THE ALGAE TOWER

A high-rise skyscraper in Dubai

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BACKGROUND – DUBAI

Dubai is a city located in the United Arab Emirates (UAE) and was established in the 18th century as a small fishing village, the city grew rapidly in the early 21st century into a cosmopolitan metropolis. The trend of urbanizing Dubai with futuristic architecture has resulted in a slew of derivative words that depict Dubai as the global epicenter of groundbreaking, ultramodern, and cutting-edge structures.

Some authors have regarded this design as a template for state-of-the-art aesthetic contours, as well as record-breaking ornamental elements and technology, and as a model for other countries to follow.
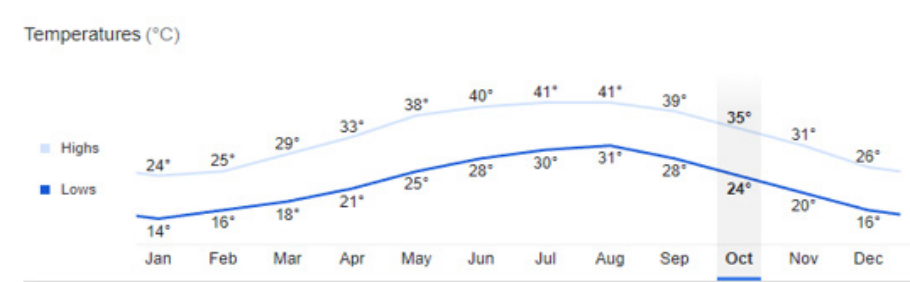
Trade, tourism, aviation, real estate, and financial services all contribute to Dubai's economy.

Oil wealth aided the city's development, which was already a major commercial hub despite accounting for less than 1% of the emirate's GDP in 2018.
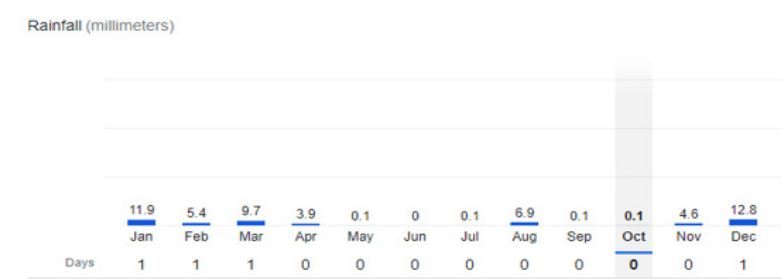
Dubai is creating an environment that encourages firms from all industries to innovate.

As part of its aspiration of being the most innovative, Dubai aims to be the world's most ecologically conscious city. Although a decade ago Dubai had one of the largest ecological footprints of any city in the world, By 2050 it wants to have the smallest.

Our project aims to be a part of this important vision of making Dubai a green city.

Urban Analysis
11 Schools
8 Cafe
14 Restaurants
8 Hotels

Temperatures (°C)

Hot temperature

Average of **4 days** of rain a **year!**

DUBAI'S GEATEST ECOLOGICAL CHALLENGE – EXTREME WEATHER

Dubai's most pressing ecological challenge, is its extreme weather conditions. The city's CO2 emissions from the various industries, fossil fuel based vehicles in addition to its already extremely hot and humid climate, transform the city into an urban heat island. Dubai has an arid desert climate. The average temperature is 28.2 °C (82.7 °F). Annual precipitation amounts to 68 mm (2.7 inch) and amounts to an average of 4 days of rain a year!

In order to preserve comfortable micro-climate that allows habitable living conditions, great amount of energy needs to be utilized.
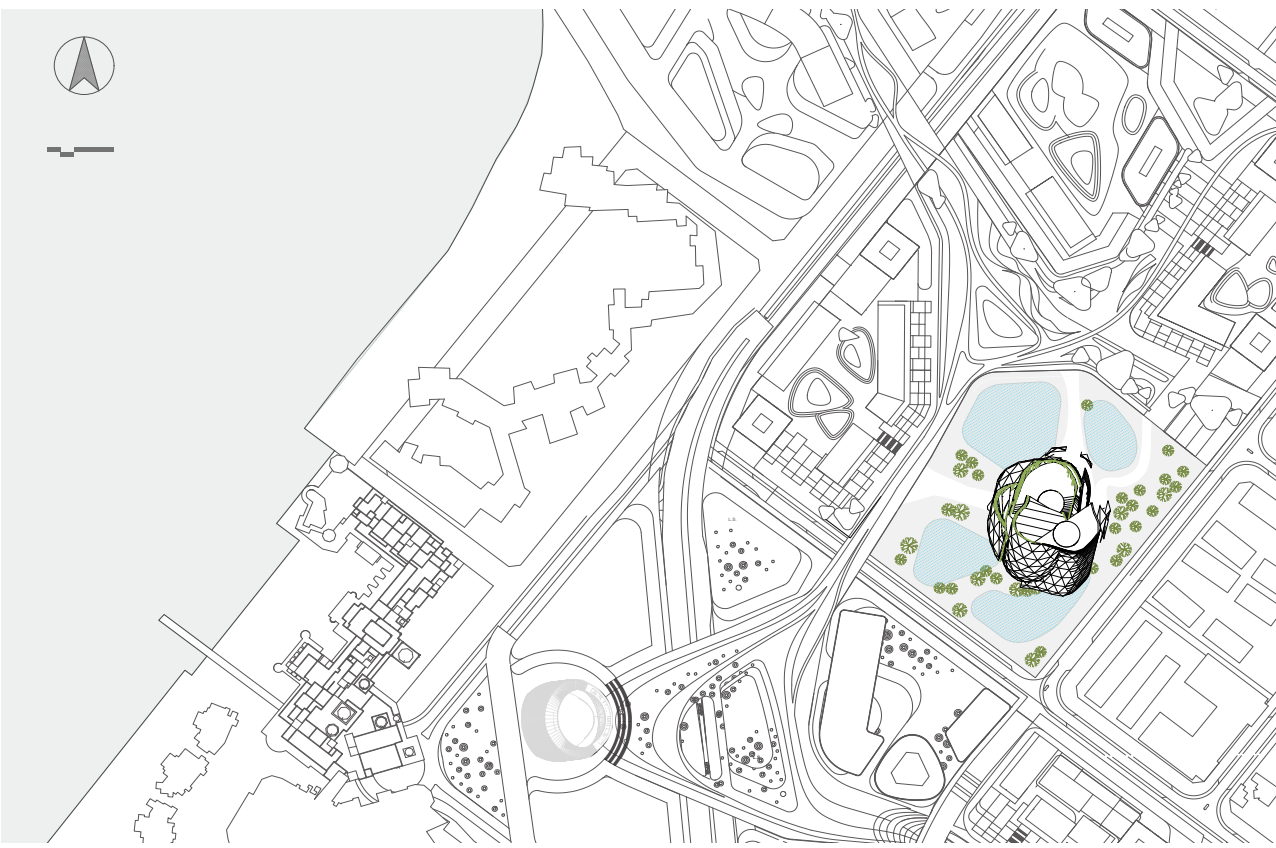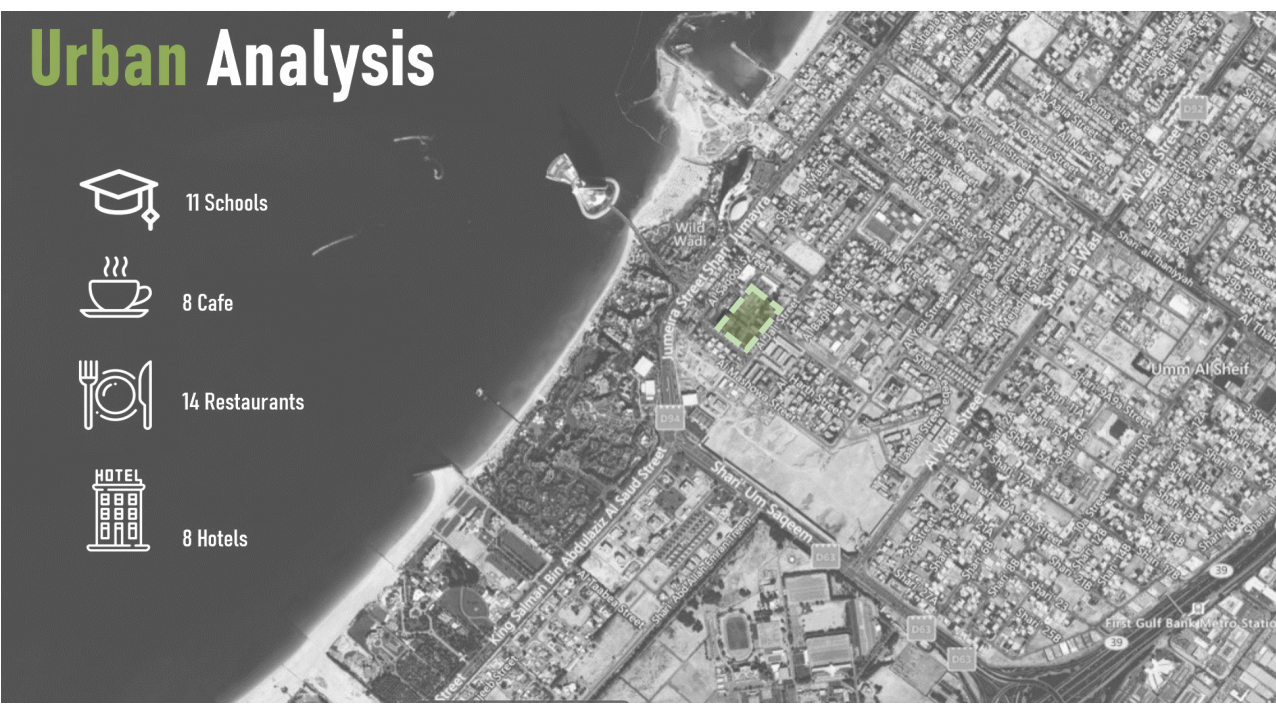
TECHNOLOGY – ALGAE

Algae belong to a group of organisms that are able to absorb CO2, NO2, SO2 which are important nutrients for them. Moreover, the addition of CO2 to algae cultures stimulates their growth!. The conditions that the algae need in order to thrive are: a wet (watery) environment, a temperature range between 16-30 degrees Celsius, sunlight and a regular supply of CO2.

By using natural biological processes, algae can significantly reduce the amount of pollutants in a space, even in relation to the air outside the building.

Another byproduct of these biological processes, and especially the process of photosynthesis, is the Evaporative Cooling process, which contributes to lowering the temperature inside the building.

As well as that, photosynthesis is known as a process which requires CO2 to produce oxygen. Algae are among the biological organisms that carry out the most efficient photosynthesis process.
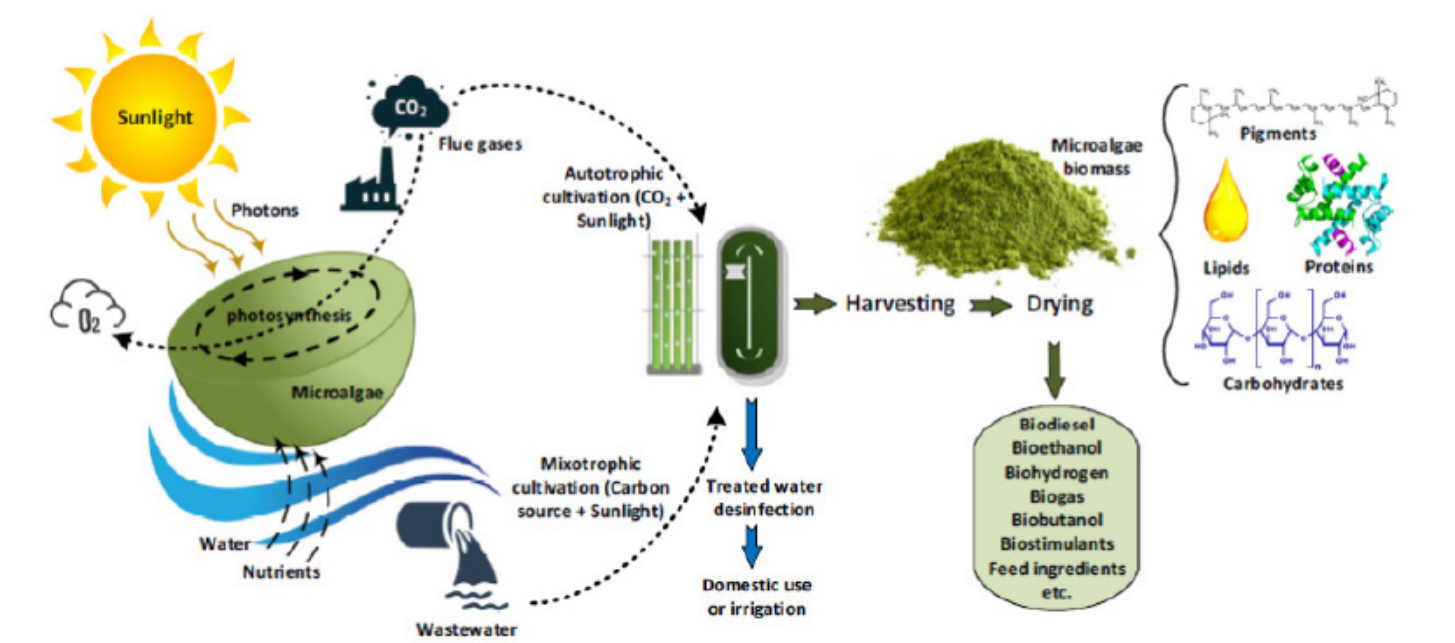
By growing certain types of algae in the interiors of buildings, it is possible to improve air quality and increase the amount of oxygen, while lowering the temperature in the building and thus bring about three desired results: improving air quality, increasing the amount of oxygen in space passively - without using fresh air systems, and lowering the temperature within the building - which will result in tremendous energy savings.

SOLUTION – MICRO ALGAE TUBES MODUL

In order to deal with the heat problem, we implemented in our project algae tubes that span throughout the height of the tower and Integrates with the architecture by creating a biological Mashrabia. The algae tubes are both extremely ecological and beautiful in addition of being a key part in our program.

As well as that, harvesting the biomass created by the algae produces several byproducts such as: biofuel, biodegradable plastic and even food supplements. These can sustain the building and its inhabitants and even generate economical profit.