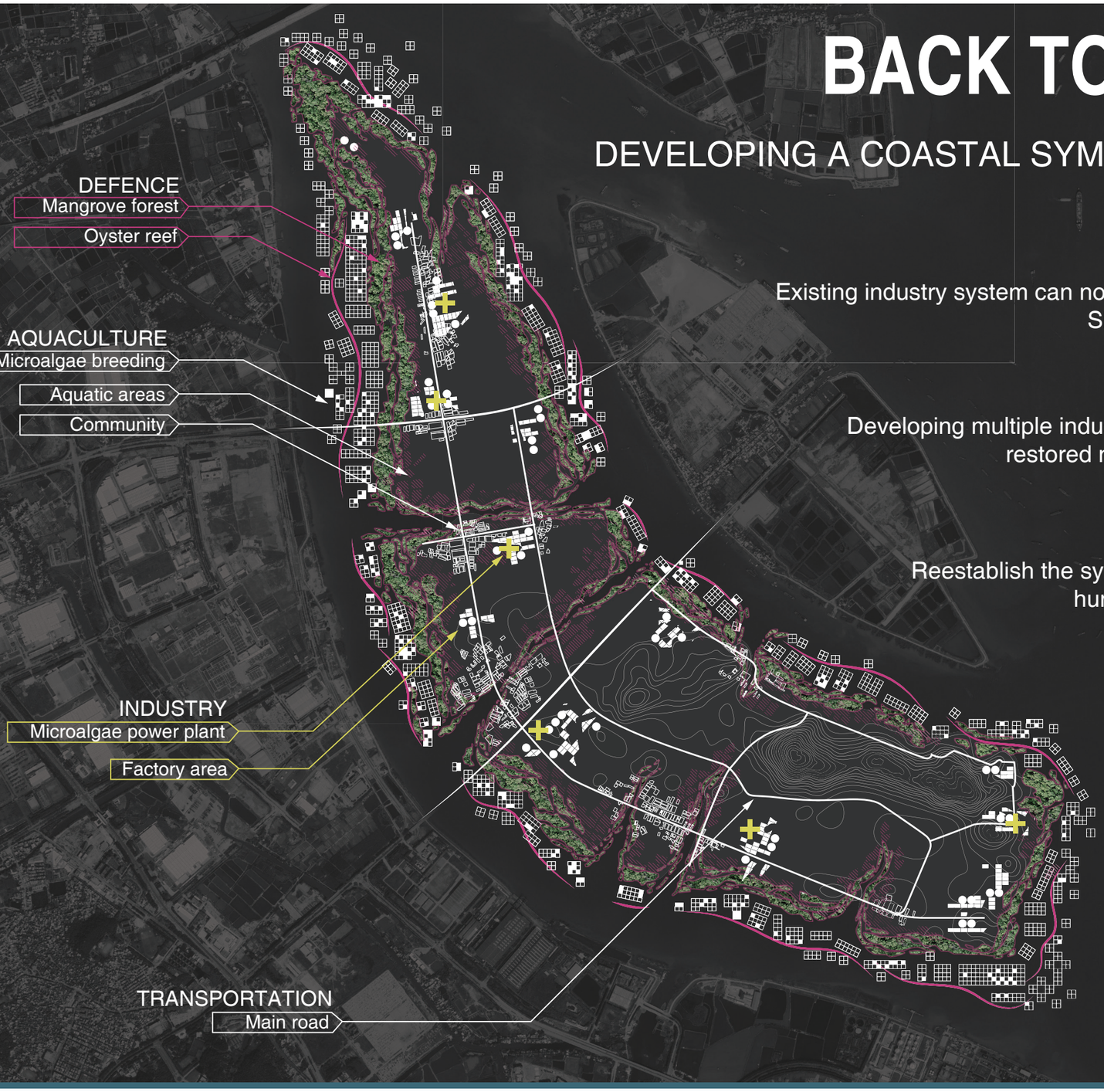
BACK TO THE FUTURE

DEVELOPING A COASTAL SYMBIOTIC INDUSTRY SYSTEM



Existing industry system can not adapt the threat of SLR and strom surge **PROBLEMS**

Developing multiple industry based on the restored mangrove system **STRATEGIES**

Reestablish the symbiotic relationship between human and nature environment **VISION**

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Academic year	Fall 2019
Title of the project	Back to the future
Authors	Jin huang; Peilin Liao; Chuyi Huang; Peiyao Xiao; Lanxing Yu.

TECHNICAL DOSSIER

Title of the project	Back to the future
Authors	Jin huang; Peilin Liao; Chuyi Huang; Peiyao Xiao; Lanxing Yu.
Title of the course	Graduation project
Academic year	2019/9
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Located in the pearl river delta, Xiaohu Island is one of the most important chemistry and petroleum industry districts in Guangzhou area which sacrificed the native mangrove system that existed before the urban expansion. However, with the increasing rising seas induced by climate change, Xiaohu Island is facing urgent problems: how does the industries develop in the new interface between land and sea under the impact of the sea-level rise (SLR) and storm surge? Should we retreat the existing industry, or develop a new type of adaptive industrial system that living with the changing sea water?

In this project, the central focus of the design is reestablishing the symbiotic relationships between different industries and natural environment. And as the most essential part of symbiotic system, mangroves will build the foundation of new systems including the microalgae industry, aquaculture system, and tourism with its natural process and biological functioning. Taking these efforts to “Back to the future”, each system in the island will grow with SLR over time, with higher economic, ecological, and cultural values.

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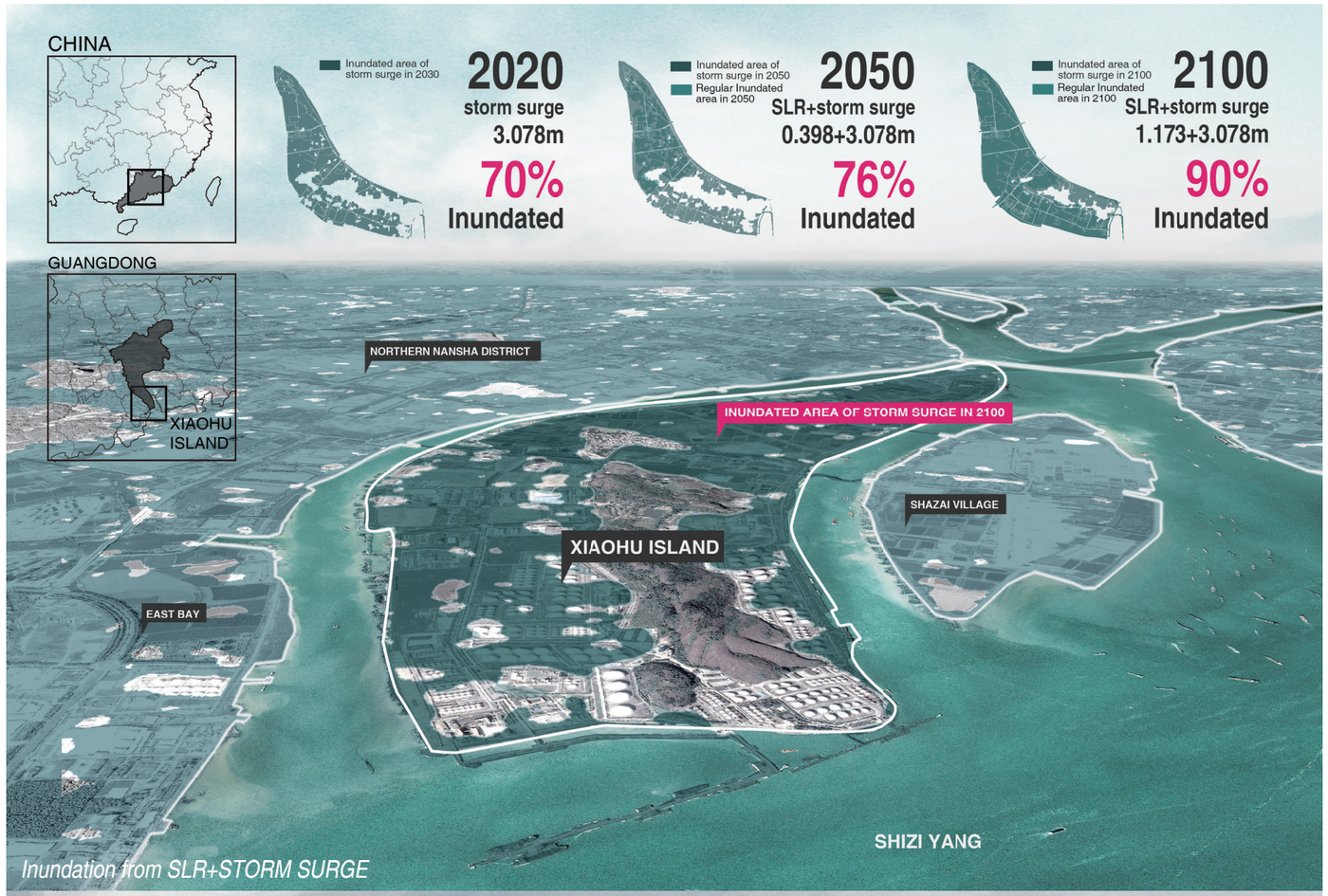
CLIMATE CHANGE AGAIN

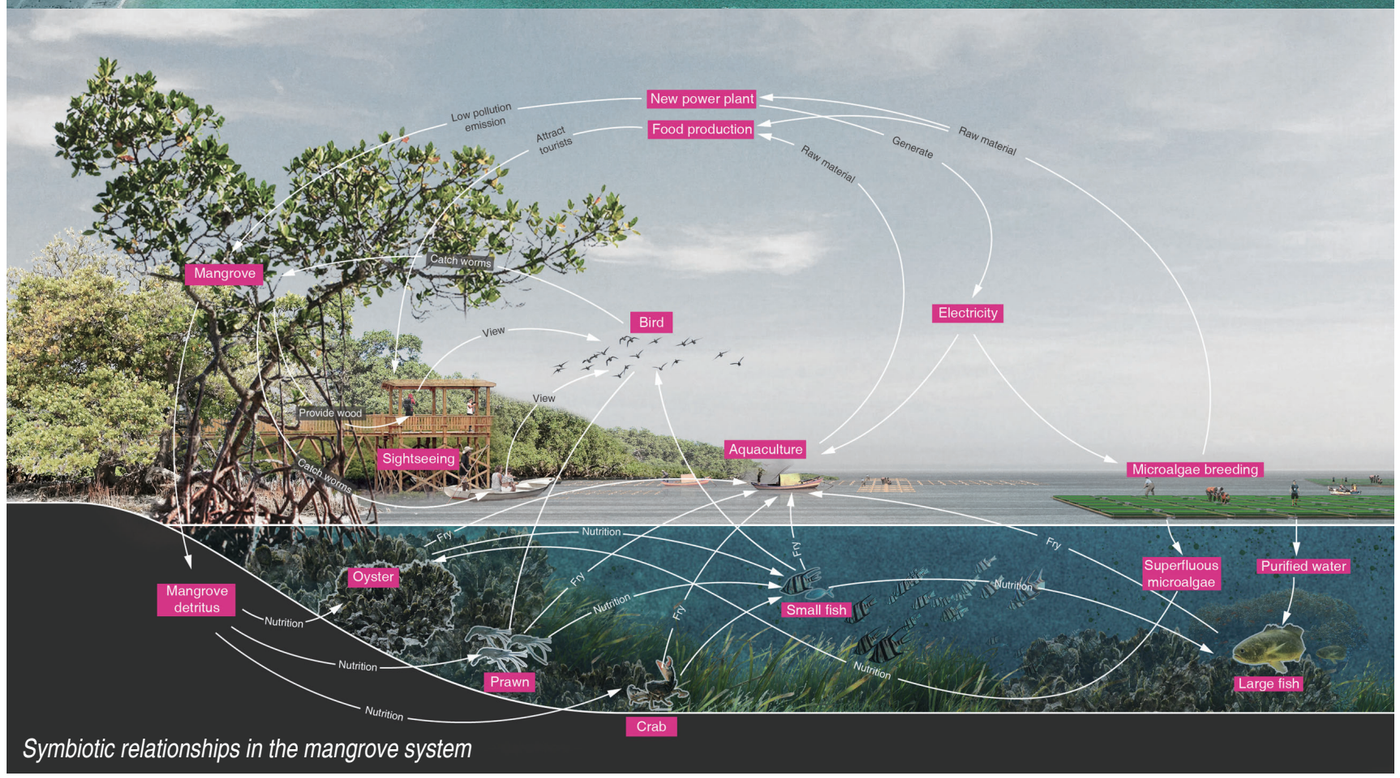
11th International Biennial Landscape Barcelona

Barcelona September 2020

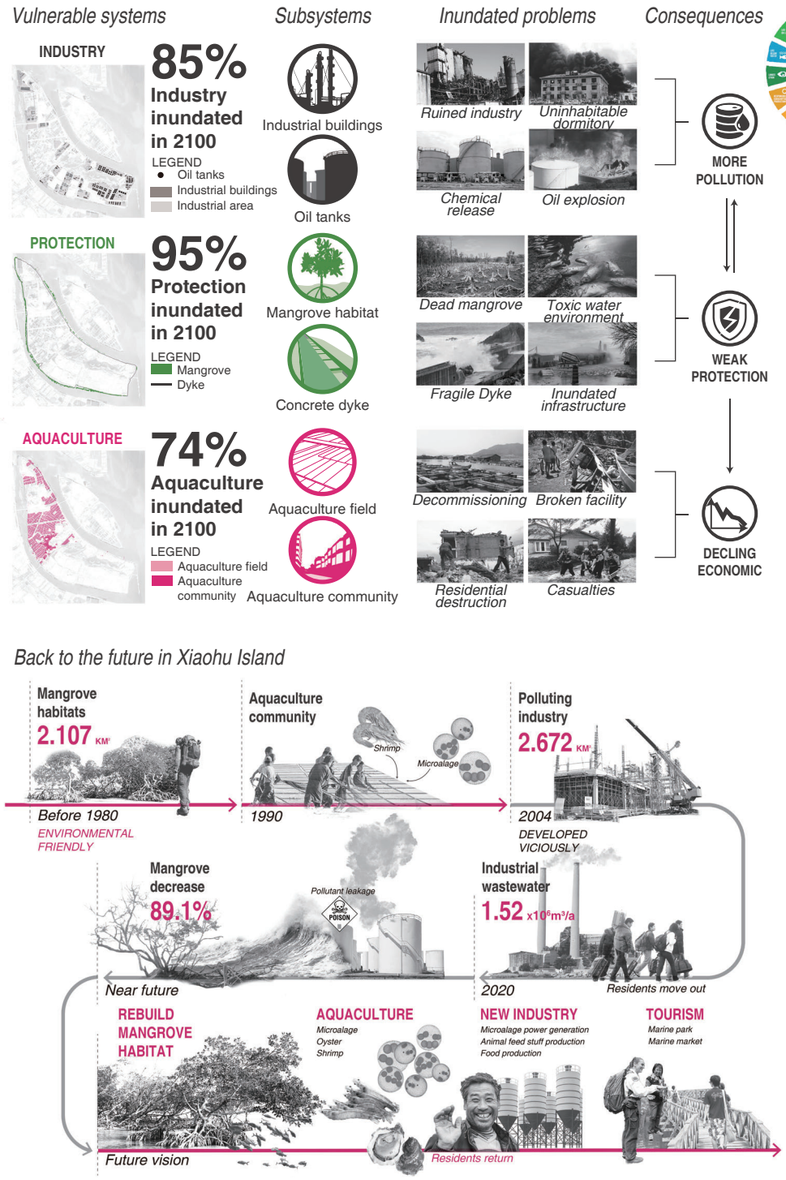
SCHOOL PRIZE

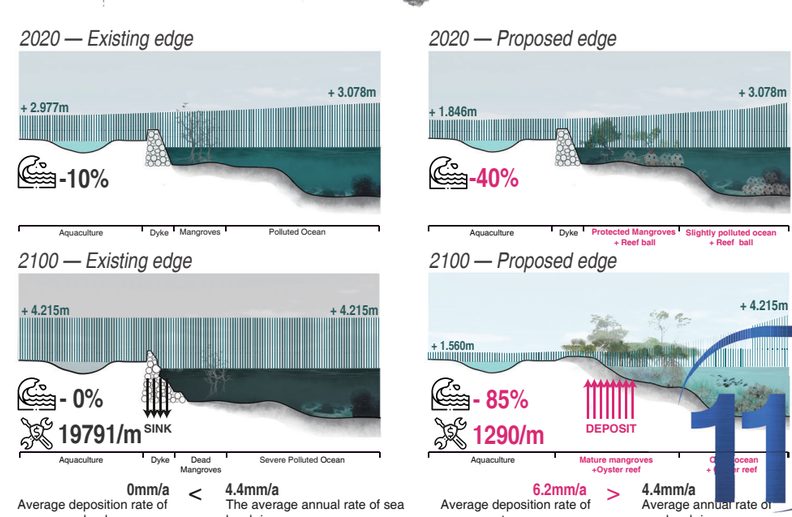


Inundation from SLR+STORM SURGE



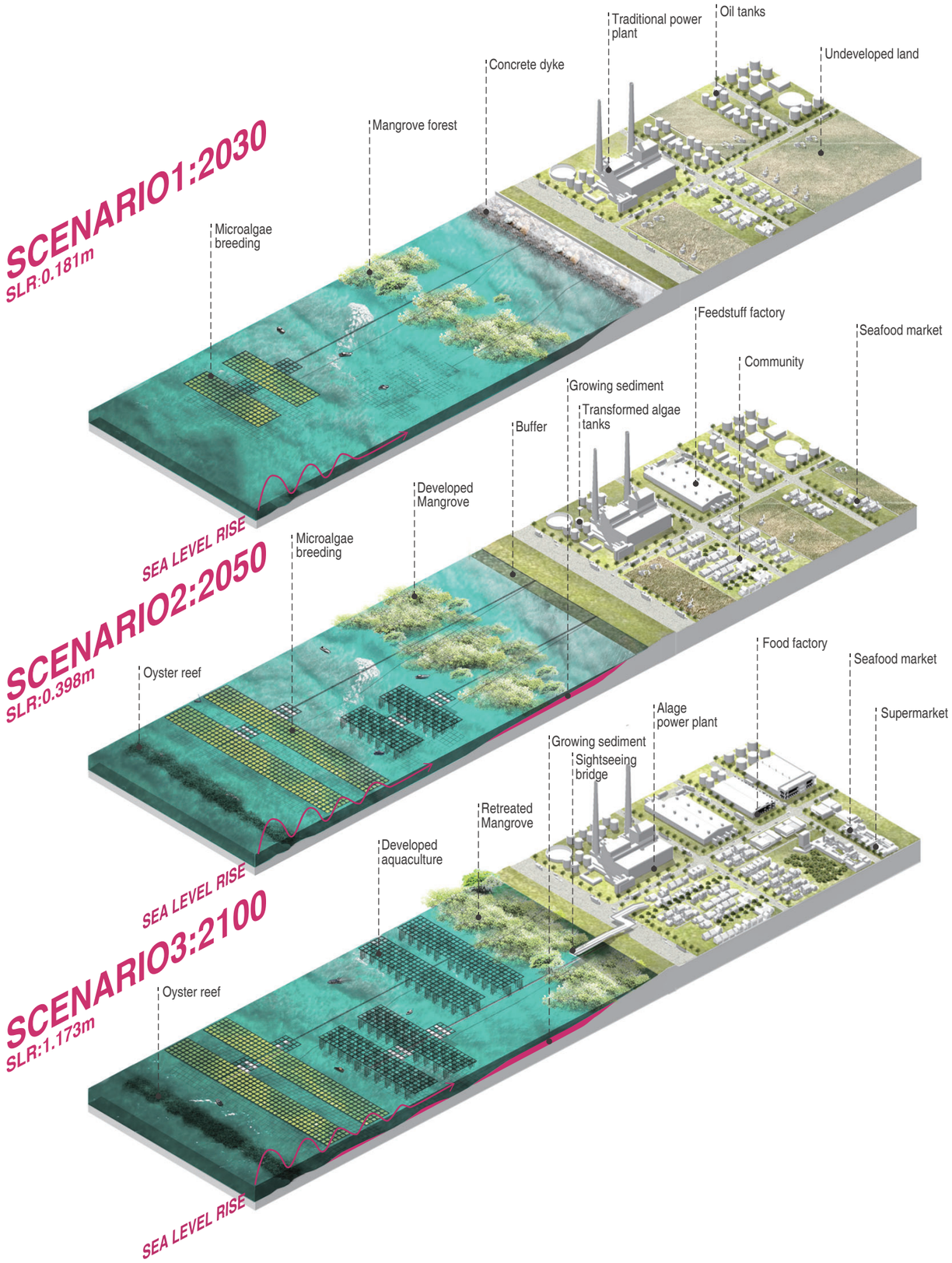
Symbiotic relationships in the mangrove system

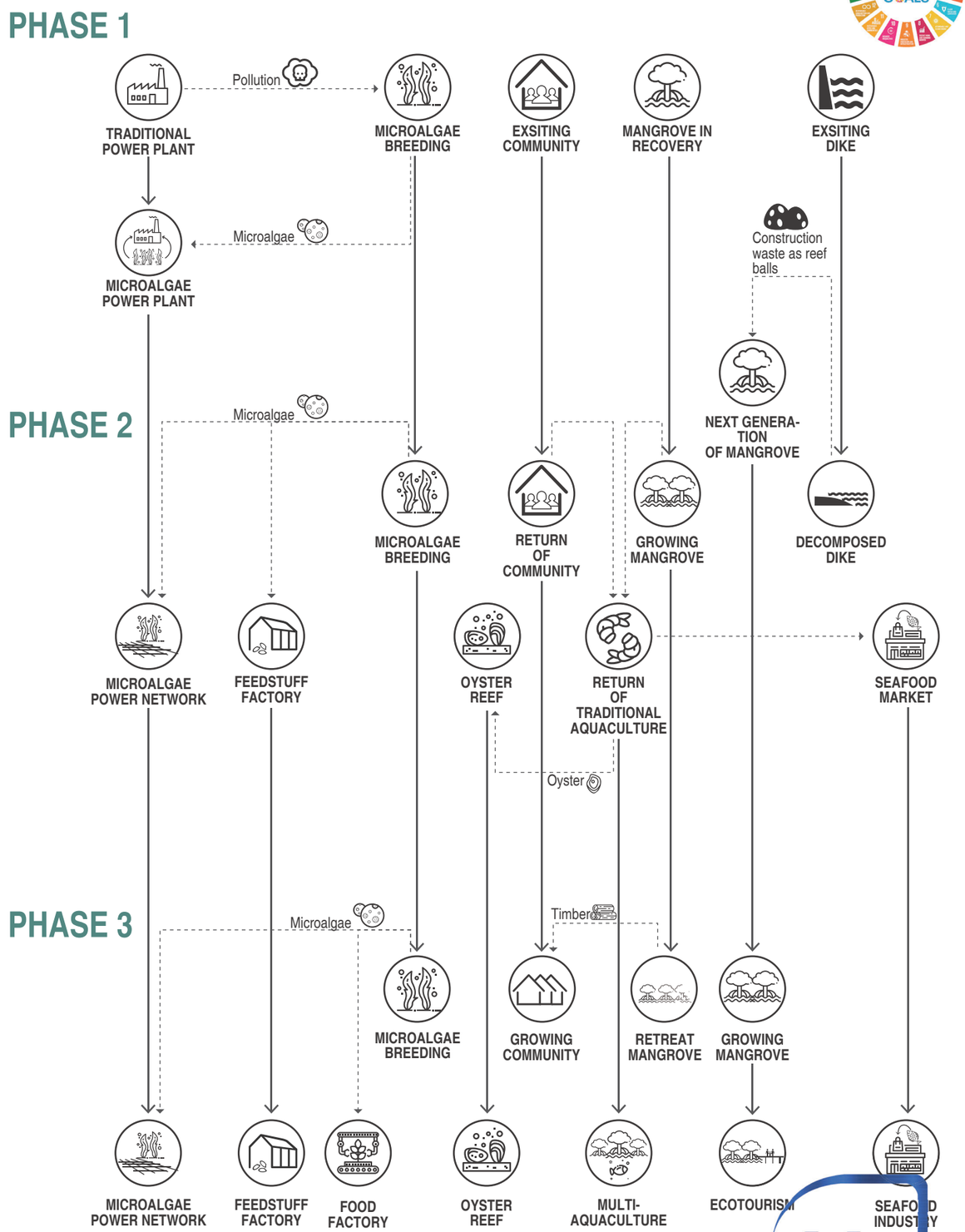




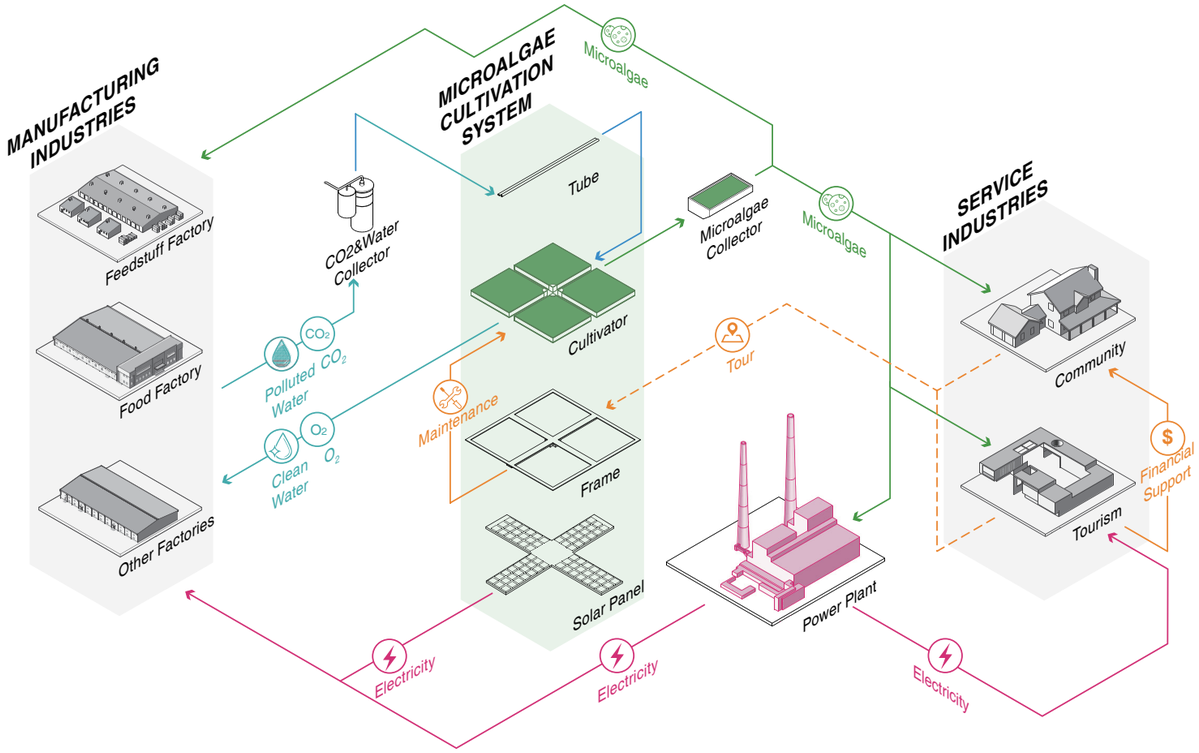
0mm/a Average deposition rate of dead magroves < **4.4mm/a** The average annual rate of sea level rise

6.2mm/a Average deposition rate of mature mangroves > **4.4mm/a** Average annual rate of sea level rise

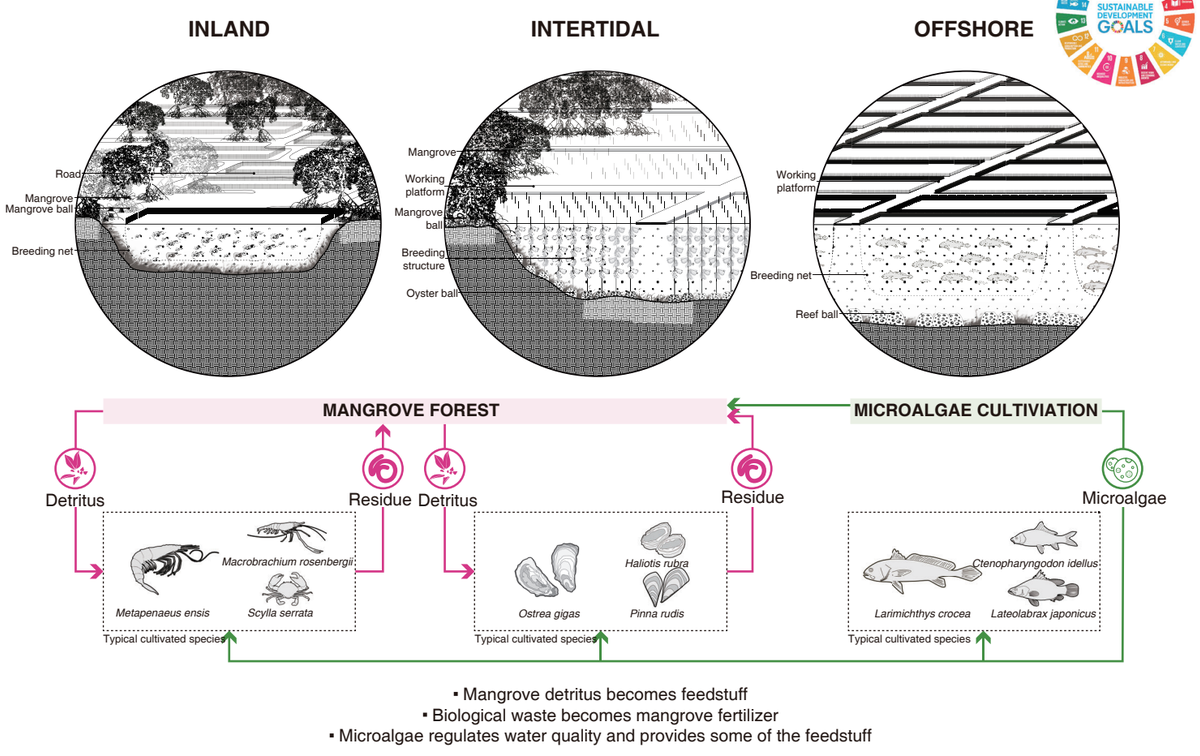

SCENARIO1:2030
SLR:0.181m
Traditional power plant
Oil tanks
Concrete dyke
Undeveloped land
Mangrove forest
Microalgae breeding
Feedstuff factory
Seafood market
Community
Growing sediment
Transformed algae tanks
Buffer
Developed Mangrove
SEA LEVEL RISE
SCENARIO2:2050
SLR:0.398m
Microalgae breeding
Oyster reef
Food factory
Seafood market
Supermarket
Alage power plant
Growing sediment
Sightseeing bridge
Retreated Mangrove
Developed aquaculture
SEA LEVEL RISE
SCENARIO3:2100
SLR:1.173m
Oyster reef
SEA LEVEL RISE


PHASE 1
TRADITIONAL POWER PLANT
Pollution
MICROALGAE BREEDING
EXSITING COMMUNITY
MANGROVE IN RECOVERY
EXSITING DIKE
MICROALGAE POWER PLANT
Microalgae
Construction waste as reef balls
NEXT GENERA-TION OF MANGROVE
PHASE 2
Microalgae
MICROALGAE BREEDING
RETURN OF COMMUNITY
GROWING MANGROVE
DECOMPOSED DIKE
MICROALGAE POWER NETWORK
FEEDSTUFF FACTORY
OYSTER REEF
RETURN OF TRADITIONAL AQUACULTURE
SEAFOOD MARKET
Oyster
PHASE 3
Microalgae
Timber
MICROALGAE BREEDING
GROWING COMMUNITY
RETREAT MANGROVE
GROWING MANGROVE
MICROALGAE POWER NETWORK
FEEDSTUFF FACTORY
FOOD FACTORY
OYSTER REEF
MULTI-AQUACULTURE
ECOTOURISM
SEAFOOD INDUSTRY

MICROALGAE INDUSTRIES CIRCULATION SYSTEM



MANGROVE AQUACULTURE CIRCULATION SYSTEM



- Mangrove detritus becomes feedstuff
- Biological waste becomes mangrove fertilizer
- Microalgae regulates water quality and provides some of the feedstuff

MICROALGAE INDUSTRY

PHASE 1 (Present-2030)	PHASE 2 (2030-2050)	PHASE 3 (2050-2100)
Utilize the microalgae to remove the pollutants to recover mangrove system		Develop diversified food industries related to the microalgae
Replace existing factories with microalgae power plants	Occupy the wasteland to develop microalgae industry	
Use microalgae to generate eletricity	Use the microalgae to generate eletricity, produce feedstuff for aquaculture and other by-products	
Establish microalgae cultivator frame to farm microalgae	Extend the frame and place more solar panels to increase genenerating efficiency	

MANGROVE AQUACULTURE

PHASE 1 (Present-2030)	PHASE 2 (2030-2050)	PHASE 3 (2050-2100)
Remove the pollutants for the regular operation of aquaculture		Develop multiple aquaculture with marine life living in mangroves
	Establish aquaculture platform surrounding mangroves and cultivate oysters	
Construct canals to provide space for mangroves and aquaculture	Develop aquaculture around canels	
	Develop oyster aquaculture and breed with extra microalgae