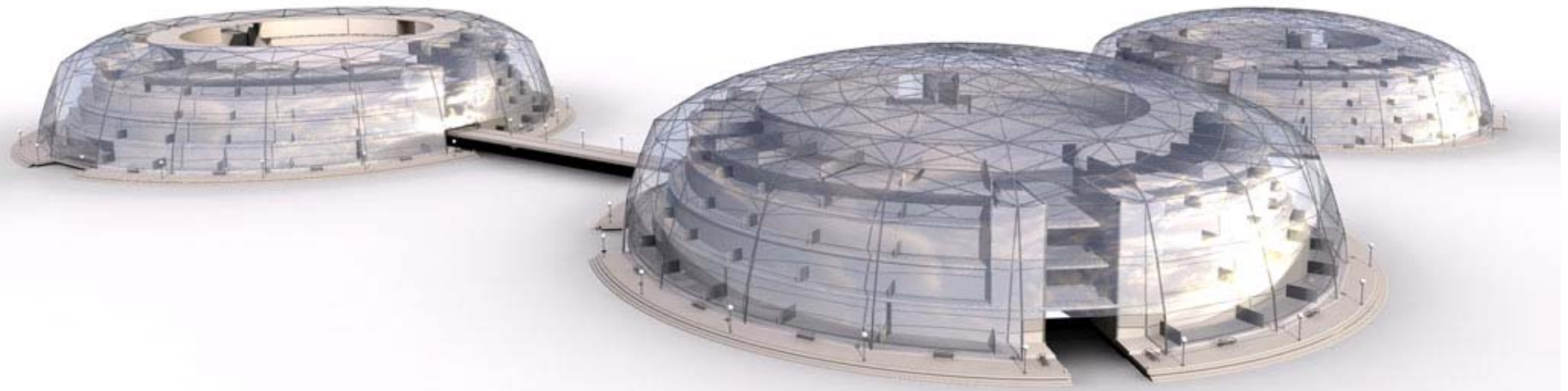


# Floating cities, climate adaptation and sustainability



Rutger de Graaf, MSc

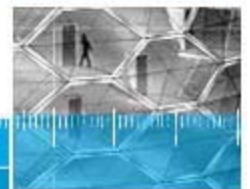
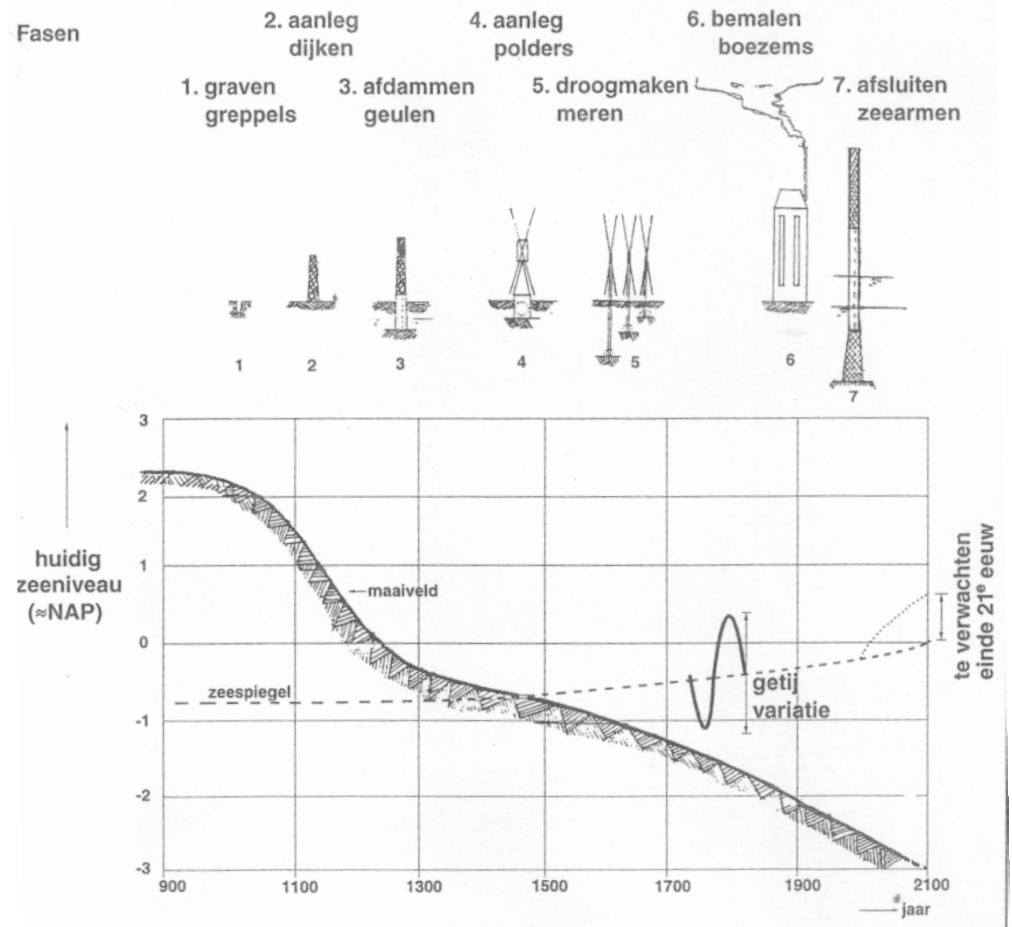


# Why float?



# Land subsidence

- Cause: developing the delta
- Improved drainage and pumping capacity -> accelerated subsidence
- Effect large compared to sealevel change



# Urbanization

1900

1970

2005

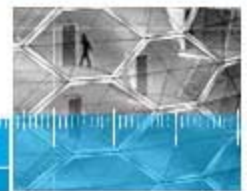
1900



1970



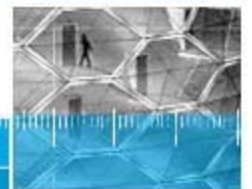
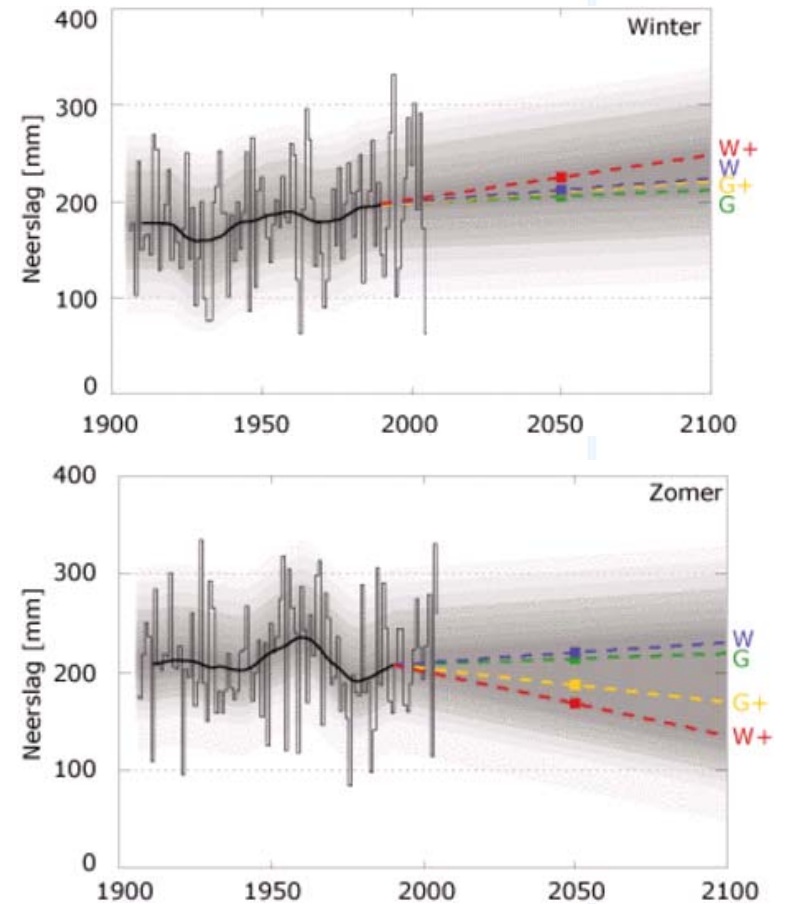
2005



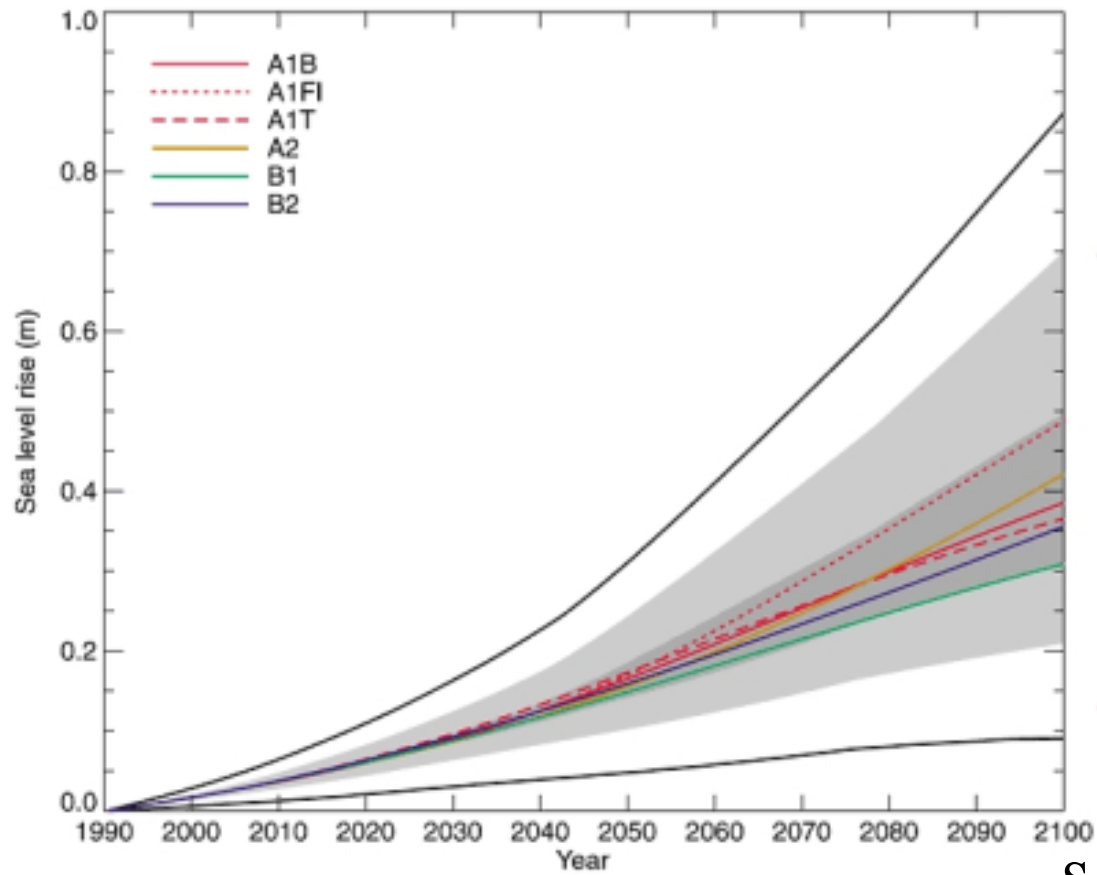
# Climate change

- Uncertainty
- Variation increases
- Water storage capacity is important for all scenario's

Bron: KNMI, 2006



# Climate change



Source: IPCC, 2005

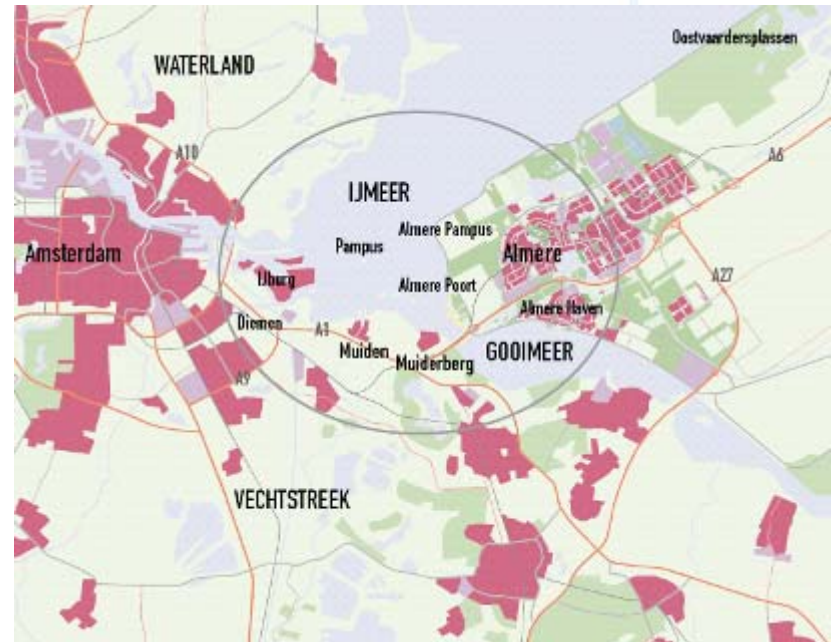
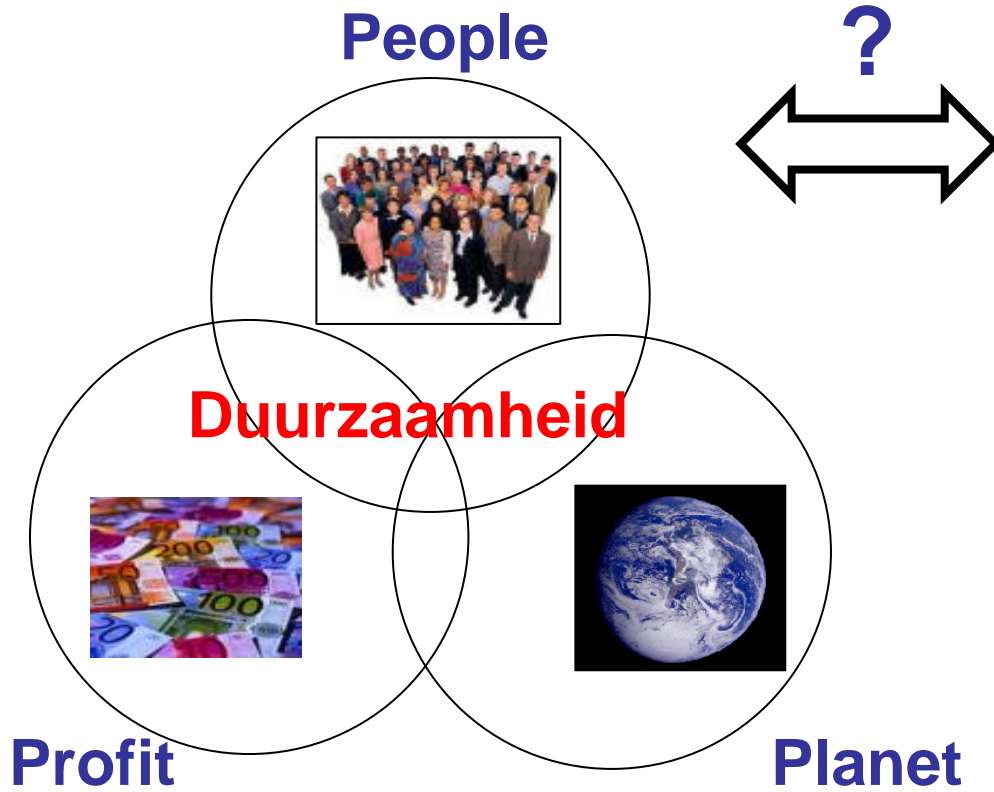


## Why a transition is needed

- Trends combined with traditional urbanization and traditional water management will lead to a delta that is:
  - Increasingly urbanized
  - Increasingly under sea level
  - Increasingly vulnerable to floods and droughts



# Regional issues IJmeer





# Regional issues

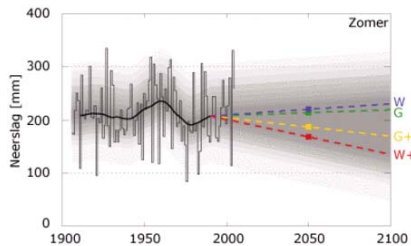
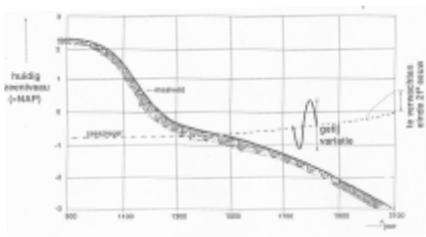


- Traffic problems
- Housing shortage
- Flood safety
- Ecological structures
- Biodiversity
- Water quality
- Knowledge based economy
- Recreation and tourism
- Economic development North Wing



# Possible strategies

## Trends



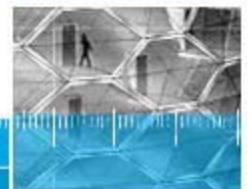
## Regional issues



- Traffic problems
- Housing shortage
- Flood safety
- Ecological structures
- Biodiversity
- Water quality
- Knowledge based economy
- Recreation and tourism
- Economic development North Wing

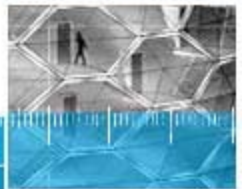
## Strategies

- Optimization
- Regression
- Innovation

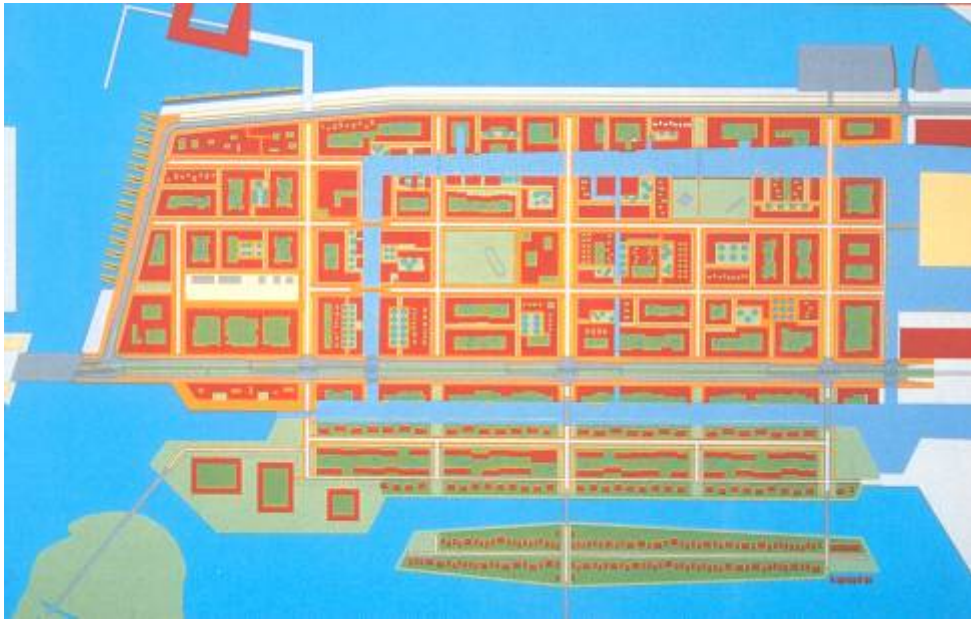


# System optimization

- Higher and stronger dikes
- Increased pump capacity
- Increased river flow capacity
- Traditional urbanization

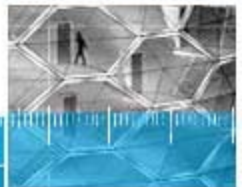


# System optimization

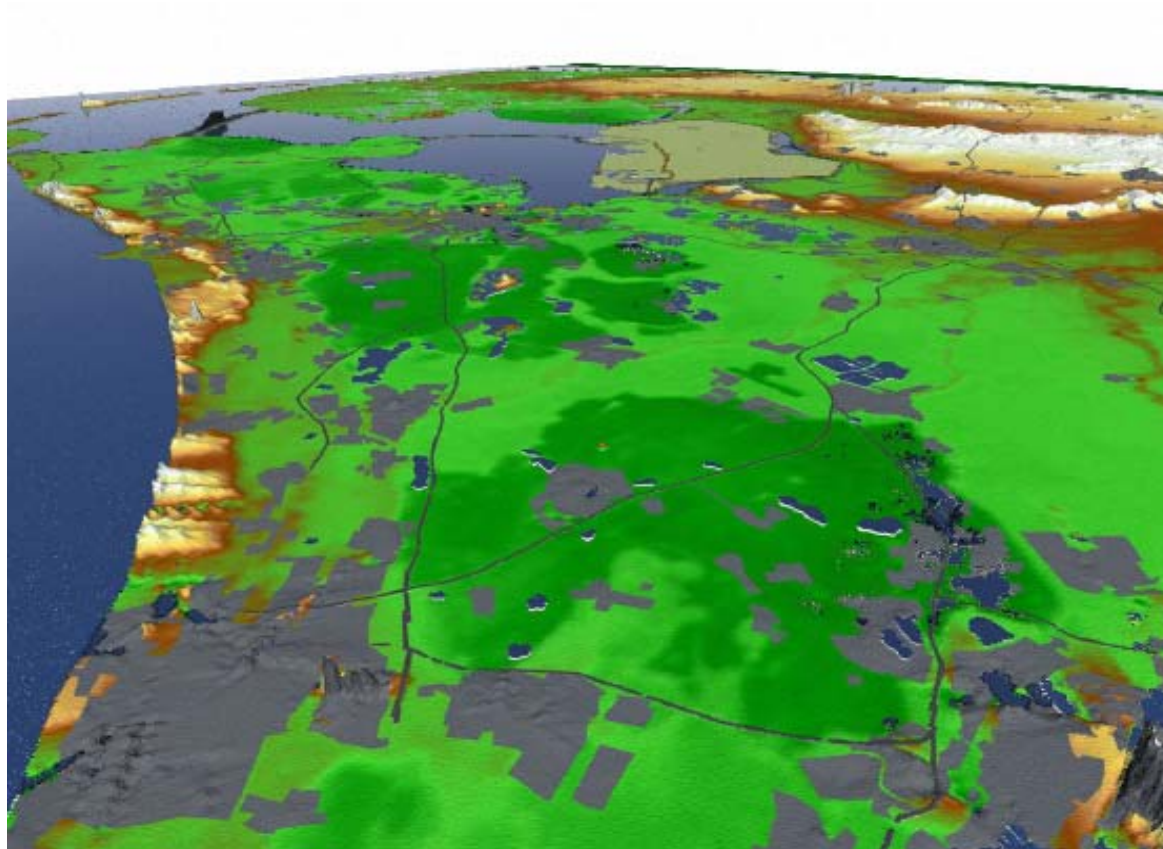


# System regression

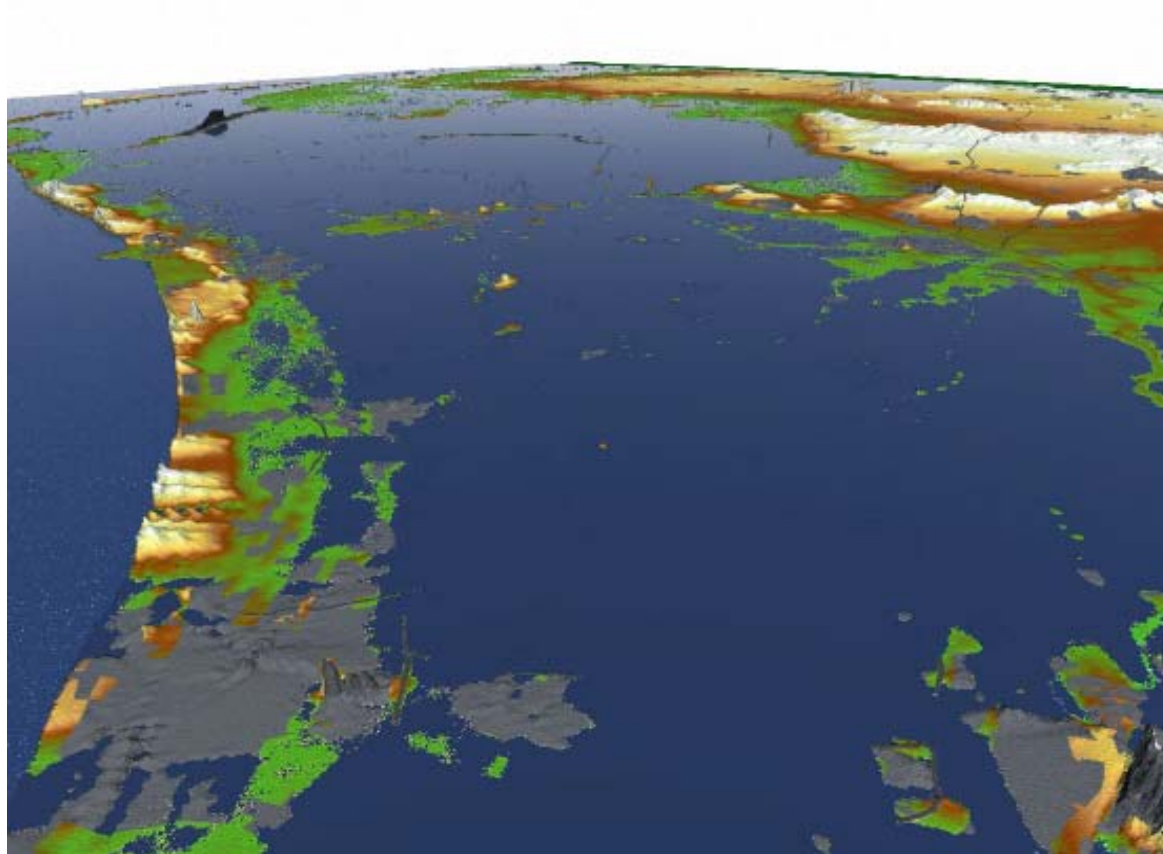
- 'Amersfoort aan zee' scenario
- Abandon western part of The Netherlands
- Protection no longer feasible



# System regression

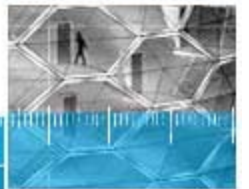


# System regression



# System innovation

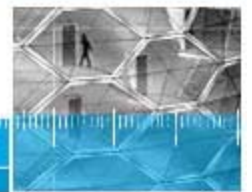
- Develop new modes of urbanization
- Increase 'coping capacity' instead of 'structural capacity' only
- Increase economic value of land without increasing flood risk





# System innovation

- Local flood defense
- Wet and dry proofing
- Building on mounds
- Building on piles
- Constructing floating cities



# Superlevee

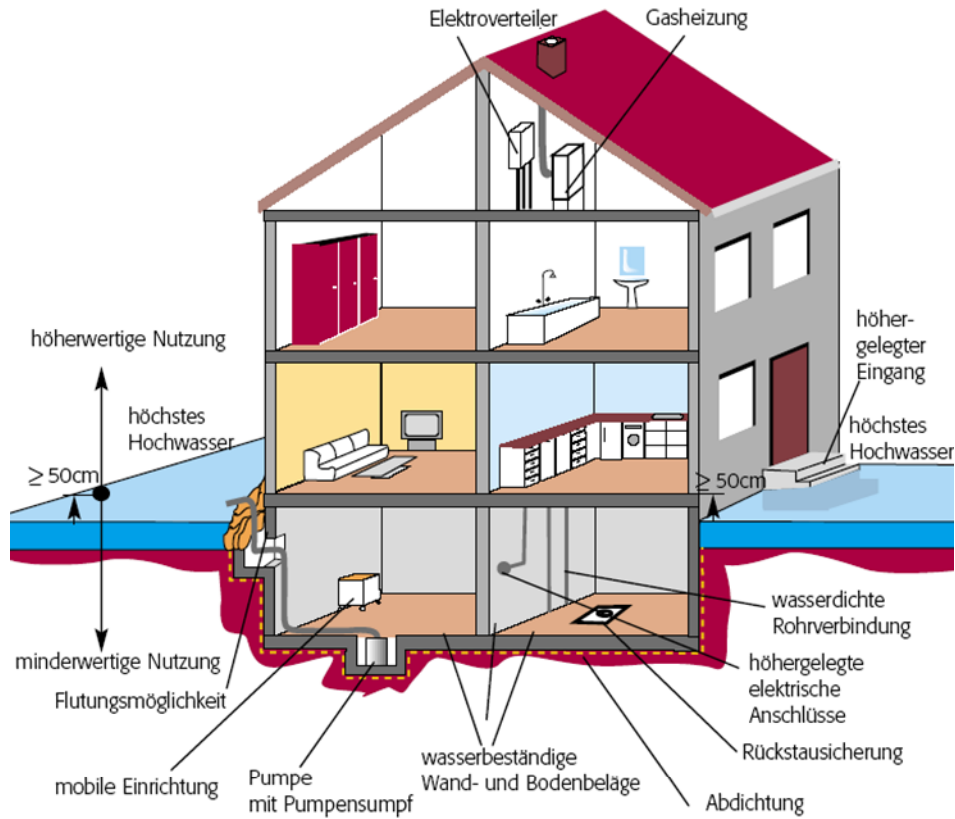
Tokyo



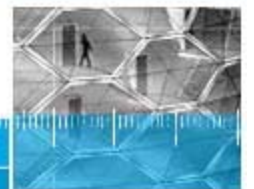
# Local flood defense



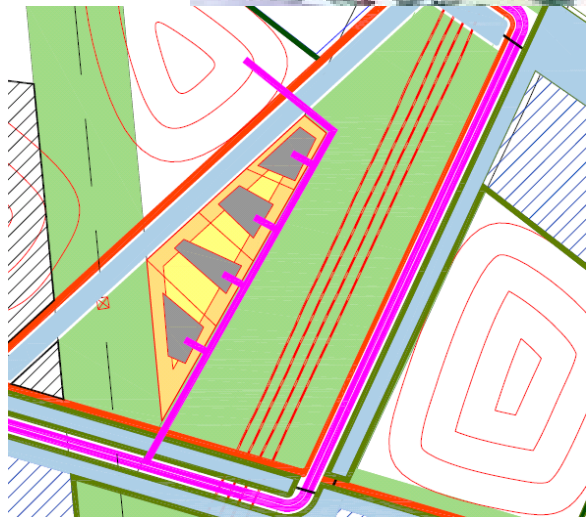
# Wet & dryproofing



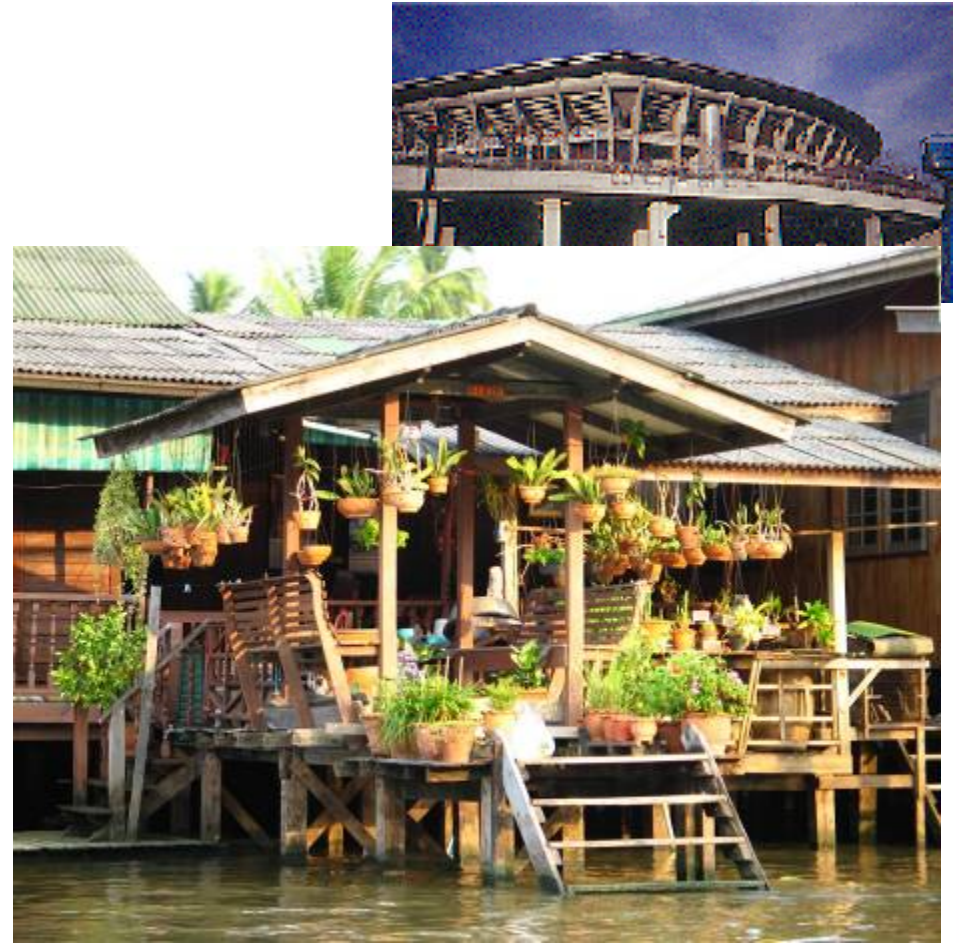
# Dryproofing



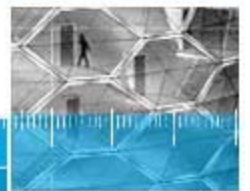
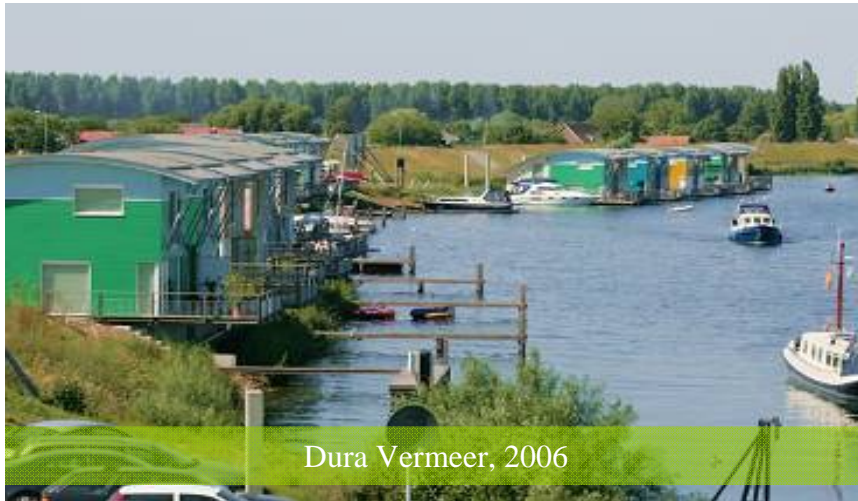
# Building on mounds



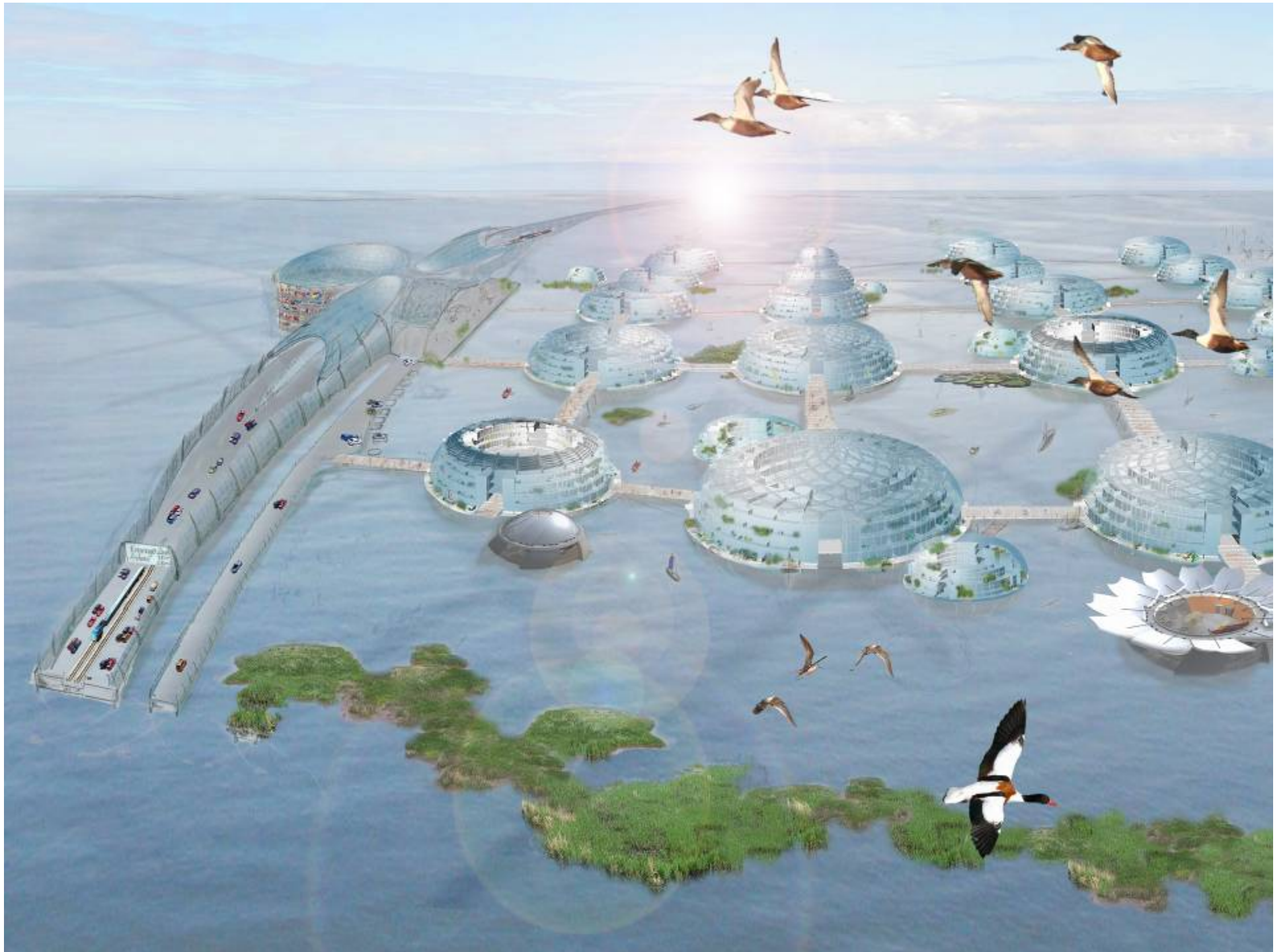
# Building on piles

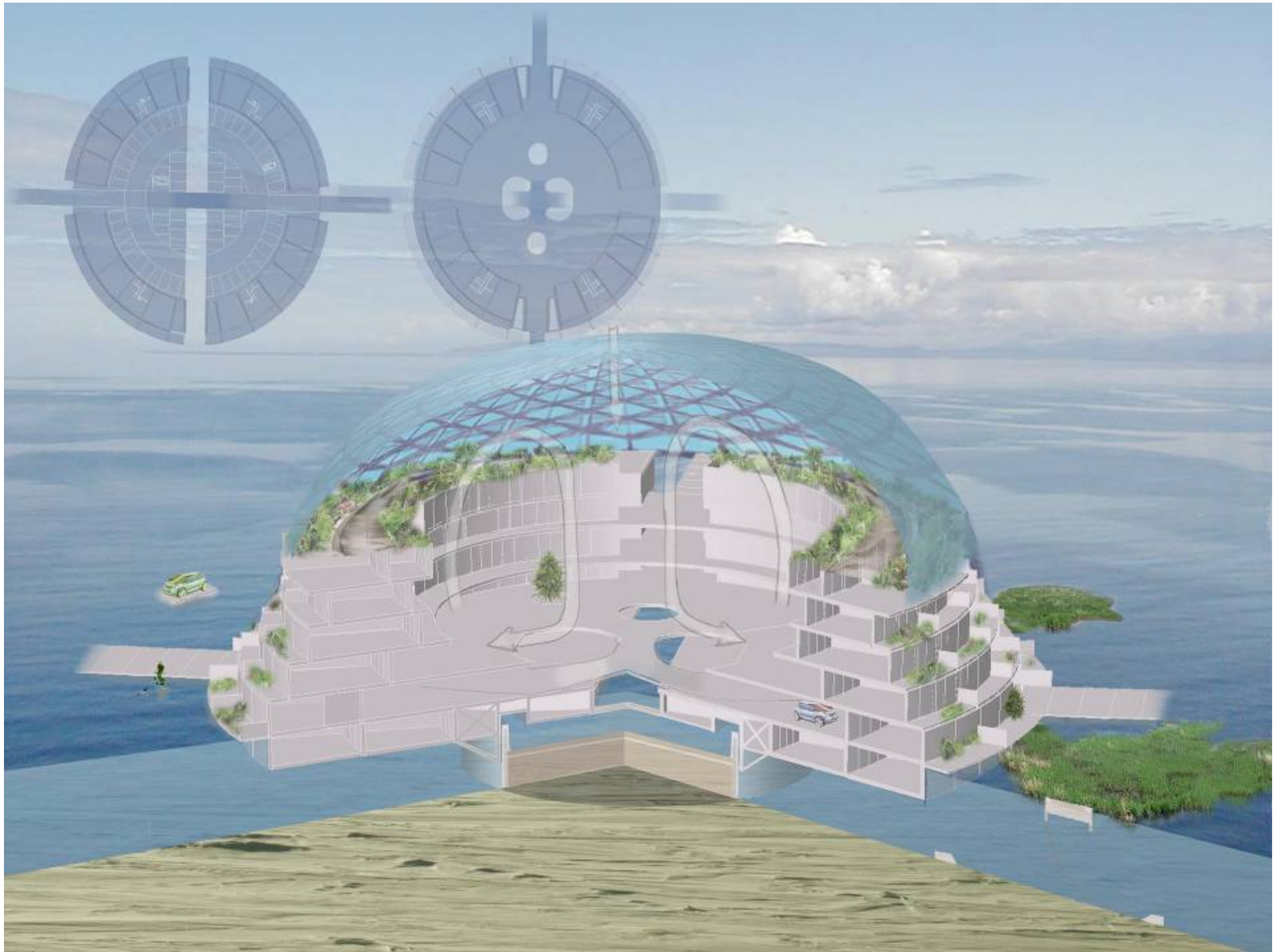


# Floating constructions









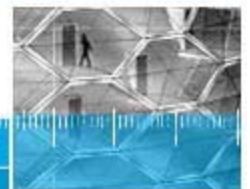
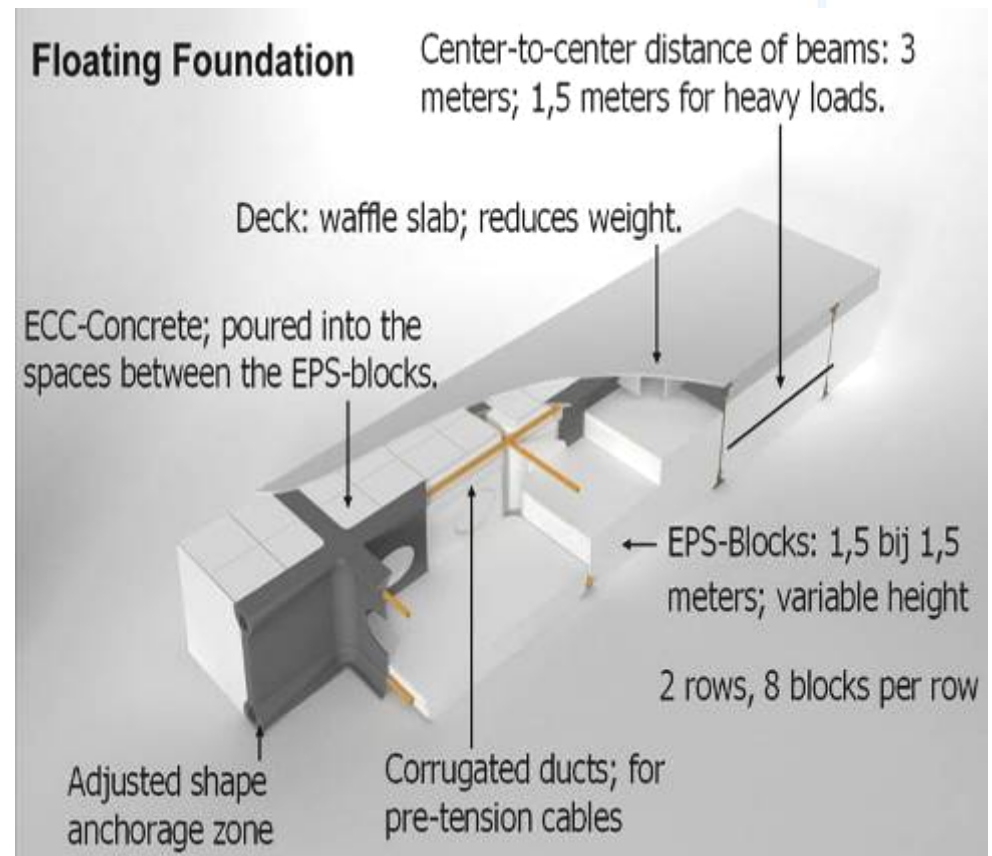
# Floating Self Supporting Urbanization



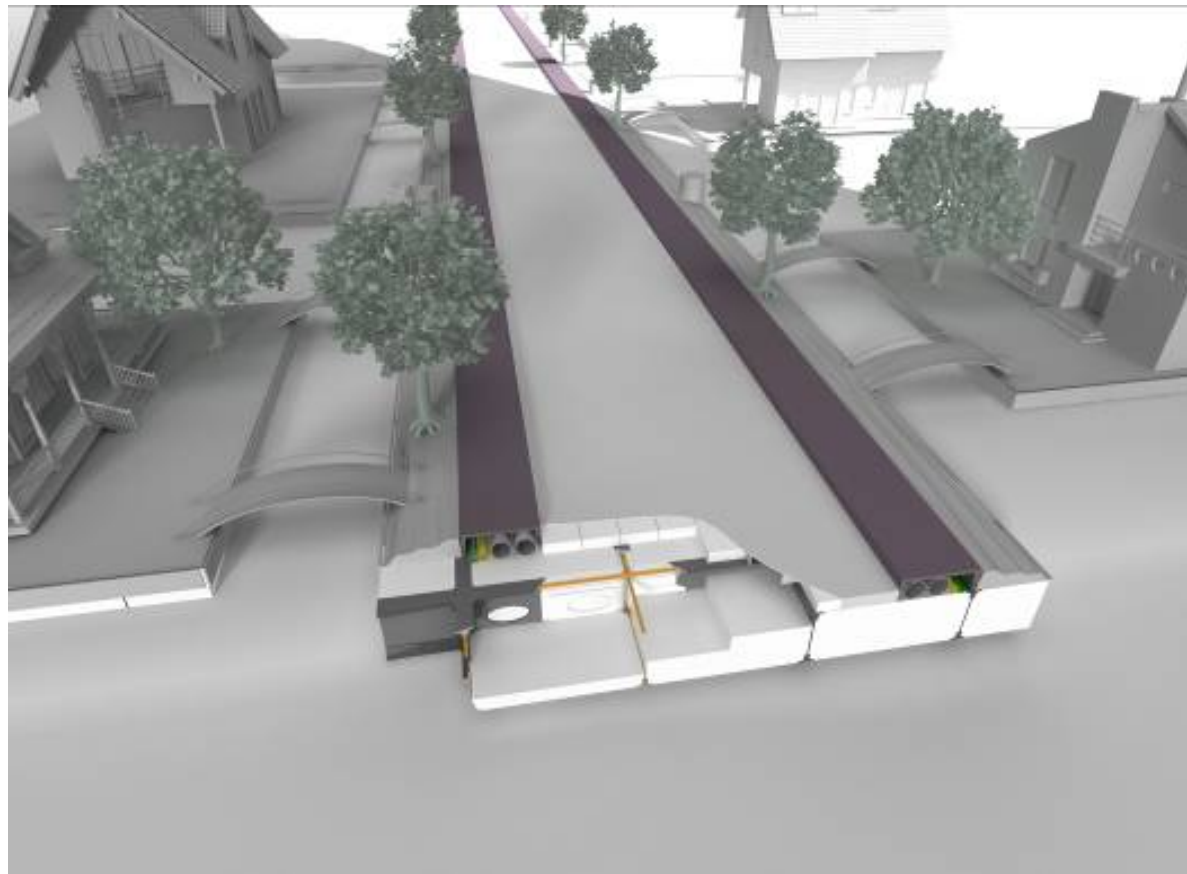
# Deltasync floating structure technology

Designed by DeltaSync

- advantages:
  - Lighter
  - Stronger
  - Faster



# Deltasync floating structure technology



# Floating structure technology

Movie Ties Rijcken



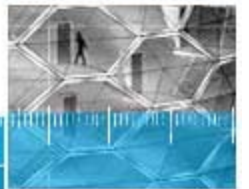
# Strategy

- Nature development comes first
- Many involved organization, none of them able to execute project on their own
- Public Private Participation is necessary
- Risk management by stepwise approach and modular expansion
- Start icon projects to demonstrate and further develop technology



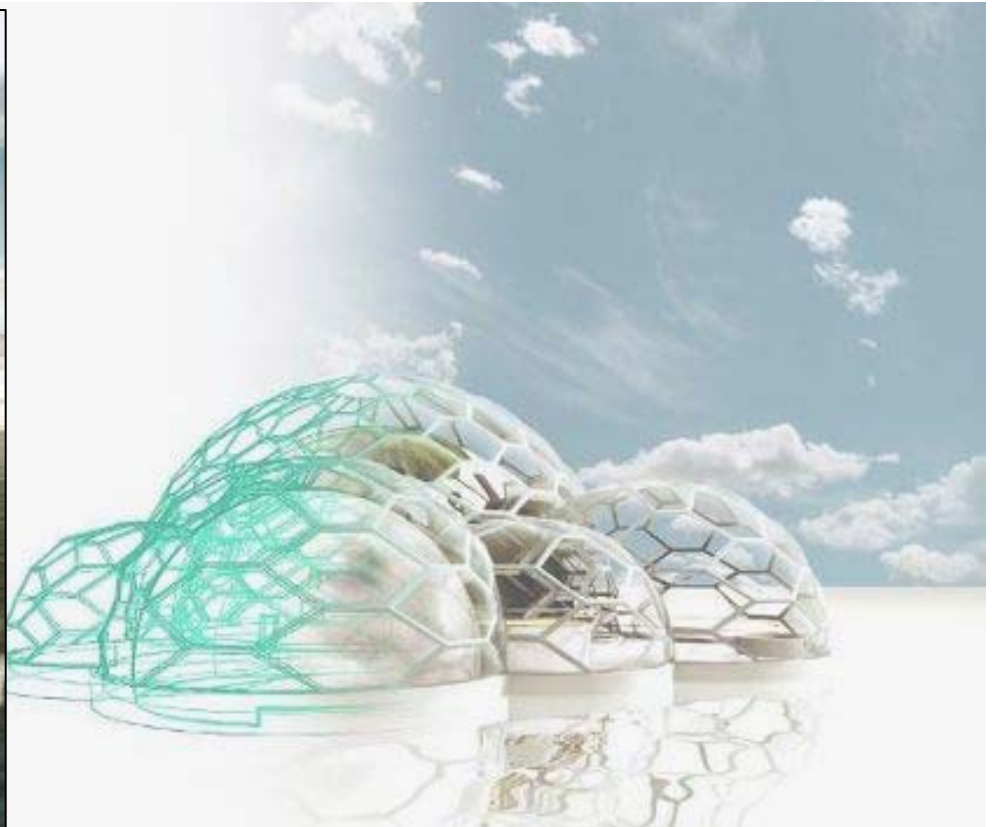
# About DeltaSync

- Innovative company based at Yes!Delft
- Focused on technology, architecture and water management
- Young, dynamic and oriented on sustainability





# Questions and discussion



Meer informatie:



[www.deltasync.nl](http://www.deltasync.nl)

[r.e.degraaf@deltasync.nl](mailto:r.e.degraaf@deltasync.nl)

deltasync

