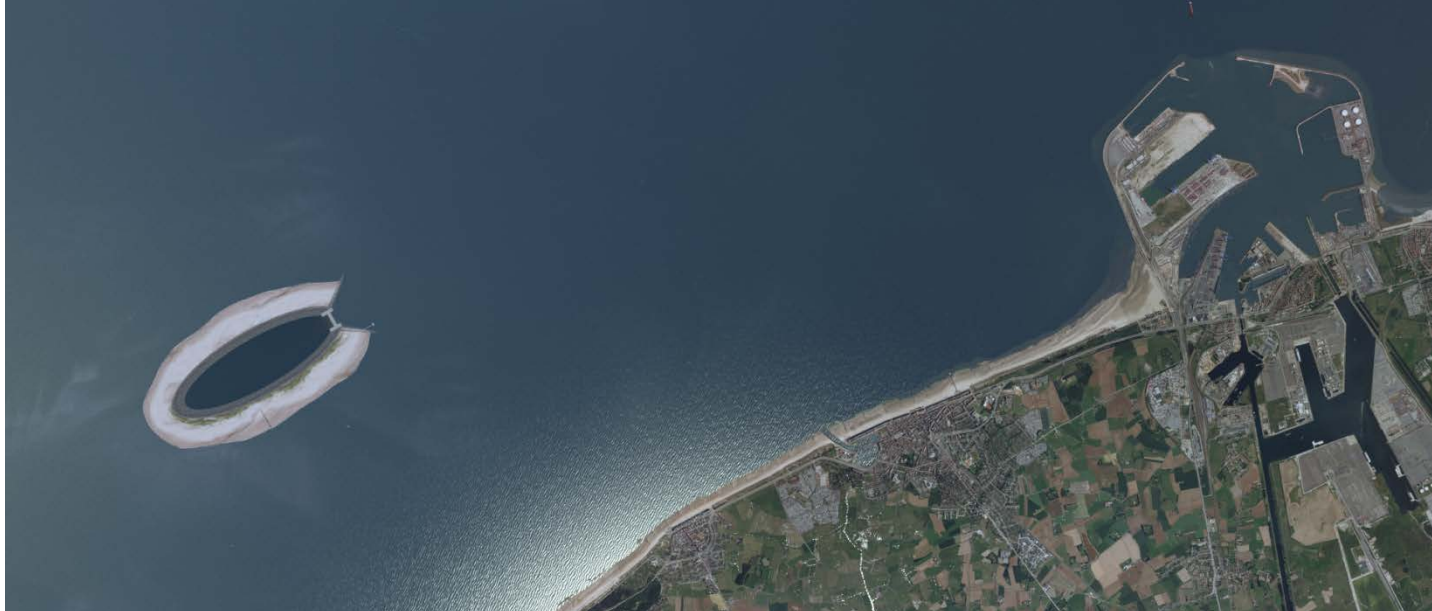


# Energy Islands

ir. Frank Verschraegen  
Project Director iLand

DEME



European Shipping Week, 5 March 2015



# Contents

- SARB islands  
(Oil&Gas, Abu Dhabi)
- iLand  
(Energy Storage, Belgium)

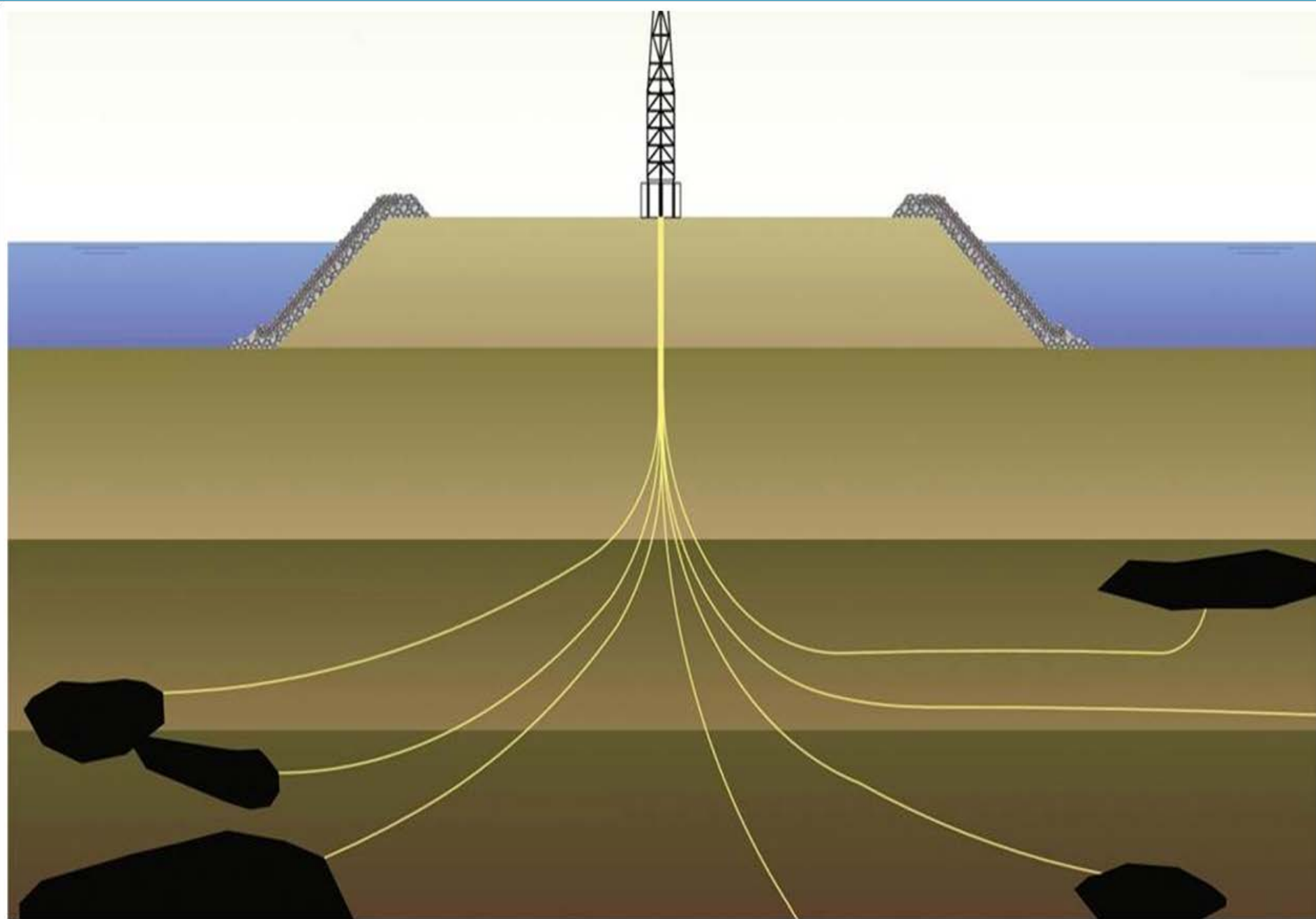
# Satah-Al-Razboot (SARB)

## Scope:

- 2 energy islands, 120 kilometers off the Abu Dhabi (U.A.E.) coastline
- 1 island: +/- 350m x 450m
- Water depths of +/- 15 meters
- Execution period: contract award Feb 2011, completion 2014
- Application: oil drilling (Satah-al-Razboot oil field) + accommodation + harbour



# Principle of directional drilling at SARB oil fields



# SARB: Some figures ...

## Scope of construction works:

- Dredging and reclamation:

→ +/- 13 million m<sup>3</sup>

- Harbour with quaywall:

- 450 m quaywall length per island
- 2,342 pre-cast concrete blocks per island, weight 50 T to 70 T
- 324,000 m<sup>3</sup> concrete

- Shore protection and breakwater, after compaction of the slope:

- Perimeter length: 1500 m per island, plus 350 m long breakwater
- 4.5 million tons of rock, various grades
- 39,000 accropode II units, 7 T



SARB 2, Oct. 7, 2013



SARB2

# SARB: perspectives

Why such offshore island as opposed to the typical steel well head structures for oil drilling?

- Capacity of the SARB oil fields in UAE: over 100 years.
- It is much cheaper, safer and more sustainable to develop a multi-purpose island as drilling platform annex harbour annex accommodation area.
- There is large potential for more artificial island projects offshore in the Gulf, subject to successful commissioning and operation of the first ones.
- Why not similar concepts in the North Sea?

# Renewable Energy



**WIND & SUN:  
No constant  
output**



**store excess  
renewable energy &  
release at times of  
shortage**

TERRANOVA, Zelzate

C-POWER, Oostende



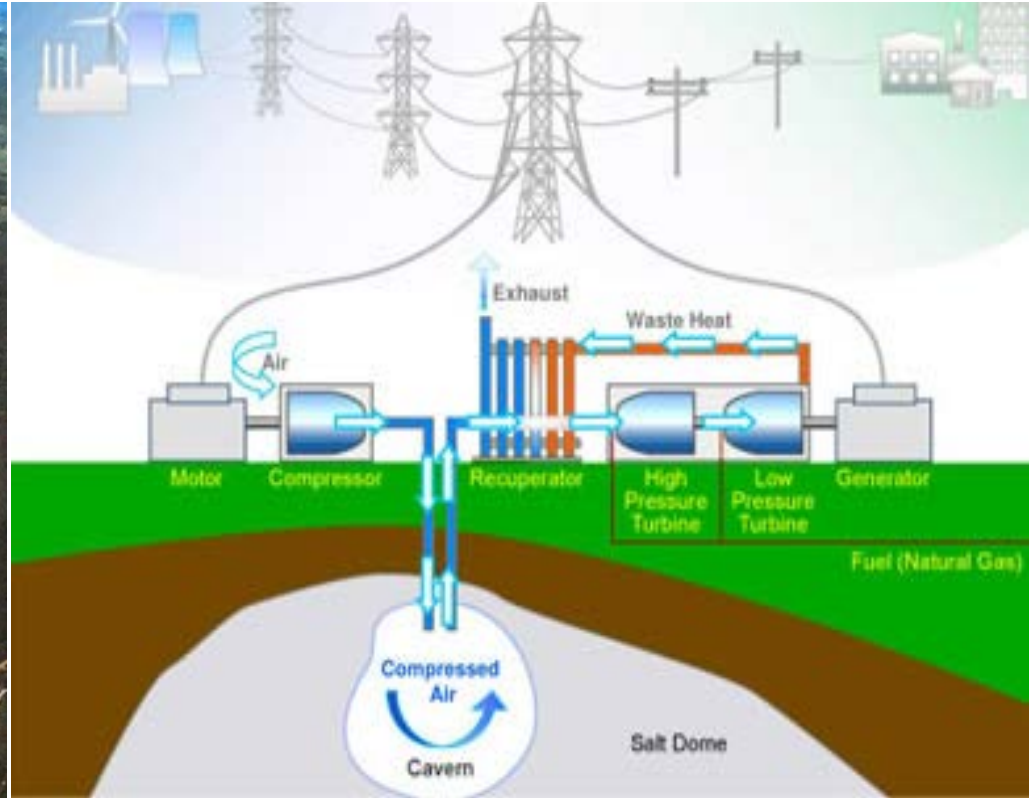
# LARGE-SCALE ENERGY STORAGE



## PUMPED HYDRO STORAGE:

98% of all large-scale energy storage worldwide.

*In Belgium: no space available onshore.*

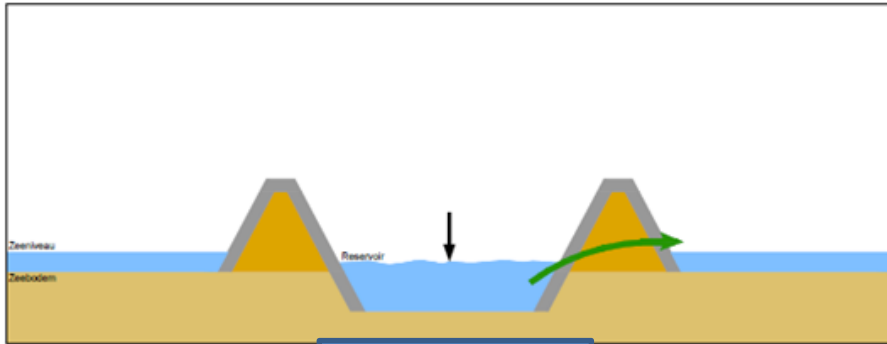


## COMPRESSED AIR STORAGE:

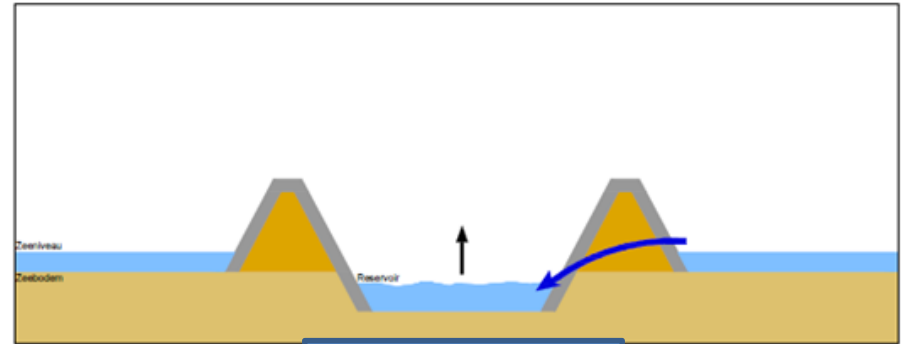
2 installations built worldwide since 1978.

*In Belgium: unfavourable ground conditions.*

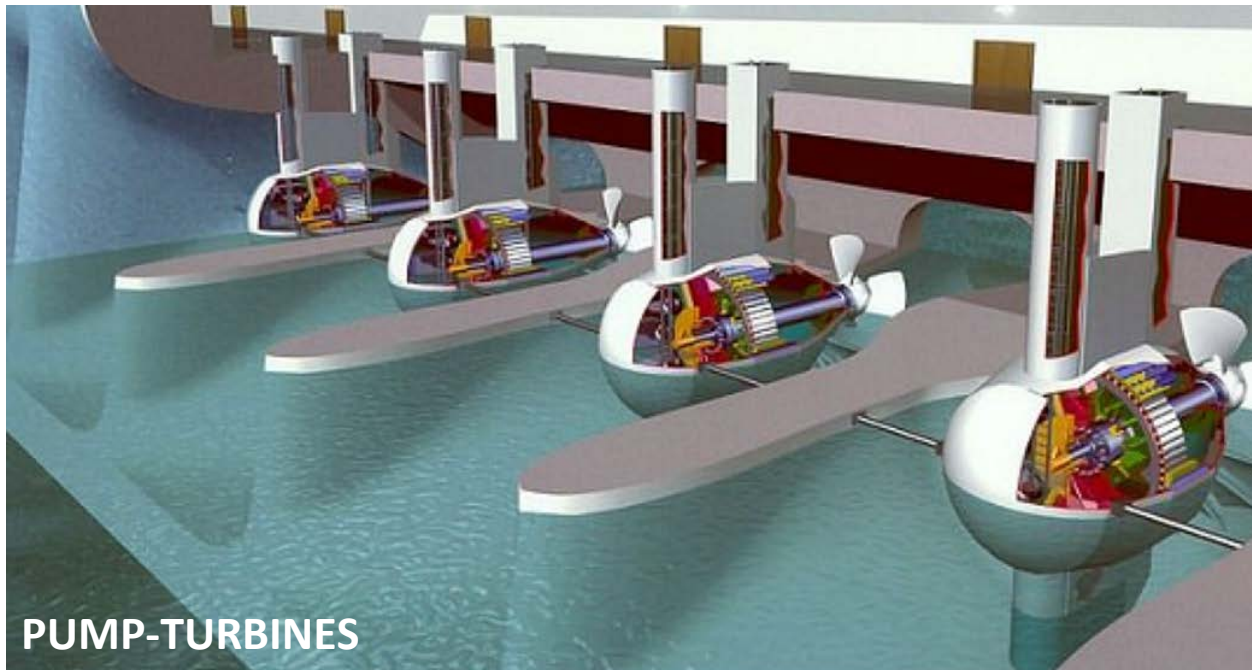
# iLand = Large-scale **offshore** energy storage



STORAGE



PRODUCTION



PUMP-TURBINES

# iLand - ENERGY

- Power +/- 500MW (=1/2 nuclear power plant)
- Energy contents +/- 2000MWh
- Grid services
- Arbitrage on power markets



# iLand – COASTAL DEFENCE



- 5 kilometers off the coast
- 2.8 km x 1.2 km
- Reservoir depth: -35m LAT
- Sea bottom -6m LAT
- Dredging: +/- 30 mio m<sup>3</sup>
- Concession requested July 2014
- Operation planned 2021

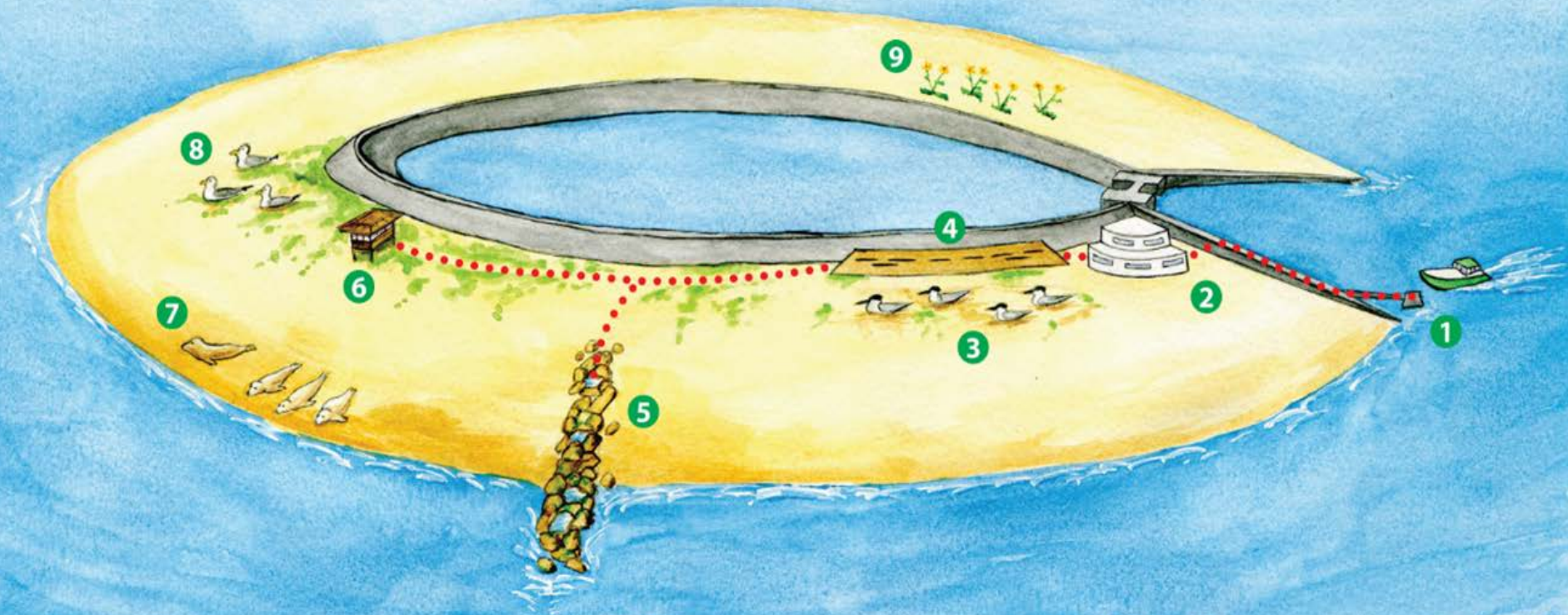
## iLand

Artist impression (niet op schaal)

- 1 pier
- 2 bezoekerscentrum
- 3 sternenkolonie
- 4 uitkijkpunt
- 5 strandhoofd
- 6 kijkhut
- 7 zeehondenrustplaats
- 8 meeuwenkolonie
- 9 vloedmerkplanten

..... route geleide wandeling

# iLand – NATURE



Thank you!