

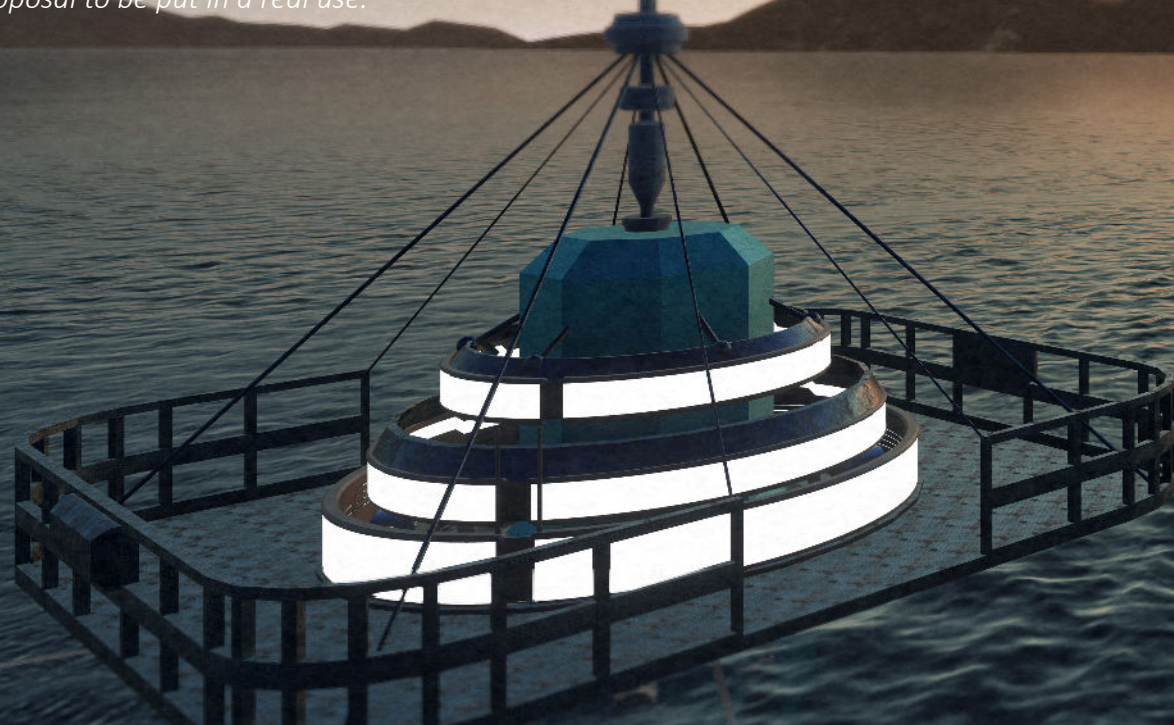
Maldives' Coral Reservation installation

Project Style: Interactive & Multimedia

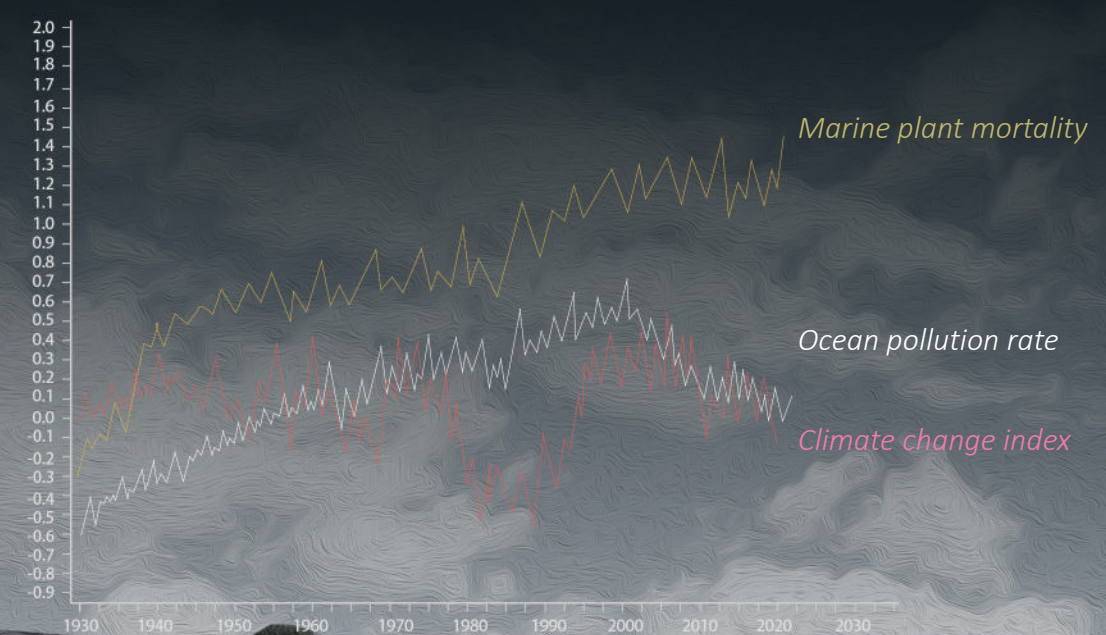
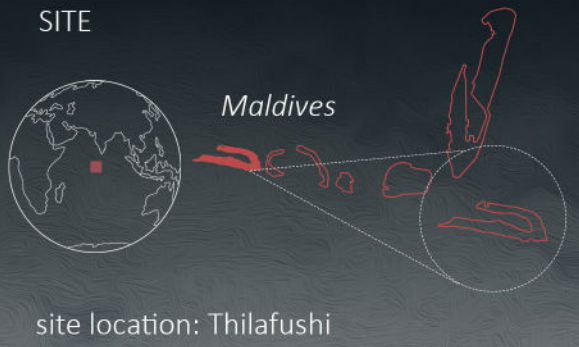
Author: Wanyi Zhu

Project Statement

This submission includes multiple pages of marine conservation conceptual design. It is an installation placed near the Thilafushi island in the Maldives. Thilafushi was once a beautiful lagoon maintaining high biodiversity, but it later became a garbage island receiving overwhelming tons of residential and industrial waste from the capital of Male. To recover the coral habitat for ocean organisms and to raise water quality around that area, I designed an installation for environmental protection and tourism purposes. My design mainly has two functions: collecting waste by using nets and membranes and purifying water by cultivating seagrasses. This design also effectively reduces the severity of ocean acidification which can have devastating impacts on reef growth and future stabilization. Visitors can observe the state of coral recovery and can learn about this project to enhance public awareness of ocean issues. My aim for this project is to provide a design idea that balances economic growth and environmental conservation so that different stakeholders can take this proposal to be put in a real use.



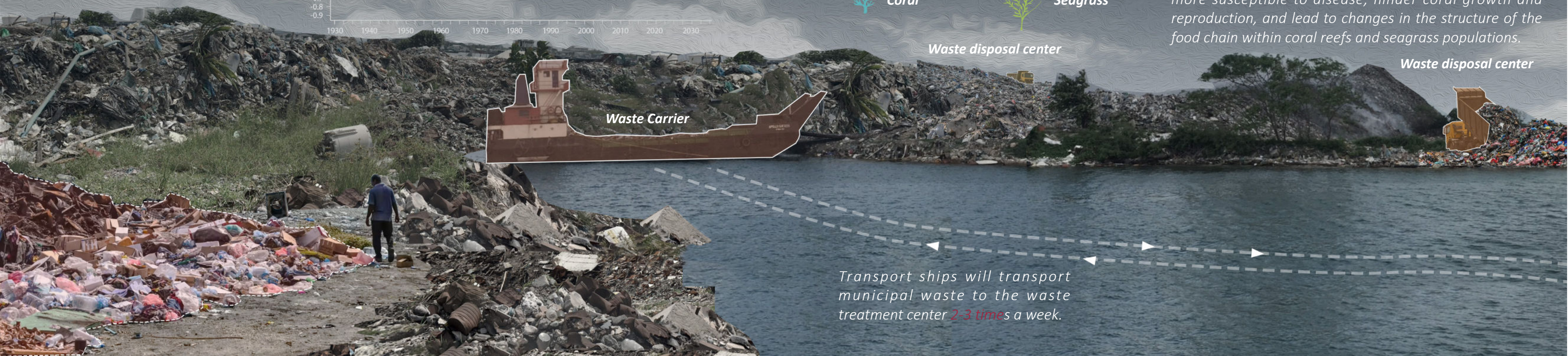
Ocean Temperature and Waste Collection Projections



The thilafushi island in the Maldives serves as a garbage collection and distribution center for the entire country. The garbage disposal center of the island gathers a large amount of household garbage and tourist garbage, which has a great impact on the ocean and climate, and the damage to marine plants in the sea area has reached 80% %, **57.7%** of the corals died.



When sediment and other pollutants enter the water, they can kill coral reefs and destroy seagrass, accelerate the growth of destructive algae, and reduce water quality. Pollution can also make corals and seagrasses more susceptible to disease, hinder coral growth and reproduction, and lead to changes in the structure of the food chain within coral reefs and seagrass populations.



Transport ships will transport municipal waste to the waste treatment center **2-3 times** a week.

CAUSES AND EFFECT



Boating Activity



Paddle Touches Seabed Plants



Coral Albino



Garbage Carrier



Garbage will sink into the ocean.



animals eat trash



Surfing and Vacation



Snorkeling



Destruction of the seagrass ecosystem



Starfish burst



Organic matter reducing



Coral Albino

TIME LINE

Historical events of Thilafushi



05-12-1991
Originally a lagoon composed with shallow coral reefs, decided to make into a landfill

Some of the trash that is transported falls into the ocean.



Updated 2003

Up to 700 tonnes of rubbish is brought to Thilafushi a day leased to entrepreneurs who used the island for various industrial activities



Waves sweep huge amounts of trash into the ocean every day

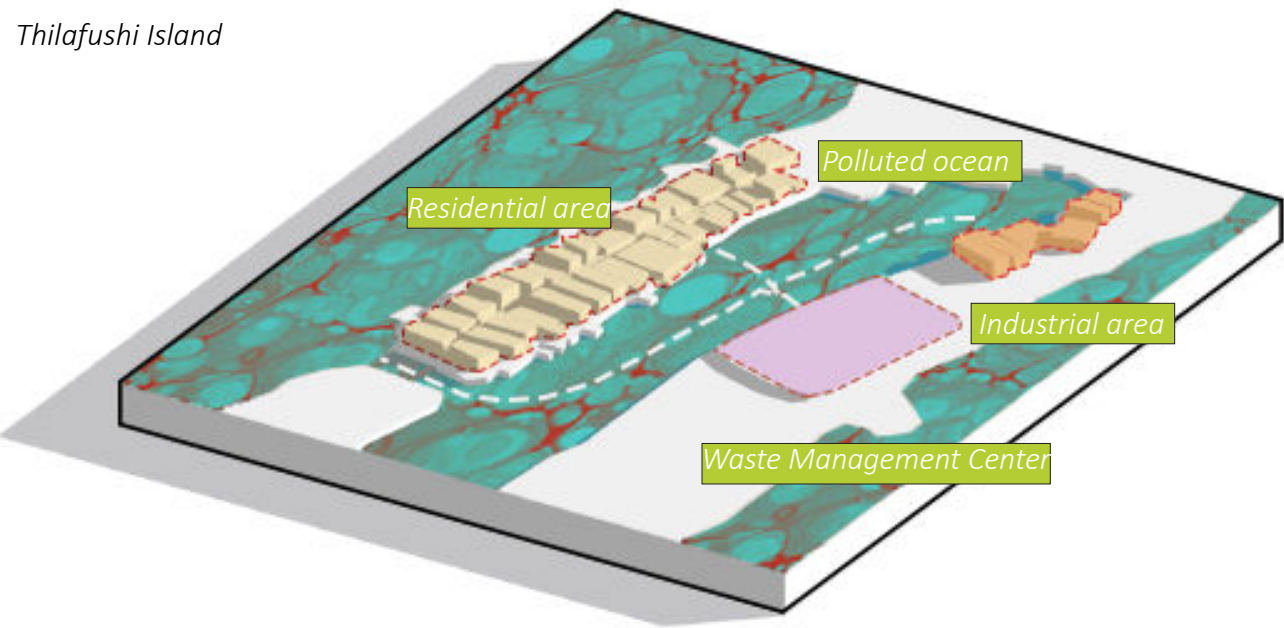


2011

In 2011, the Maldives government announced a ban on other islands from dumping rubbish at Thilafushi's garbage center.

Other Potential Problems and Strategies

Thilafushi Island

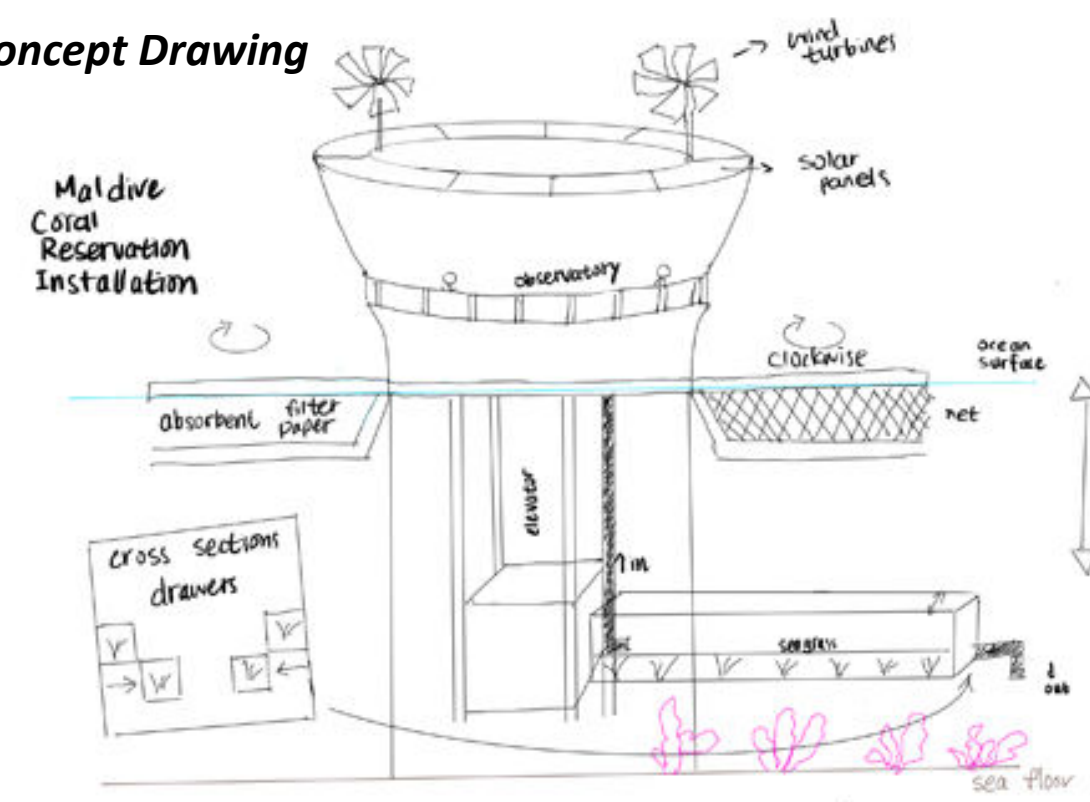


Potential Problems

- > Climate change resulted in coral bleaching (overall percentage of bleached corals recorded across all 71 sites in the Maldives is 73%)
- > Tourism and over-exploitation
- > Pollution from uncontrolled waste disposal, untreated sewage
- > Unsustainable agricultural practice from overuse of chemical fertilizers and pesticides
- > Removal of vegetation for human settlement and infrastructure (tourism) > rising sea level due to global warming (increase risk of flooding)
- > Soil/beach erosion (the harbor prevent natural sediment from accumulating, meaning the self-sustained rising land level is damaged)

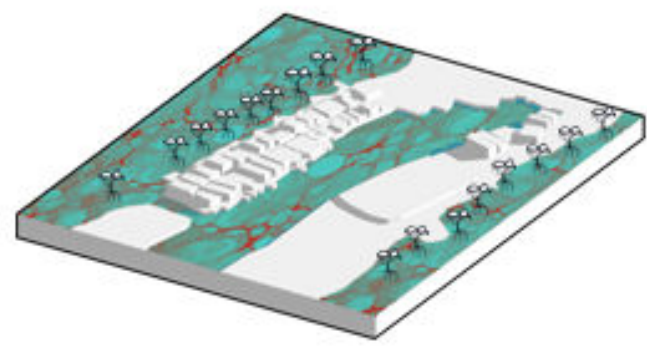
Serious marine pollution due to waste management center, industrial area, residential area sewage discharge

Device Concept Drawing



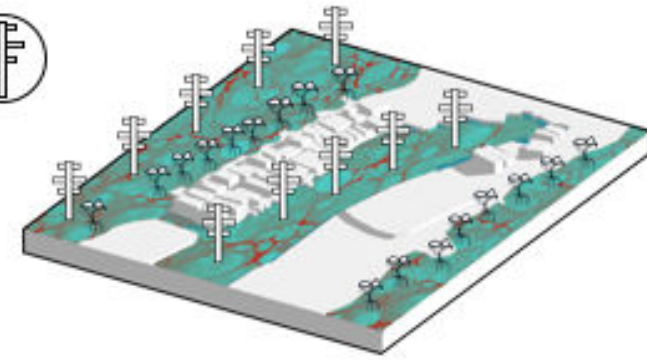
Strategies

PHASE 1 Mangrove ecological barrier



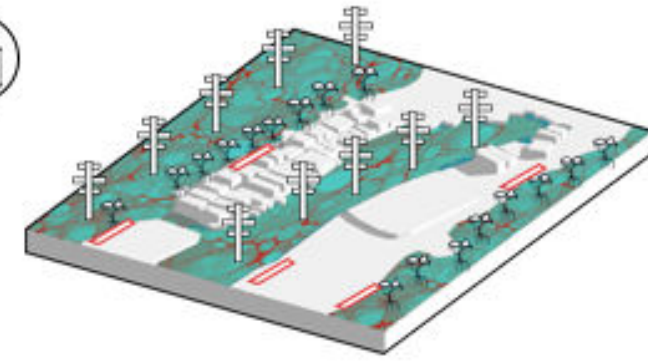
Mangrove ecological barriers along bleached coasts to limit kayaking areas

PHASE 2 Smart Waste Collection Device

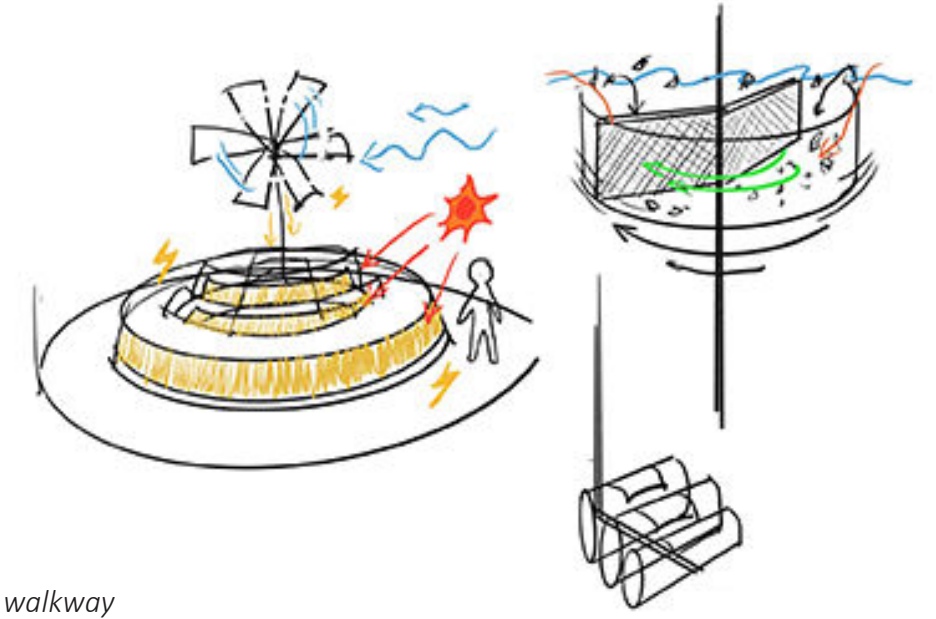


The placed device absorbs solar energy to generate electricity to collect garbage in the ocean.

PHASE 2 Construct walkway



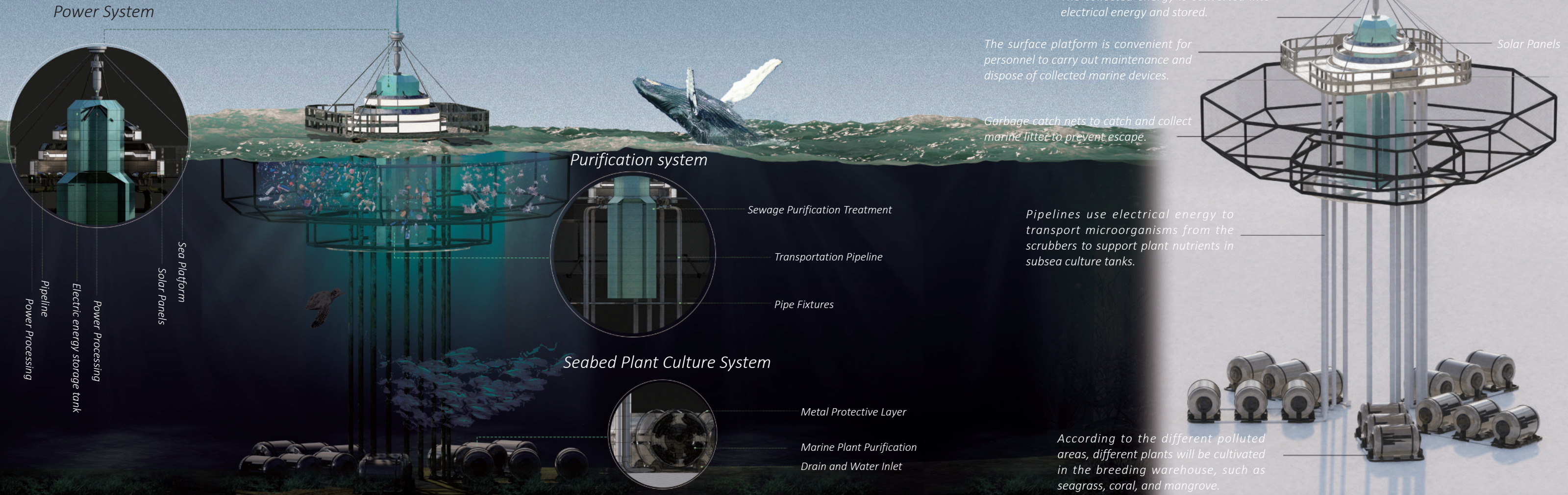
Construct timber by the sea, visitors could walk on the walkway enjoy the sight and controlled the device



Marine Waste Garbage Collection and Purification System

Main features and description.

The device mainly collects natural resources and converts them into electrical energy, collects marine garbage through electrical energy, alleviates the garbage problem in the ocean, and helps marine plants provide an ecological barrier and nutritional guarantee by placing cultivation chambers. When the plants in the warehouse reach a certain stage, they are transplanted to other areas.



Device structure

Wind turbines collect wind energy and convert it into electricity.

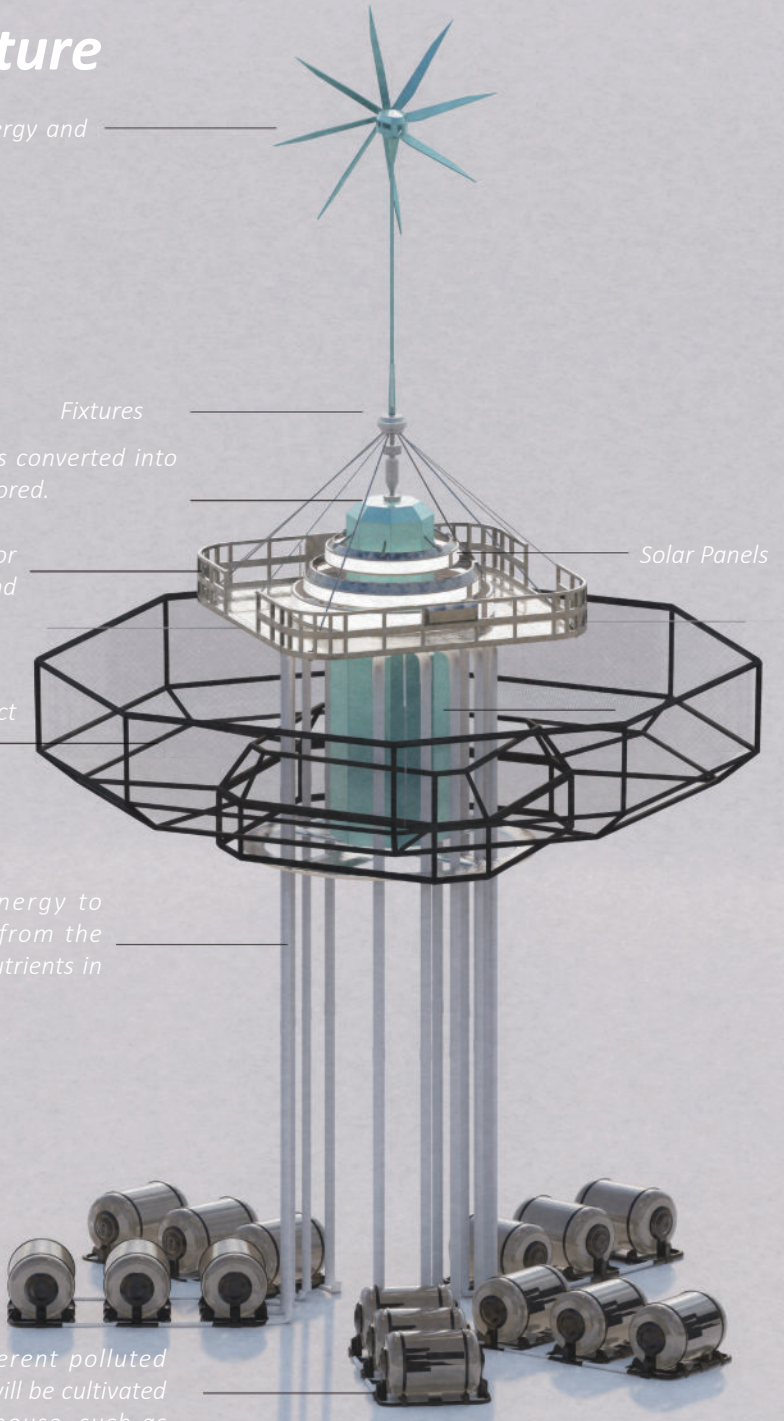
The collected energy is converted into electrical energy and stored.

The surface platform is convenient for personnel to carry out maintenance and dispose of collected marine devices.

Garbage catch nets to catch and collect marine litter to prevent escape.

Pipelines use electrical energy to transport microorganisms from the scrubbers to support plant nutrients in subsea culture tanks.

According to the different polluted areas, different plants will be cultivated in the breeding warehouse, such as seagrass, coral, and mangrove.



THILAFUSHI ISLAND CURRENTLY

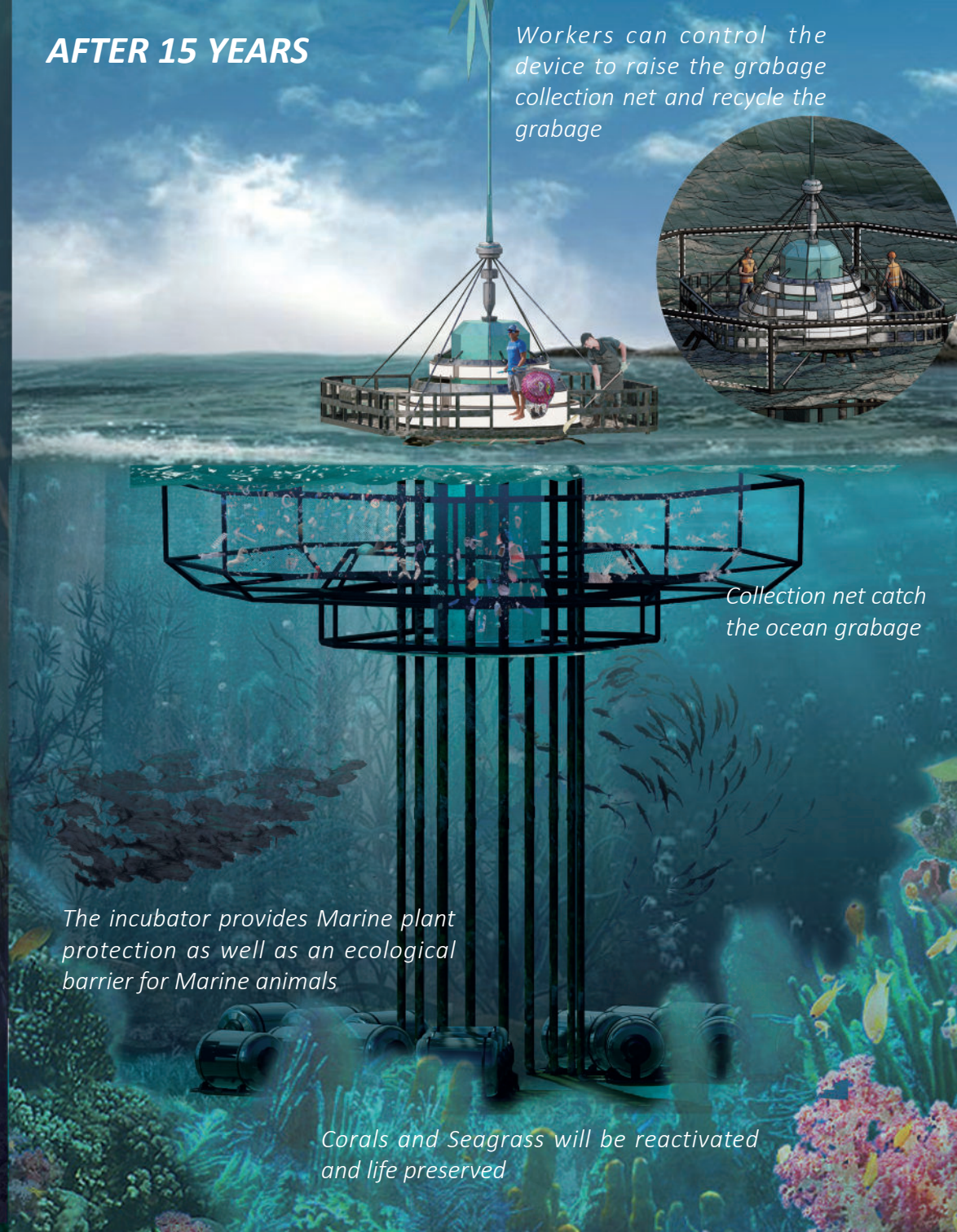


Traditional cleaning method require people dive into the sea to clean up trash

Ocean waste case the sea grass dead

Ocean waste case the Coral bleaching

AFTER 15 YEARS



Workers can control the device to raise the grabage collection net and recycle the grabage

Collection net catch the ocean grabage

The incubator provides Marine plant protection as well as an ecological barrier for Marine animals

Corals and Seagrass will be reactivated and life preserved

EDUCATION PURPOSE

☁ Cloudy

🌀 3.6

☀ 4

1208

- 🌿 Marine plants monitoring
- 🔬 Purification running status
- ⚡ Power System
- 🌐 LANGUAGE OPTIONS

STRUCTURE VIEWS



Popular science of Coral Species



Under Marine Views

