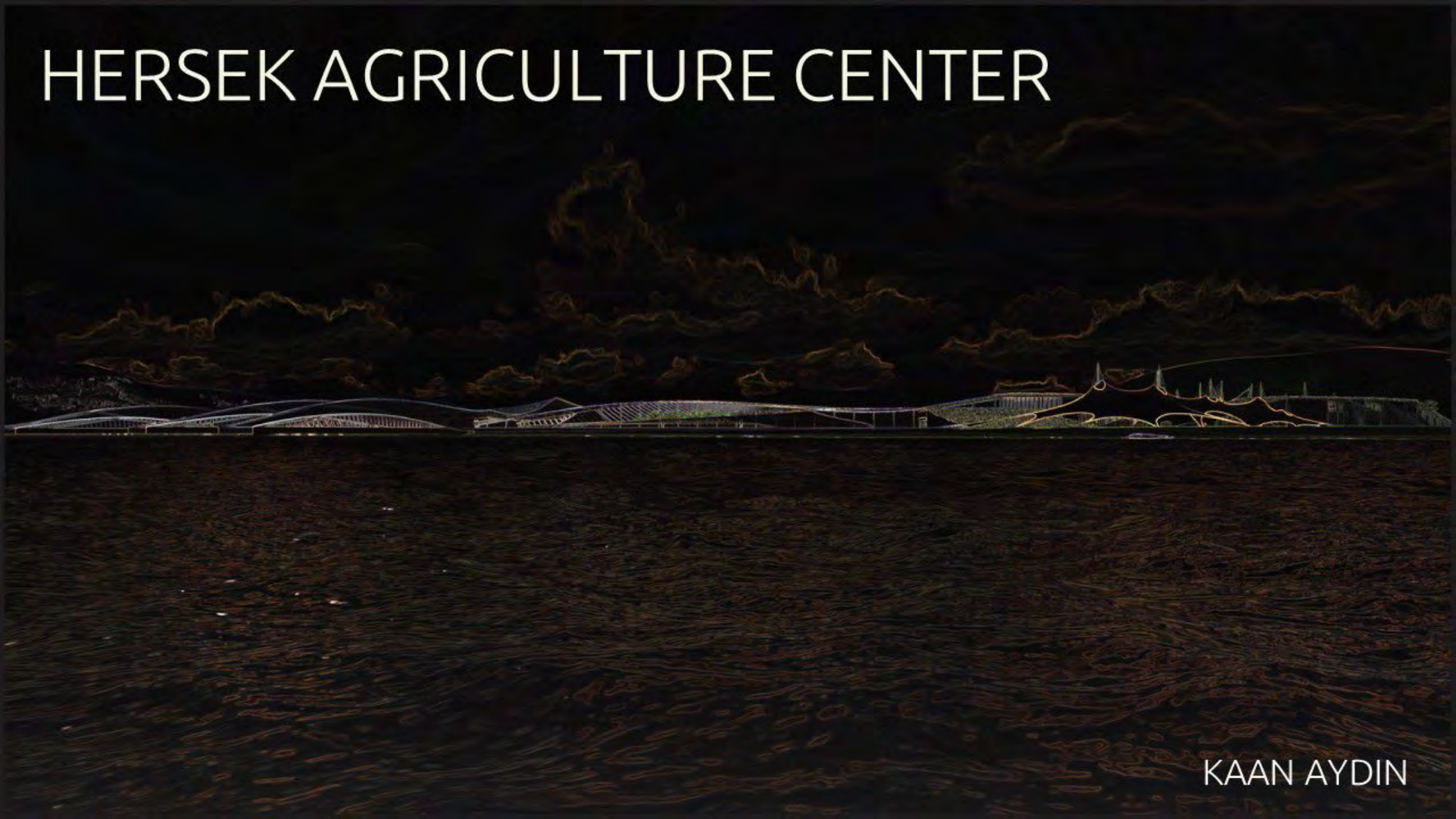
HERSEK AGRICULTURE CENTER



KAAN AYDIN

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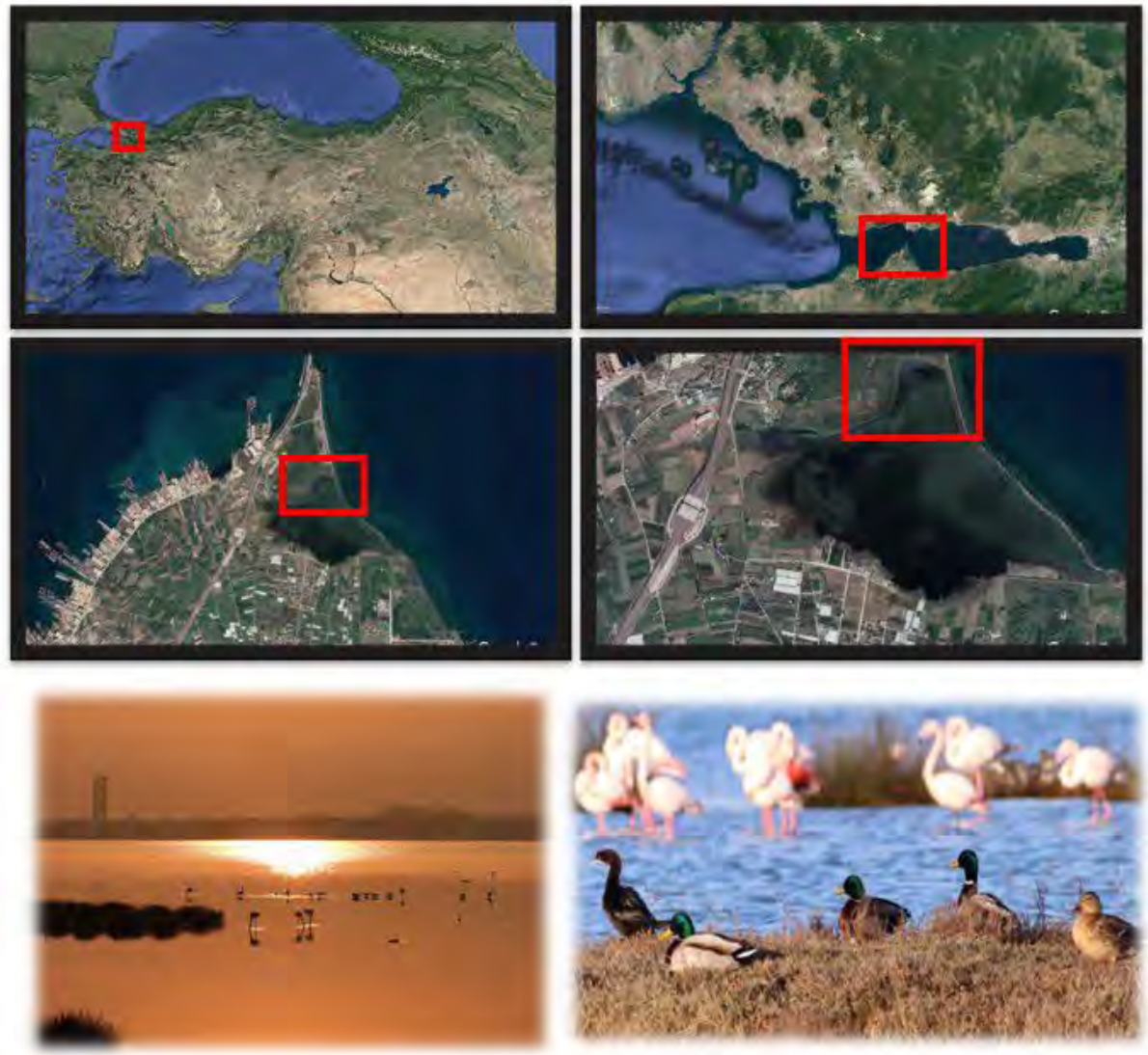
INTRODUCTION

Hersek Lagoon.

Altınova, Yalova / Turkey

Hersek Lagoon is one of the few lagoon (sea lake) systems on the southern shores of the Marmara Sea. The surface area of the lagoon, located within the borders of Altınova District of Yalova province, is 152 hectares. Altınova District, where Hersek Lagoon is also located, was formed by the alluviums carried by the surrounding rivers filling the Sea of Marmara. The lagoon is separated from the Sea of Marmara by a thin coastline. Therefore, the freshwater ecosystem can be protected to some extent naturally. Besides being a freshwater ecosystem, it is also a frequent destination for migratory birds.



Hersek Lagoon.

Altınova, Yalova / Turkey

The area around the lagoon, which annually visits 230-250 bird species for breeding and feeding, has been closed to residential settlements within the scope of the natural protection area. In addition, natural factors beyond the threats from the land also pose the danger of drying out the lagoon. Water entry into the lagoon occurs with sea water overflowing from the coastline to the lake in stormy weather, precipitation falling on the lake surface, discharge waters of the lands in the south of the lagoon and surface flows. Although salt water inflows positively affect the biodiversity in the lagoon, high salinity may cause the lagoon to dry out.

SITE ANALYSIS

Flora
Endemic Plants

Centaurea solstitialis

For chill; dried flowers are taken internally every morning.

Chondrilla juncea

As stomachic; latex obtained by the incision of roots is chewed.

Cistus creticus

For urethra inflammation and sterility; boiled with water and affected area is exposed to the vapours from boiling herbs.

Melissa officinalis

As sedative; infusion as tea.

Mentha longifolia

For wound healing; externally. As antitussive; infusion as tea.

Phillyrea latifolia

Plantago lanceolata

Ruscus hypoglossum

Teucrium polium

Vitis sylvestris

Fauna

Migrating Bird Species (10/241)

Phoenicopterus roseus

The adult is pale pink-white in color, its wings are dark red and black. Adolescents are more dull and dirty gray. Its downward-curved bill is bright pink in color, and the tip of the beak is black. Flamingos live in large groups in stagnant lakes, salt lakes, or lagoons. They come to places where other animal species are scarce and where extraordinary natural conditions exist. Examples include salt lakes or lakes with alkaline content. In short, this bird species lives in salty and soda shallow waters.

Somateria mollissima

Striking contrasting colors are only found in male birds.Females are monochromatic, matte brown.Immature males show varying variations of brown and white. It is a seabird spread from the coasts of Europe and North America to eastern Siberia.It is abundant in northern Canada.They grow along the shores of three oceans as well as off the coast of Baffin Island.

Himantopus himantopus

It has a slender, straight bill, long wings, and a glossy black head. Most of its head and body shines white; There is a variable amount of black on the head. Their legs are dark reddish-pink and surprisingly long. The upper side of the juvenile is more brown, and the trailing line on its wings is white. The "V" shape formed on the backs of all of them during the flight is quite remarkable. Its crowing is loud and scolding. It is seen in hot and tropical climate zones. They usually feed in freshwater areas, lake edges, seaside, swamps, river beds and swamp ponds.

Larus genei

The slender-billed gull, which at first glance stands out with its long beak; It is a medium sized seagull.- Its beak is actually longer than that of a black-headed gull, not thinner.- It is slightly larger in size than the black-headed gull; their legs are also longer; flat-topped, elongated forehead.- The color of the beak and legs is so dark red that it can be seen from afar in the summer in adults, and red in the winter. The beak and legs are yellowish-orange in juveniles.- Iris color is usually yellowish or whitish; Depending on the light conditions, the color may appear dark (the iris of the black-headed gull is always dark)

Charadrius dubius

Rainbirds (Charadriidae) are a species of rainbirds.It is a thin, long-winged and elegant plover.The mask and chest girdle are black, the eye ring is yellow. The eyebrow is thin and white.It comes from both sides and converges at the top. Its beak is black, its legs are pale yellow.The eye ring of the young is prominent, the forehead is light colored, the back of the eye is dark, the chest girdle is cut.It does not have a wing line. It is seen on sandy and pebbly lake shores and streams.

Haematopus ostralegus

Larus melanocephalus

Sterna sandvicensis

Bucephala clangula

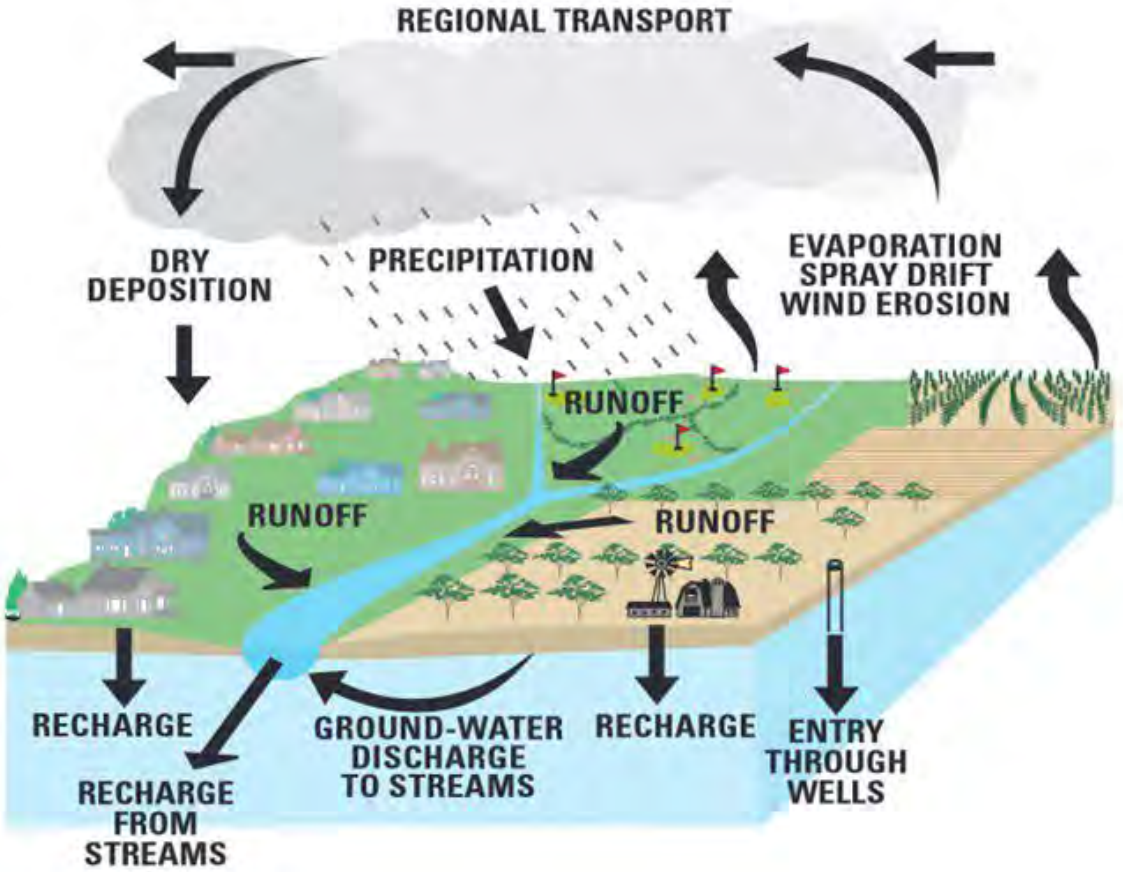
Fulica atra

Conventional Farming
Pesticide Usage

Pesticides used in conventional agriculture in Yalova are chemicals that ensure harmful organisms do not infect the products grown in the soil.

Ingestion of these chemicals through food may cause genetic disorders and muscle disorders.

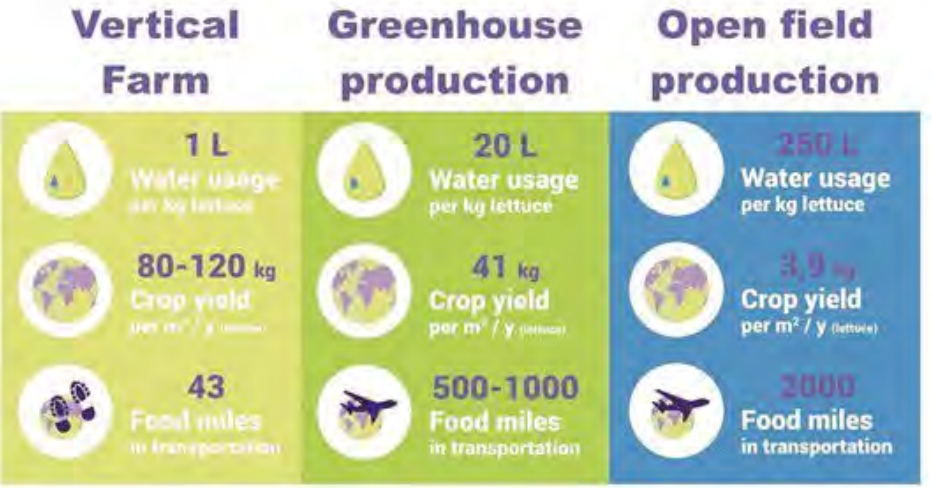
Especially when mixed with water, pesticides have devastating effects on marine flora and fauna. It is carried by aerosols in the air and kills insects such as bees and butterflies and poisons birds.

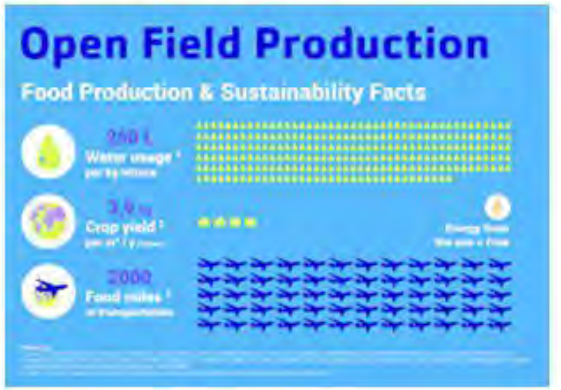


Pesticides are transported to streams and ground water primarily by runoff and recharge. Sources of pesticides gradually increase in countryside areas where enriched soil is used for conventional farming.

Disadvantages of Conventional Farming

- Conventional farming may ruin the soil in the long run
- Pests may become resistant
- Plant diseases may spread
- Organic farmers may have a hard time competing
- Many small farmers may go out of business
- Food may not be as healthy as with organic farming
- Long-term health effects are still rather unclear
- Many people have a bad feeling with conventional agriculture





Tides on Lagoon Set

A tidal lagoon generates electricity from the natural rise and fall of the tides. Tidal lagoons work in a similar way to tidal barrages by capturing a large volume of water behind a man-made structure which is then released to drive turbines and generate electricity. Unlike a barrage, where the structure spans an entire river estuary in a straight line, a tidal lagoon encloses an area of coastline with a high tidal range behind a breakwater, with a footprint carefully designed for the local environment.

The water in the lagoon then returns to closely match the same level as the sea outside. This process also happens in reverse as the tide flows out (ebbs) because the turbines are 'bi-directional' and so electricity can be generated from the incoming and outgoing tides.

LITERATURE REVIEW

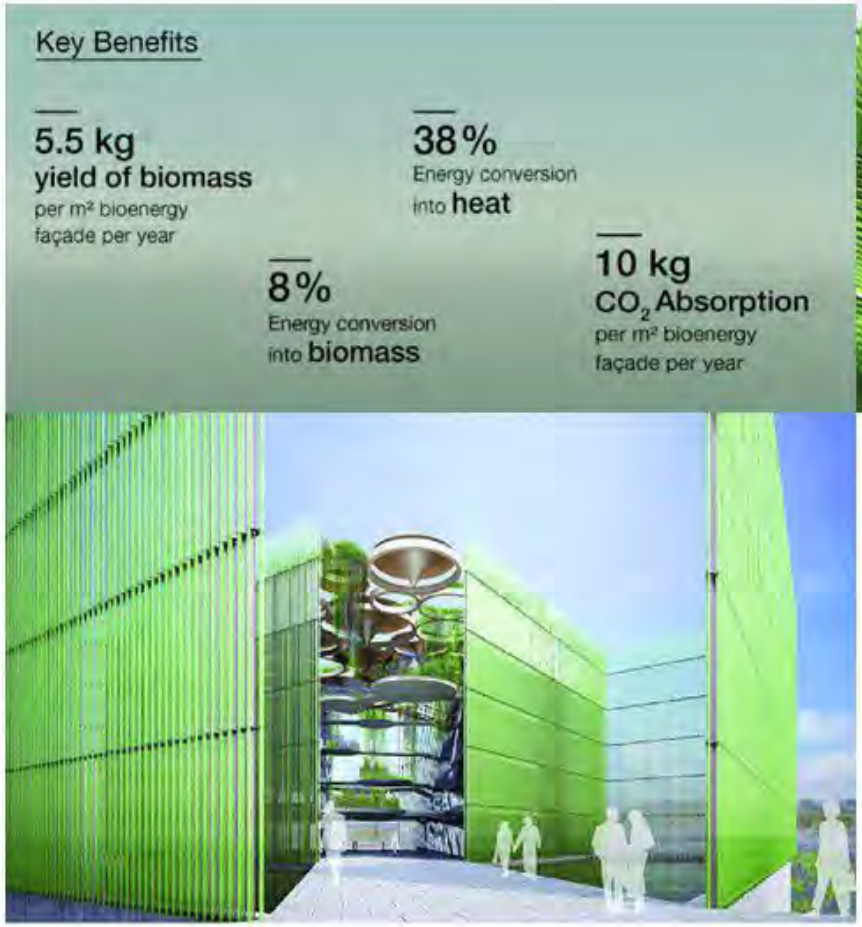
Vertical Farming

Vertical farming is the agricultural process in which crops are grown on top of each other, rather than in traditional, horizontal rows. Growing vertically allows for conservation in space, resulting in a higher crop yield per square foot of land used. Vertical farms are mainly located indoors, such as a warehouse, where they have the ability to control the environmental conditions for plants to succeed.

This next frontier of farming boasts some important advantages: it allows farmers to produce more output, use fewer resources, and reduce transportation by locating operations closer to the point of consumption.

Algae Facade

Algae is an incredibly versatile plant which can be used in a wide variety of commercial and industrial applications from energy to oil to cosmetics, and it possesses impressive potential for carbon capture technology. Algae has been at used in small-scale versions of these applications for some time, but photobioreactors have unleashed greater potential for algae in all of these areas. Until recently, algae has been grown in open air cultivation systems which are expensive and prone to challenges including water evaporation, predators eating the algae cultures, and a large land requirement. Photobioreactors, however, are closed cultivation systems, which solve these challenges while increasing production efficiencies and increasing yields.

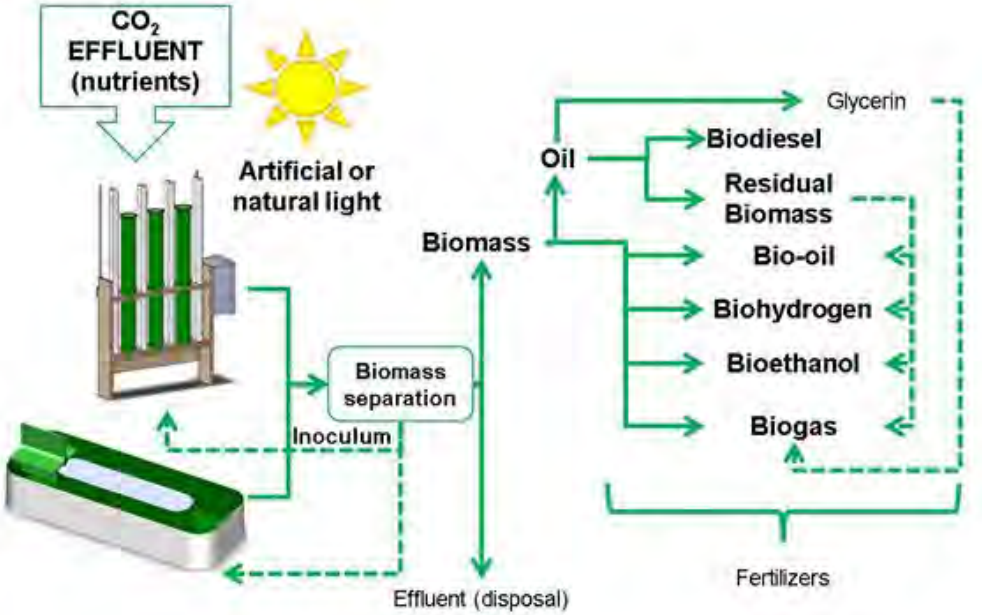


Three different facade elements may open up new possibilities for architectural design: A translucent version, which allows the green colouring of the algae to be experienced in the interior, an opaque solution, in which the algae serve as design elements on the outer facade, and a transparent frame, which ensures undisturbed viewing.

Biofuel Production

There are several advantages of algal biomass for biofuels production:

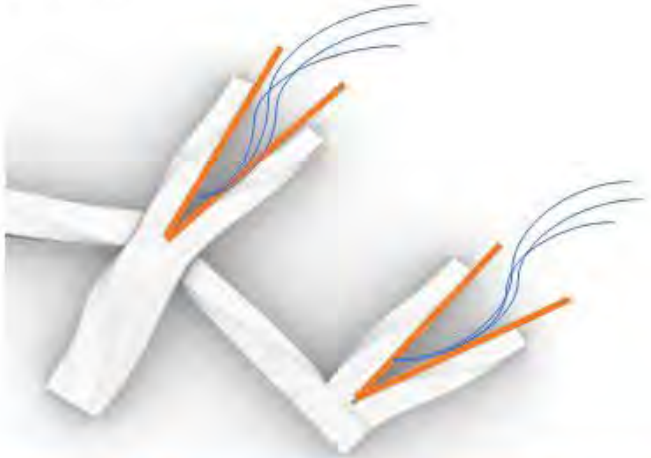
- ability to grow throughout the year, therefore, algal oil productivity is higher in comparison to the conventional oil seed crops;
- higher tolerance to high carbon dioxide content;
- the consumption rate of water is very less in algae cultivation;
- no requirement of herbicides or pesticides in algal cultivation;
- the growth potential of algal species is very high in comparison to others;
- different sources of wastewater containing nutrients like nitrogen and phosphorus can be utilized for algal cultivation apart from providing any additional nutrient; and
- the ability to grow under harsh conditions like saline, brackish water, coastal seawater, which does not affect any conventional agriculture



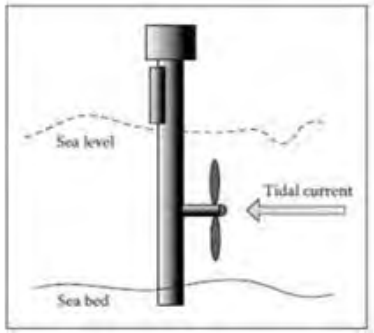
Tidal Power

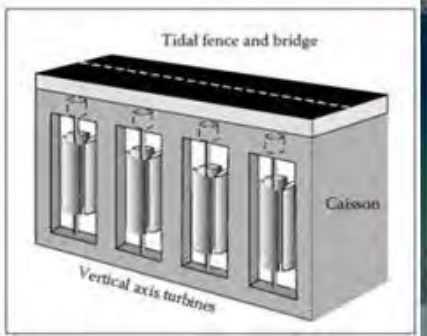
Turbines

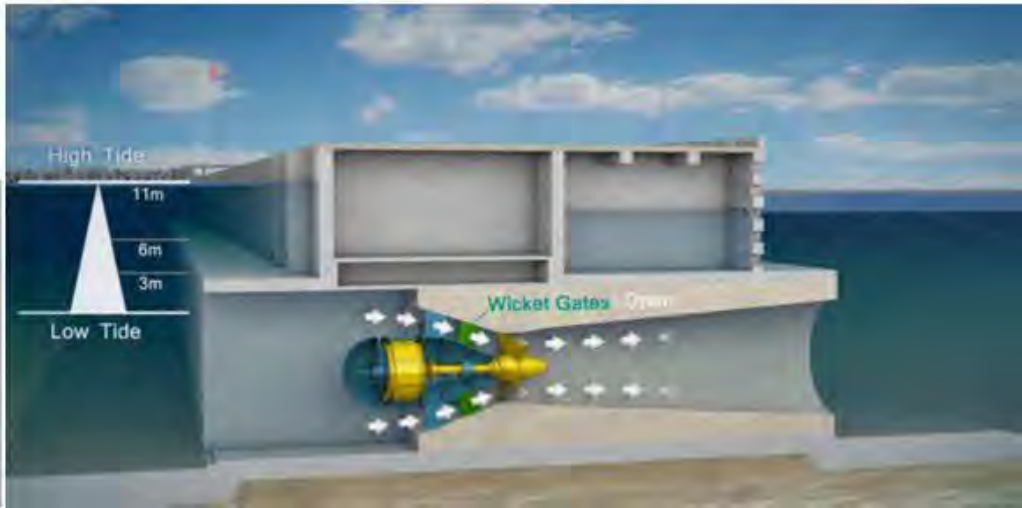
In order to power up the speed of tides, building shape create a "V" through the sea perpendicular to the set line of lagoon.



By placing tidal generators at the entrance of a lagoon, one can harness the energy provided by the change in depth. Lagoons operate similarly to barrages but present fewer environmental complications. Lagoons can easily be constructed out of natural materials and are built along the coastline. Barriers would keep out sea creatures too large to swim into the lagoon, while the smaller animals would be able to enter and exit easily.







CASE STUDIES

German Pavilion, Expo ‘67

Tensile Structure

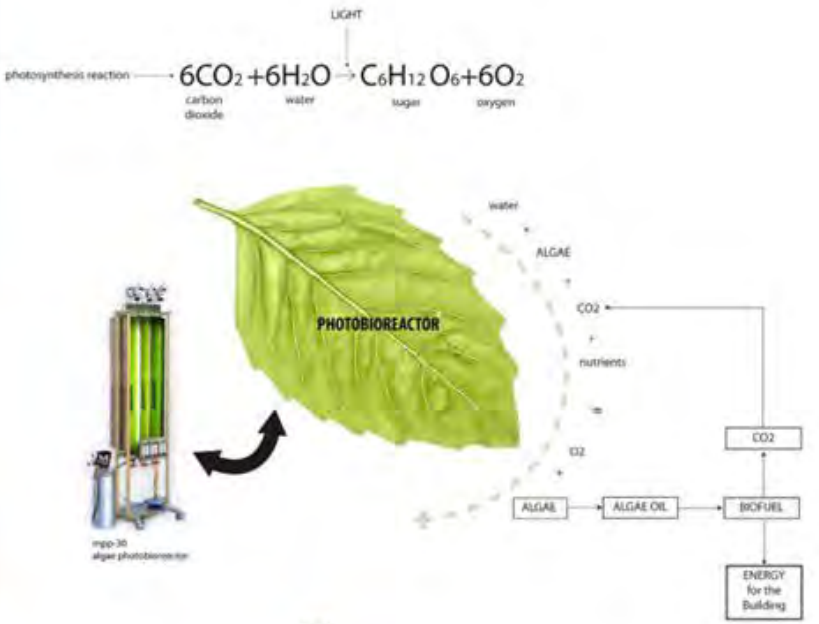
Montreal, Canada, Frei Otto, Rolf Gutbrod

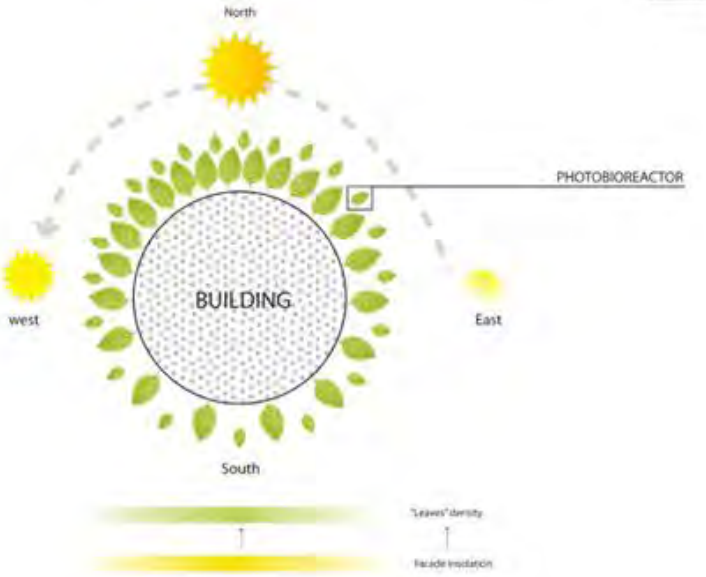
Membrane structures in the form of tents extend back to prehistory. But the use of membrane surfaces in modern construction did not begin in earnest until the second half of the 20th century. The engineers and architects in the circle around the German architect Frei Otto contributed to the overall development of wide-span membrane structures.

Algae Tower

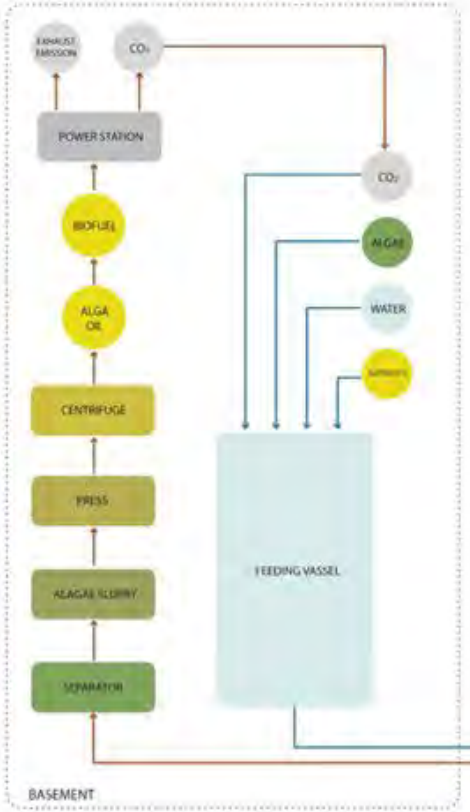
Photobioreactor Façade

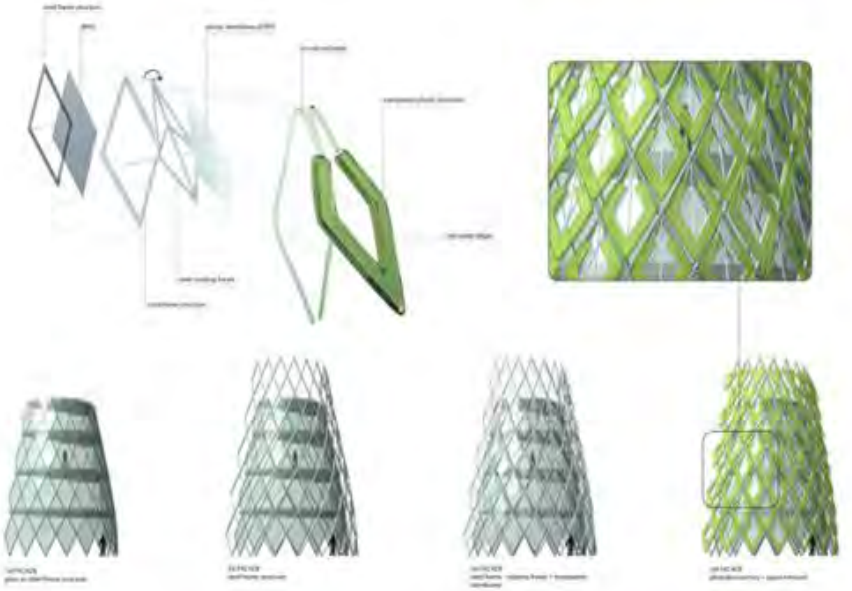
Melbourne, AUS, UOOU Studio

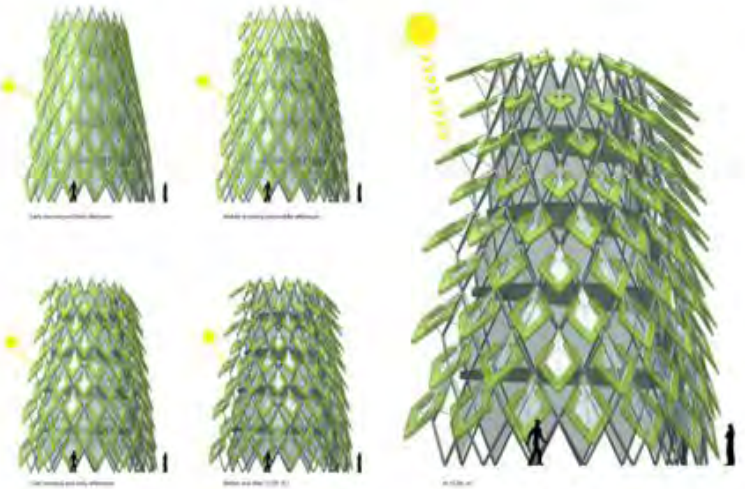




UOOU Studio researched several experimental plants, demonstrating that the way photobioreactors generate biomass has enormous potential as an alternative to bio-fuel production. Additionally, microalgae need a tremendous amount of carbon dioxide for their reproduction. The aim is to help make the system a closed cycle where all the CO2 produced can be re-injected into the reactor. In this design process, the biggest challenge is integrating the photo-bio-reactor technology with the architecture of the building.







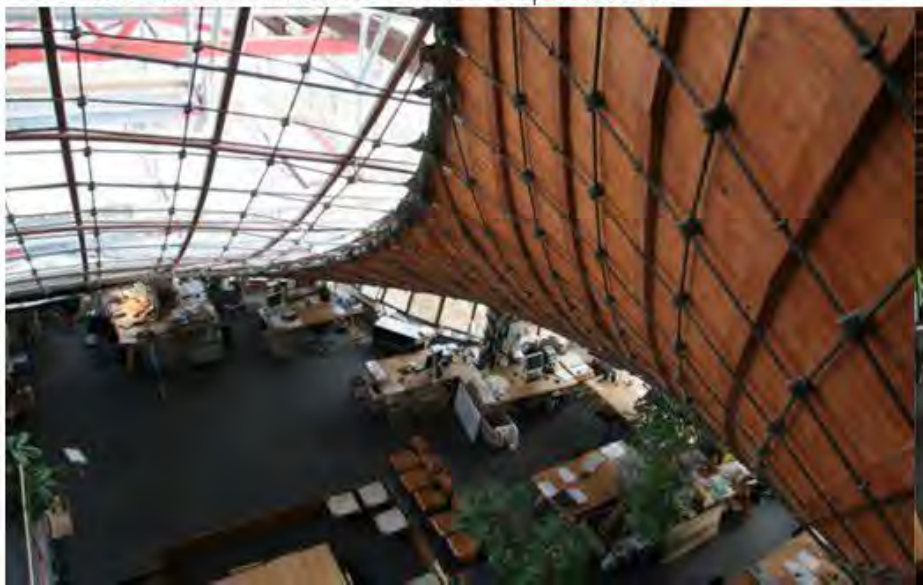
The facade reacts to the seasons and the daily variation of solar radiation, precisely as a tree canopy does. During the colder seasons, the skin will produce less biomass because of the lower intensity of the sun and the lower temperatures. The transparency will allow the sunlight to filter through the glass facade and heat the interiors. During summer, micro-algae production will be at its maximum, and the face will turn into an intense green: this will mean a higher production of bio-fuel and simultaneously a better shading with a consequent reduction in the use of air conditioning.

Lightweight Structures Institute

Tensile Structure

Stuttgart, Germany, restored by Frei Otto

An experimental structure was erected on the university campus in Stuttgart-Vaihingen in 1966 to test the construction and assembly of the Montreal pavilion. The net has a mesh width of 50 cm and has been prefabricated in four strips which were then fitted together to form two symmetrical sections on the site and suspended within the peripheral ropes. The tubular steel mast was raised by a crane and temporarily guyed with strings. The ridge and eye edge cables were fastened to the masthead, and ridges drew the net evenly and slowly up the mast. Otto fixed the peripheral lines in the anchorage points, and the net was suspended in the ridge and eye edge cables. Pre-tension in the net was achieved by a hydraulic raising the mast and tension on the anchorage points. Frei Otto filled the sand tub in which the mast was mounted with sand to fix it in position.

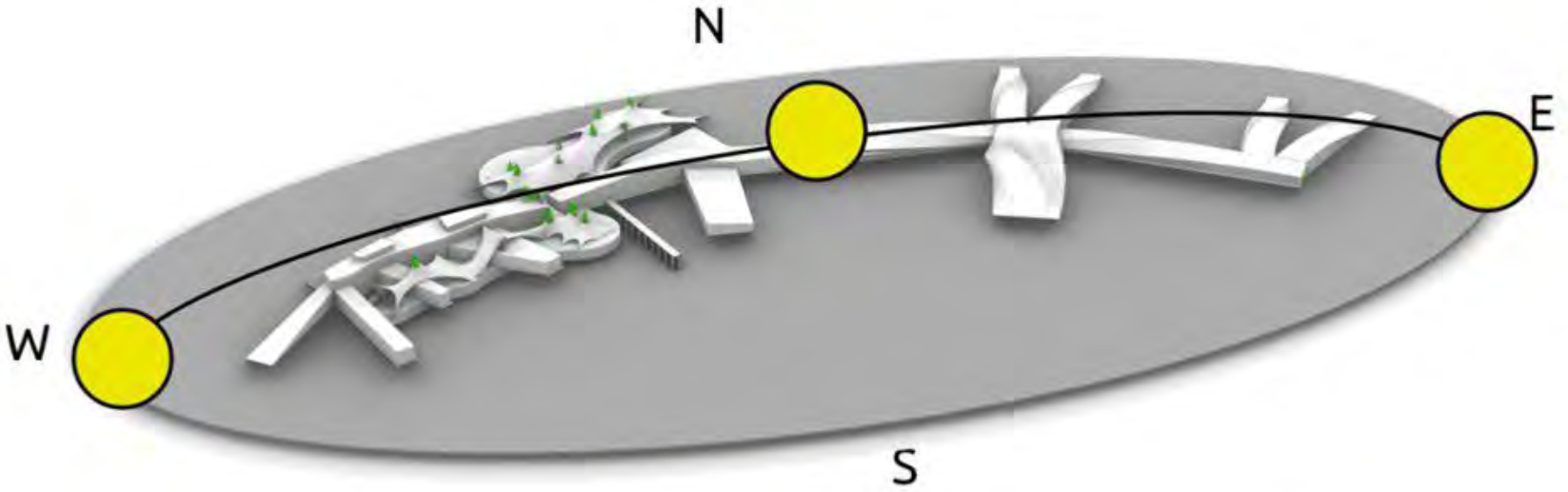


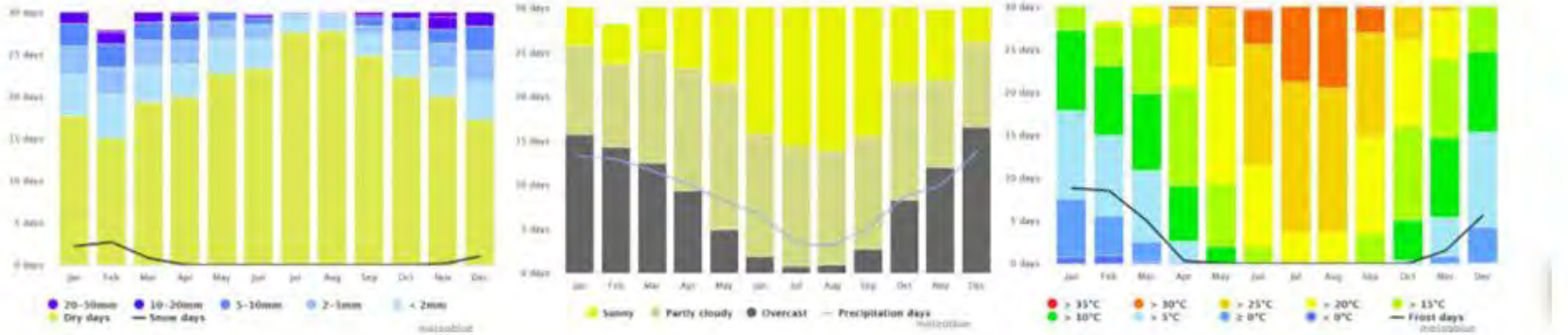
"Alles ist Fiktion."
Traumnovelle

PROJECT

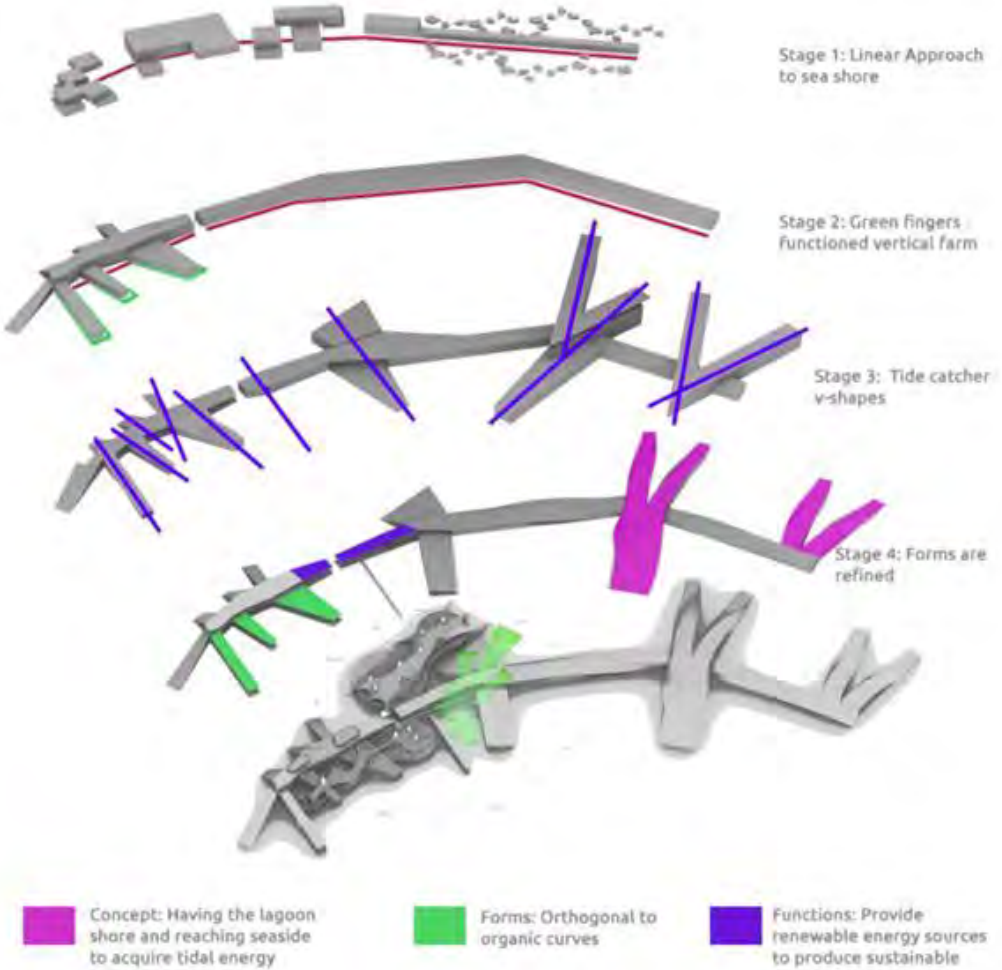
MASTER PLAN

CLIMATE & DIRECTION OF SUN

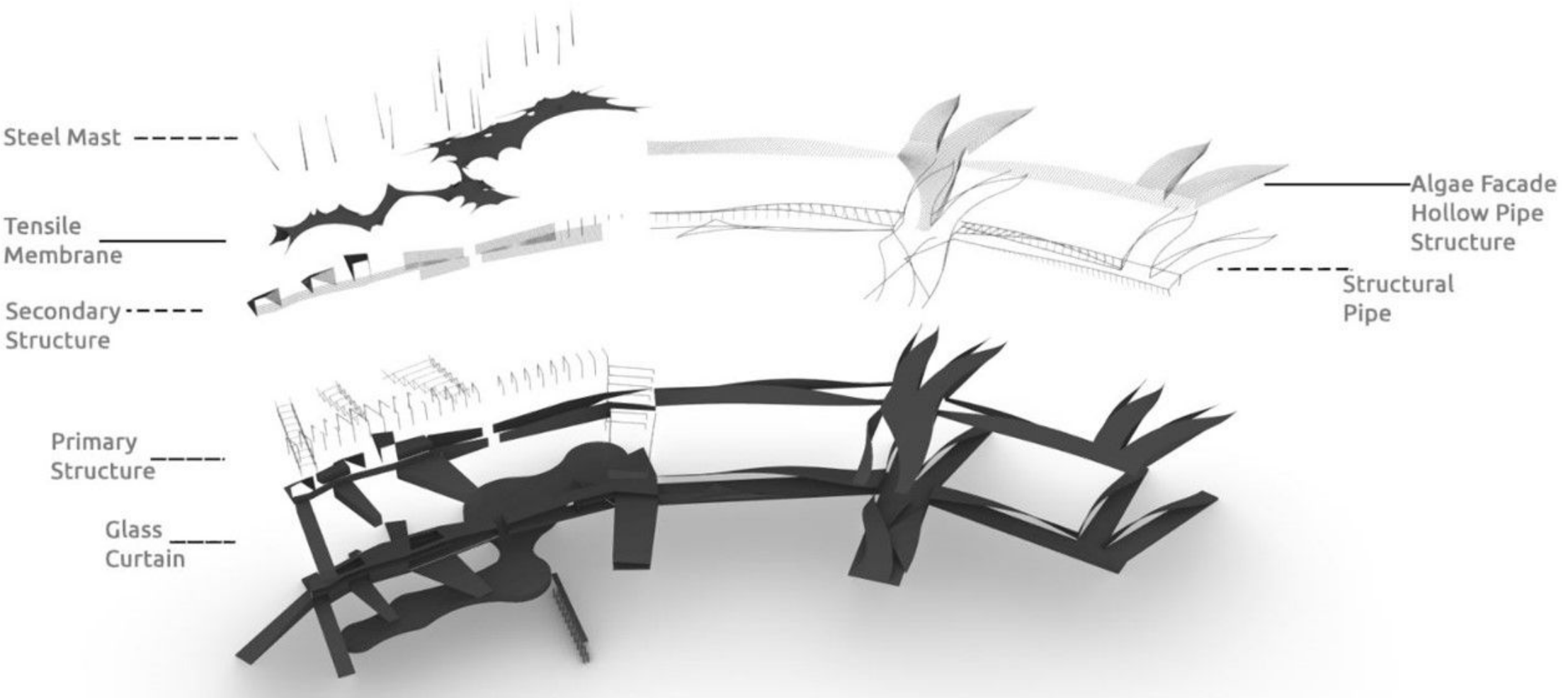




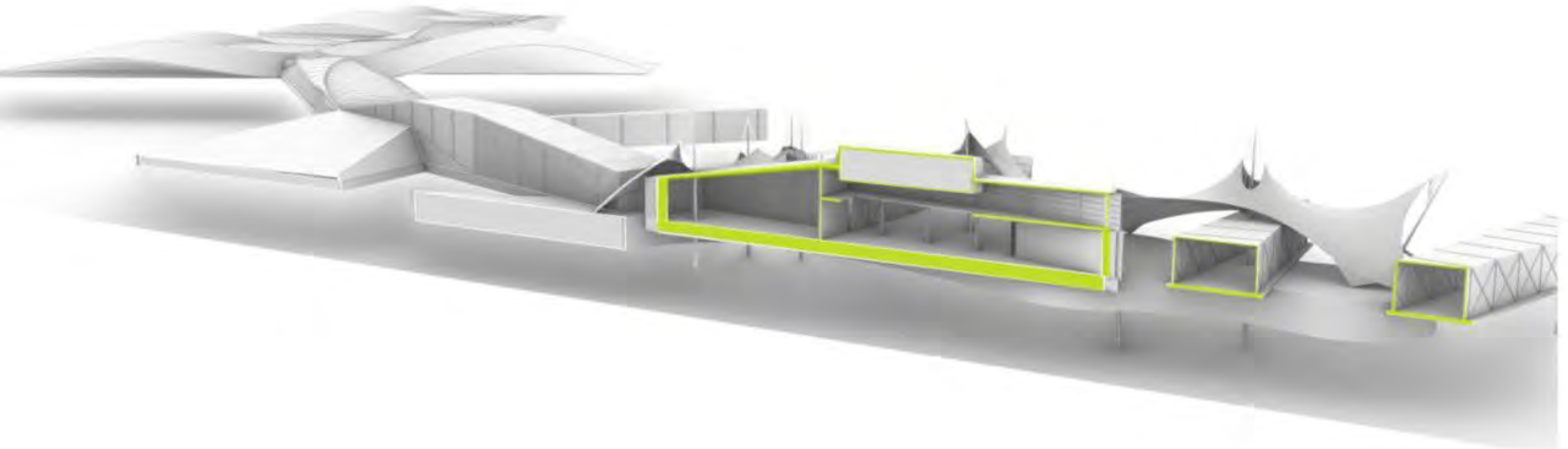
DESIGN APPROACH



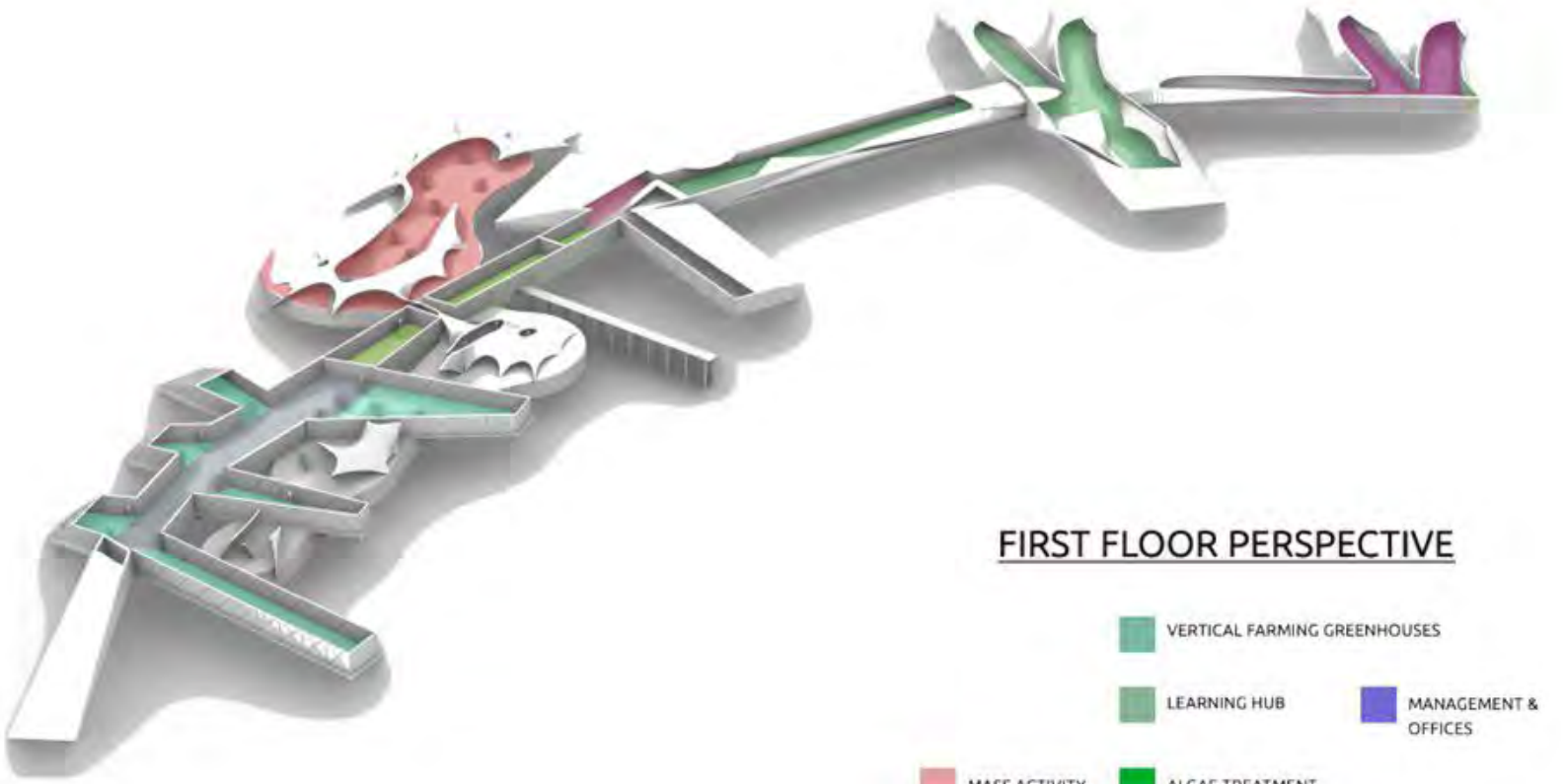
EXPLODED AXONOMETRIC DIAGRAM



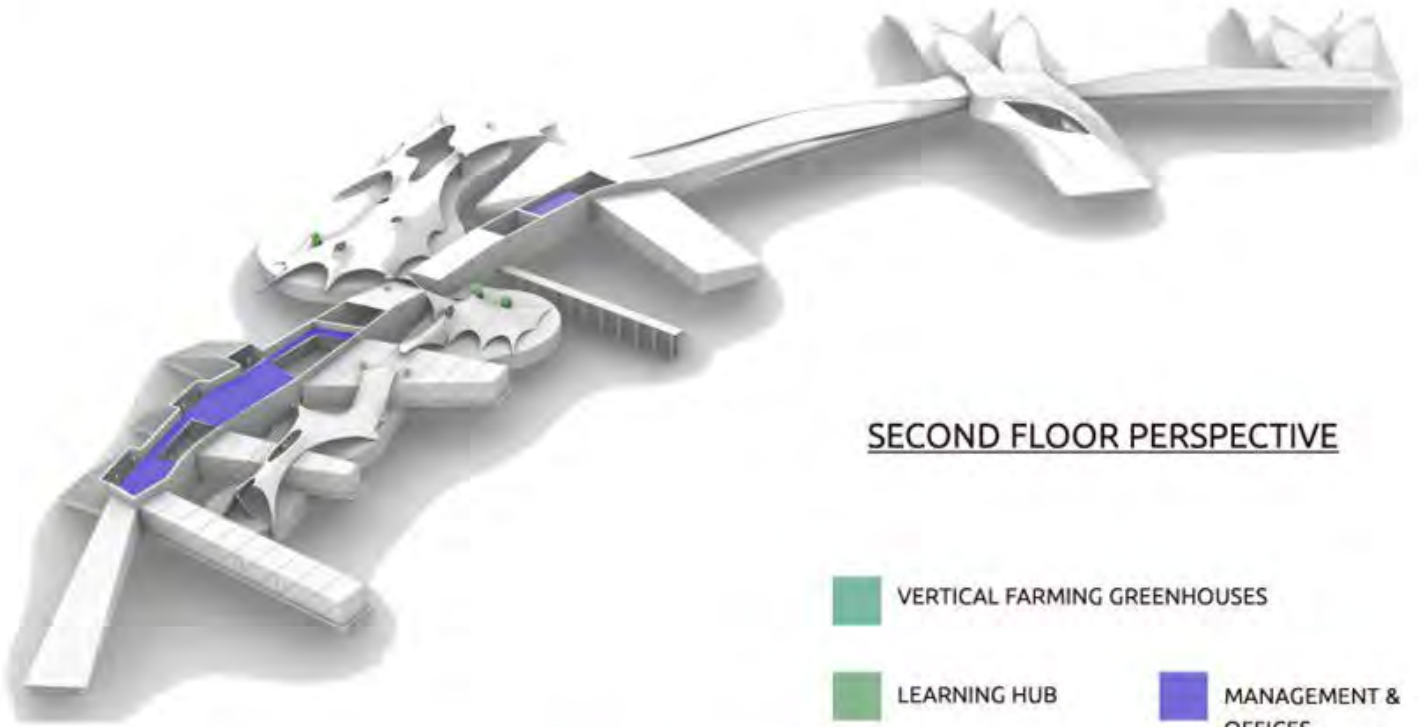
SECTION PERSPECTIVE



FLOOR PLANS


FIRST FLOOR PERSPECTIVE
VERTICAL FARMING GREENHOUSES
LEARNING HUB
MANAGEMENT & OFFICES
MASS ACTIVITY
ALGAE TREATMENT HUB
LECTURE ROOM
HAUTE CUISINE

FLOOR PLANS


SECOND FLOOR PERSPECTIVE
VERTICAL FARMING GREENHOUSES
LEARNING HUB
MANAGEMENT & OFFICES
MASS ACTIVITY
ALGAE TREATMENT HUB
LECTURE ROOM
HAUTE CUISINE