactors making it a net zero architecture. Inflation helps in reducing direct sun exposure. As the surface inflates, the surface area increases which reduces the area of exposure, also the inflation is liquid nitrogen to last longer and to keep the area cool.

This project is a window to the world that can be built upon the foundations of biology and technology together as we need them both and also to address to the 33% of world pollution that is due to the construction industry and its derivatives.