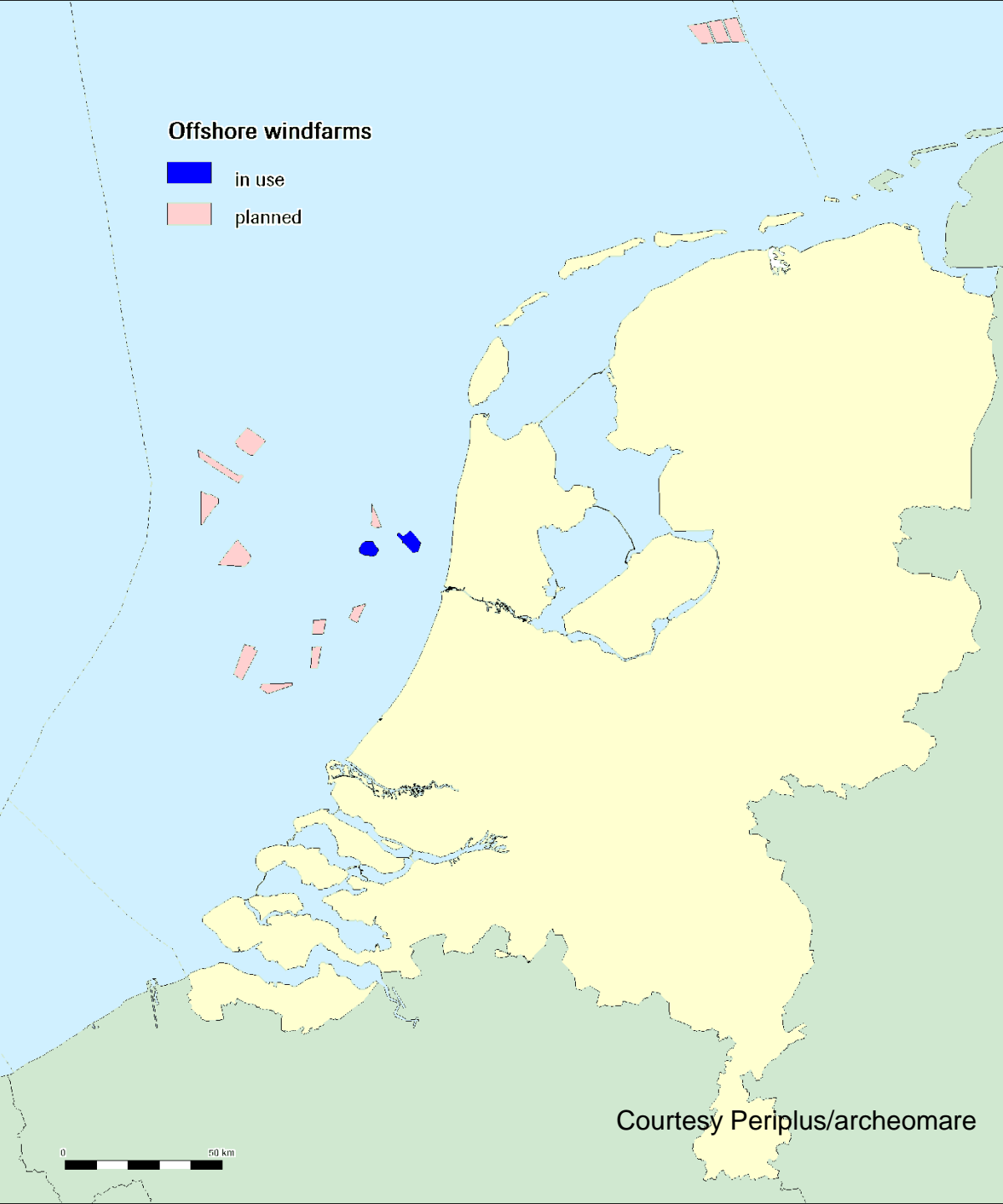


A row of white wind turbines on the North Sea under a blue sky. The turbines are arranged in a line, receding into the distance. The sky is a clear, deep blue, and the water is a darker blue. The turbines have three blades each, and their towers are tall and slender.

# Renewable Energy

Windfarms on the North Sea

M. Manders, RCE, the  
Netherlands



# Chances (General)

- **Green Energy**
- Perception of **doing good**
- **Kyoto** (<CO<sub>2</sub>)
- **Independance** to oil and gas producers
- The expansion is strongly driven by EU and national policies to aim to provide **a much greater penetration of renewable energy sources.**
- **Political certainty is key** to move from a pioneering phase to large scale offshore wind development

# Chances for UCH

- Possibility to **gain knowledge** about the seabed and possible UCH
- Possible **long term monitoring** of specific areas, understanding the dynamics
- Large **areas excluded** for (other) possible seabed disturbance activities

# Threats to UCH

**Short Term** : Seabed disturbance due to

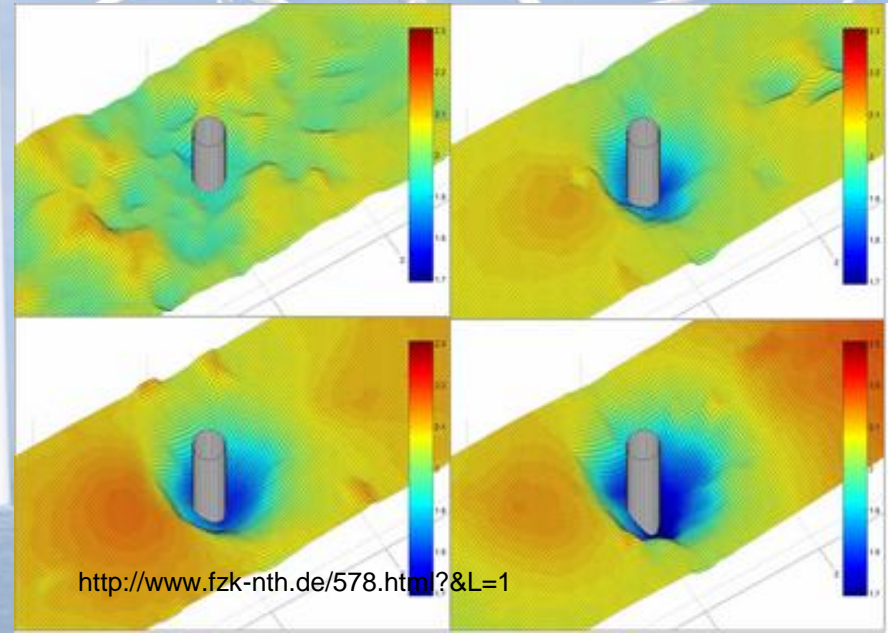
- Construction of wind turbines and cables
- The intrusion on the seabed due to construction activities
- Movements of ships while constructing the farms



<http://193.88.185.141/Graphics/Publikationer/Havvindmoeller/kap03.htm>

# Threats to UCH

**Long Term:** Seabed disturbance due to:  
Erosion patterns caused by currents redirected by  
the hard substrate of the wind turbine  
foundations and cables on the seabed.



<http://www.fzk-nth.de/578.html?&L=1>

# Political situation

- Renewable Energy is a primary focus of the EU
- Underwater Cultural Heritage is not: it is arranged/managed through the individual countries.



## This means :

- Funding for the installation of wind farms:  
Many new plans to meet the demands.
- No additional funding for the protection and  
(long term) management of UCH

The latest evidence of this situation are the new calls for the WP 2013 of the 7th Framework Programme of the EU







## Perception:

- Wind Energy will earn us the money
- UCH only costs us money

Is there any country that has a **regular budget for long-term management** of the UCH?

Money for:

- In situ protection
- Monitoring
- And mitigation of the effects (repair, excavation, etc)

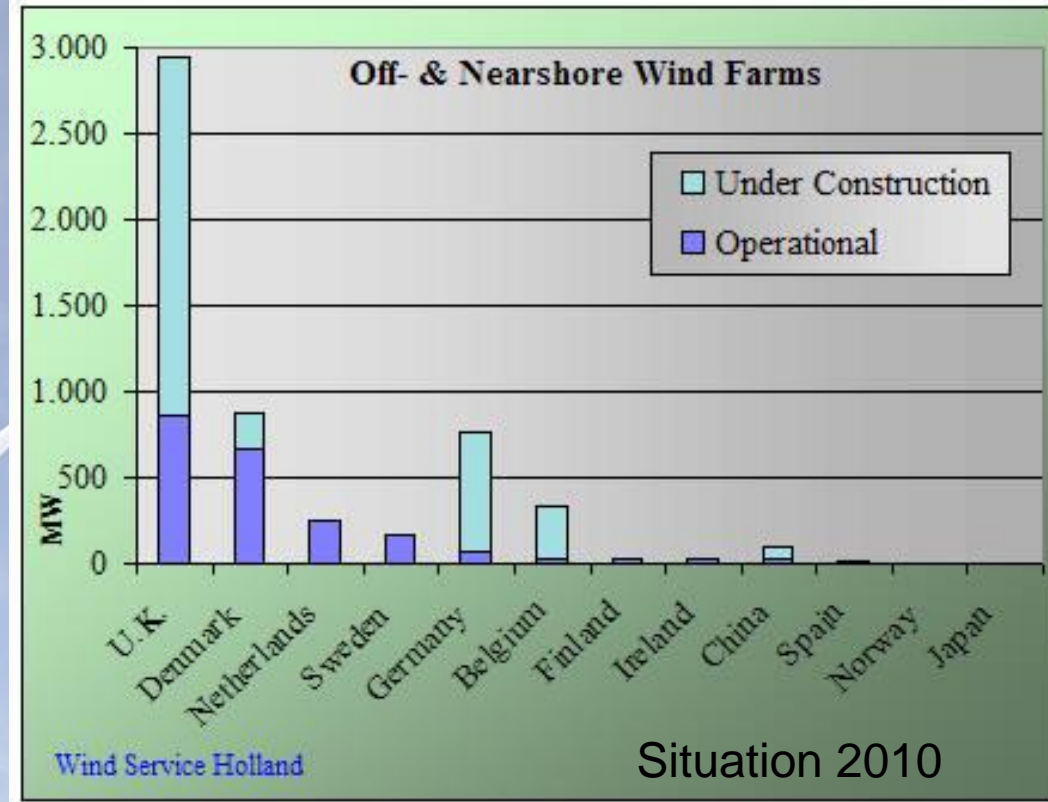
**June 2009:** Report “Net op Zee” (Net at Sea)

*Ministry of Economic Affairs in The Netherlands calculated the cost for a wind turbines network at the North Sea at 5 to 11 billion Euro's*

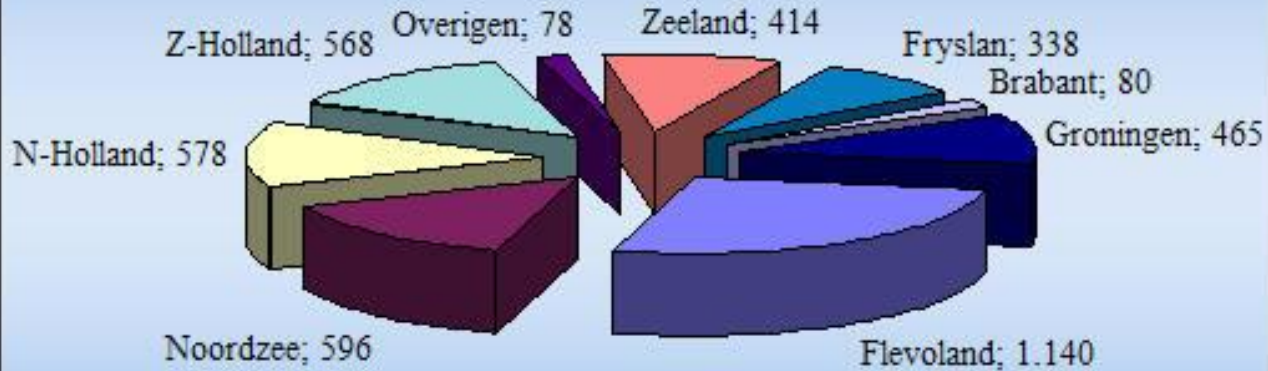
**Ambition Netherlands in 2009:** Capacity of windfarms at sea and on land in 2020: 10.000 MW.

In 2020: half of the Energy from windfarms.

6000 MW on the North Sea



## Windstroomproductie 2008, GWh



<http://www.windenergie-nieuws.nl/windparken1/nederland>

**On land: 3.660 GWh**  
**At Sea: 596 GWh**

**Space left: at sea**

# And we do not have these problems



[http://www.zeeburgnieuws.nl/nieuws/kv\\_windenergie.html](http://www.zeeburgnieuws.nl/nieuws/kv_windenergie.html)

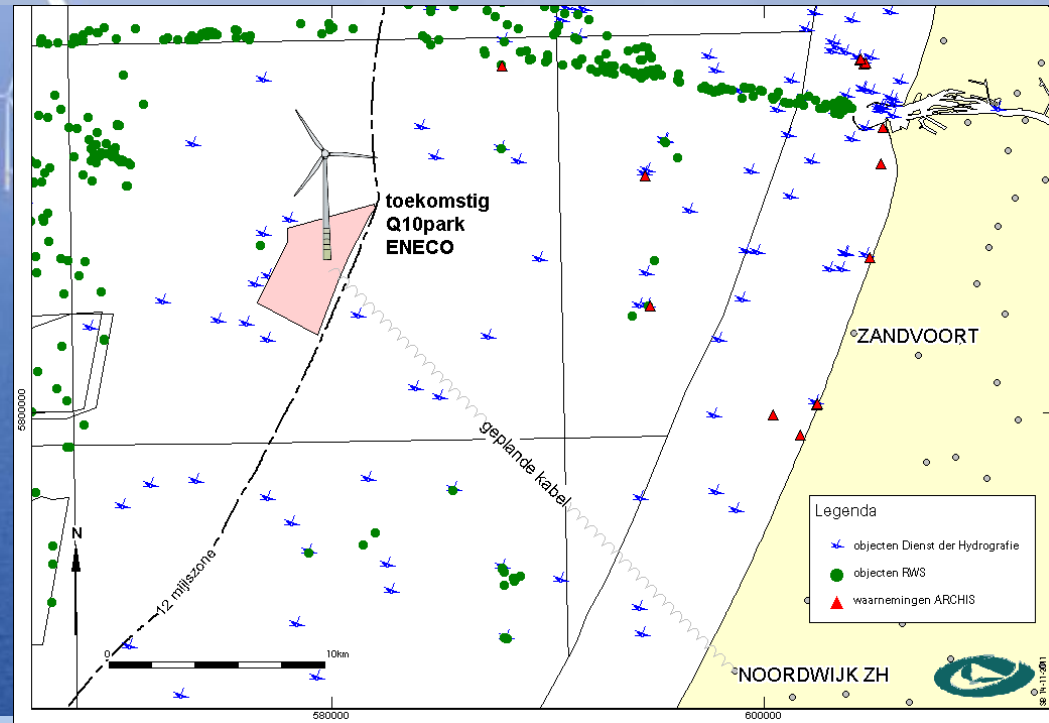


<http://www.geheugenvanalmere.nl/page/2932/nl>



<http://www.ravagedigitaal.org/2011nieuws/april/20/nws.php>

# Or do we?



## Windfarms in the Dutch North Sea

### First Mega Wind Park in Dutch Area

opened in 2007: 10 to 18 km from Egmond aan Zee in the North Sea.

These are 36 Wind Turbines on a total surface of 27m<sup>2</sup>.

Cost: € 200 mil.

**Prinses Amalia windmolenpark** (offshore windpark Q7), opened in 2008, 23 km outside of IJmuiden in the North Sea.

Cost: € 383 mil.

**Windpark Westereems:** opened in 2008 near Eemshaven in Groningen.



<http://www.parool.nl/parool/nl/30/ECONOMIE/article/detail/43230/2008/11/15/Milieugroep-in-windenergie.dhtml>



<http://www.ecn.nl/nl/nieuws/newsletter-en/2009/june-2009/flight-leader/>



There is an urge to build new farms, and quickly as well!



<http://dlund.20m.com/Dick8wm.html>



<http://www.parool.nl/parool/nl/30/ECONOMIE/article/detail/43230/2008/11/15/Milieugroep-in-windenergie.dhtml>



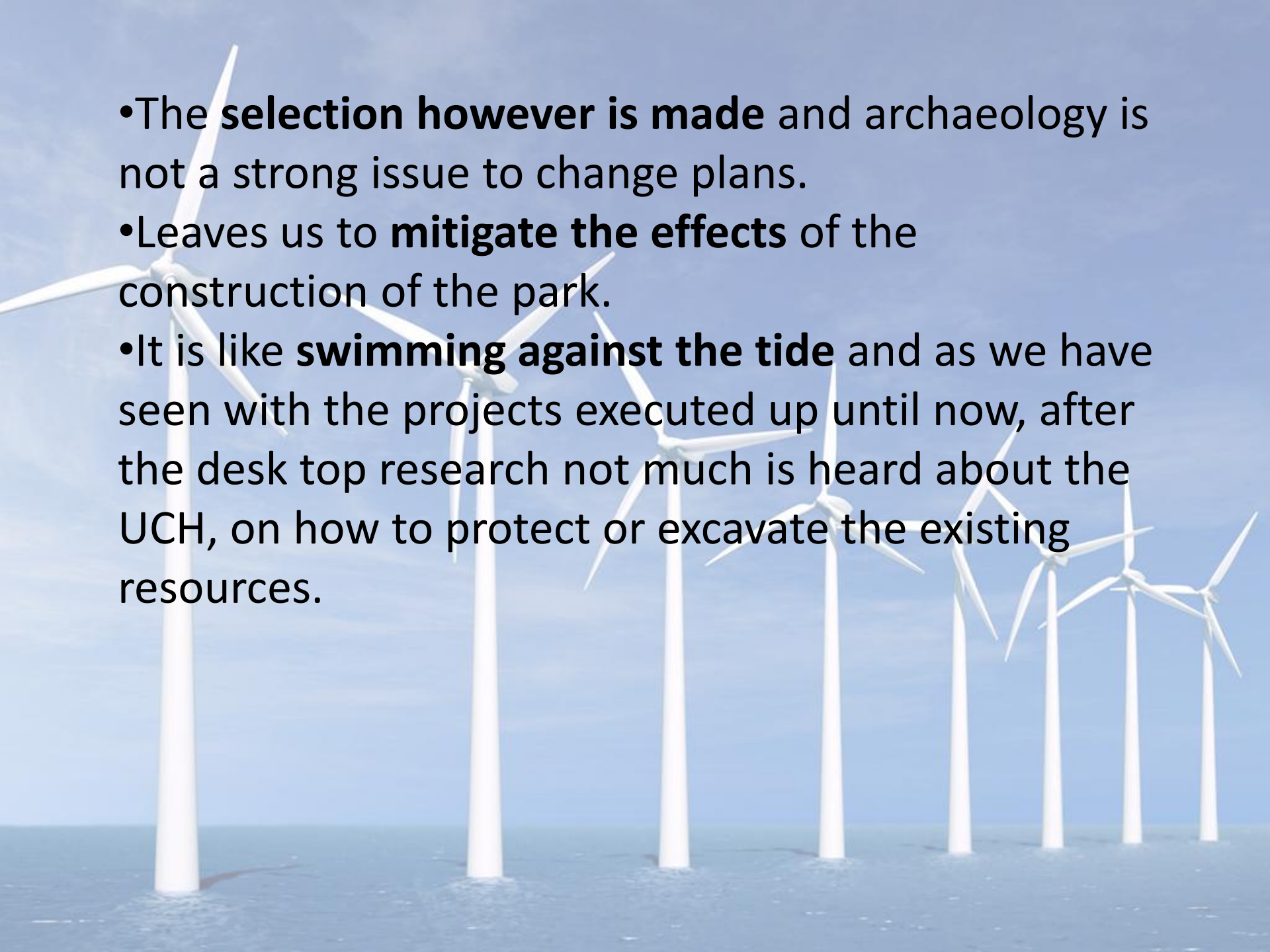
<http://www.ecn.nl/nl/nieuws/newsletter-en/2009/june-2009/flight-leader/>

# Archaeology and Wind parks at Sea

## Current Procedure:

- Archaeology is part of the **Environmental Impact Assessments (EIA/MER)** executed prior to the construction work.
- Usually **several alternative locations** are selected, but in the initiation phase archaeology only plays a minor role:
- Reason for this is that only **little information** is available about the underwater cultural resources.
- Usually **only after selection** of the proposed area, **research on UCH is more intense.**



- 
- A row of white wind turbines stands on a blue sea under a clear sky. The turbines are arranged in a line, receding into the distance. The text is overlaid on the left side of the image.
- The **selection however is made** and archaeology is not a strong issue to change plans.
  - Leaves us to **mitigate the effects** of the construction of the park.
  - It is like **swimming against the tide** and as we have seen with the projects executed up until now, after the desk top research not much is heard about the UCH, on how to protect or excavate the existing resources.

# Protecting UCH within the process: Situation Now

- Within 12 And 24 miles UCH is protected through the Dutch Heritage Law.
- Outside 24 miles, only protection when explicitly formulated in the contract with the constructors

Best possibility for protection seems now to be:

- **making this heritage visible** and...
- Keeping **all the players aware** of the fact they are dealing with this heritage and need to protect it.

# Awareness

A row of white wind turbines stands on a blue sea under a clear blue sky. The turbines are arranged in a line, receding into the distance. The sky is a uniform light blue, and the water is a darker blue. The turbines have three blades each, and their towers are tall and slender.

- Best way to protect heritage **now** is to be aware of the plans and make sure that archaeology is not forgotten in the process.
- This requires active involvement of the heritage officer

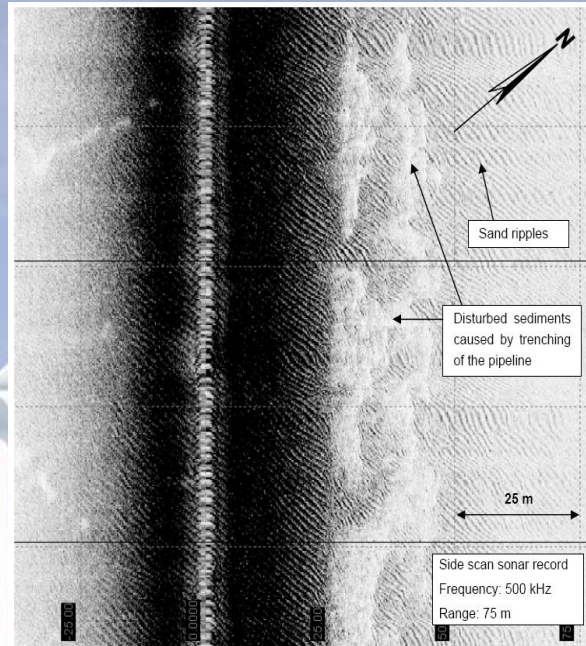
# Improvements?

1. **Explain the law** to all stakeholders
2. **Make** all known **information** about the UCH **available** for others
3. **Improve further knowledge** on UCH  
(especially the Unknown resources and effects of installation to the UCH)
4. Make **clear procedures/policies/formats** on how to act in different situations
5. Make sure people understand **what you** as heritage officer/underwater archaeologist **DO and** what you **WILL NOT DO**
6. Explain **what you would like to learn** from the UCH (e.g. Research Agenda)

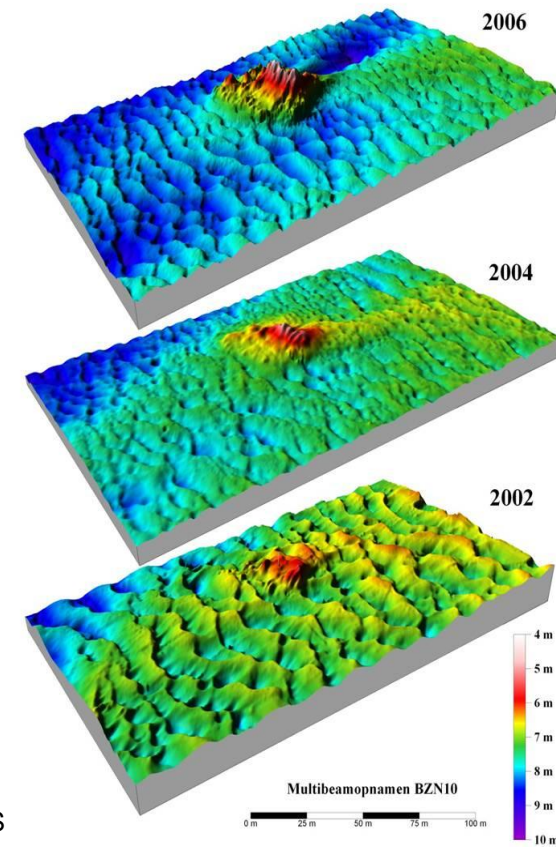
# Monitoring of the effects of the construction of windfarms (3)

No study has been undertaken yet to investigate the effects of wind turbines on the seabed and UCH over a longer period of time.

**Monitoring!**

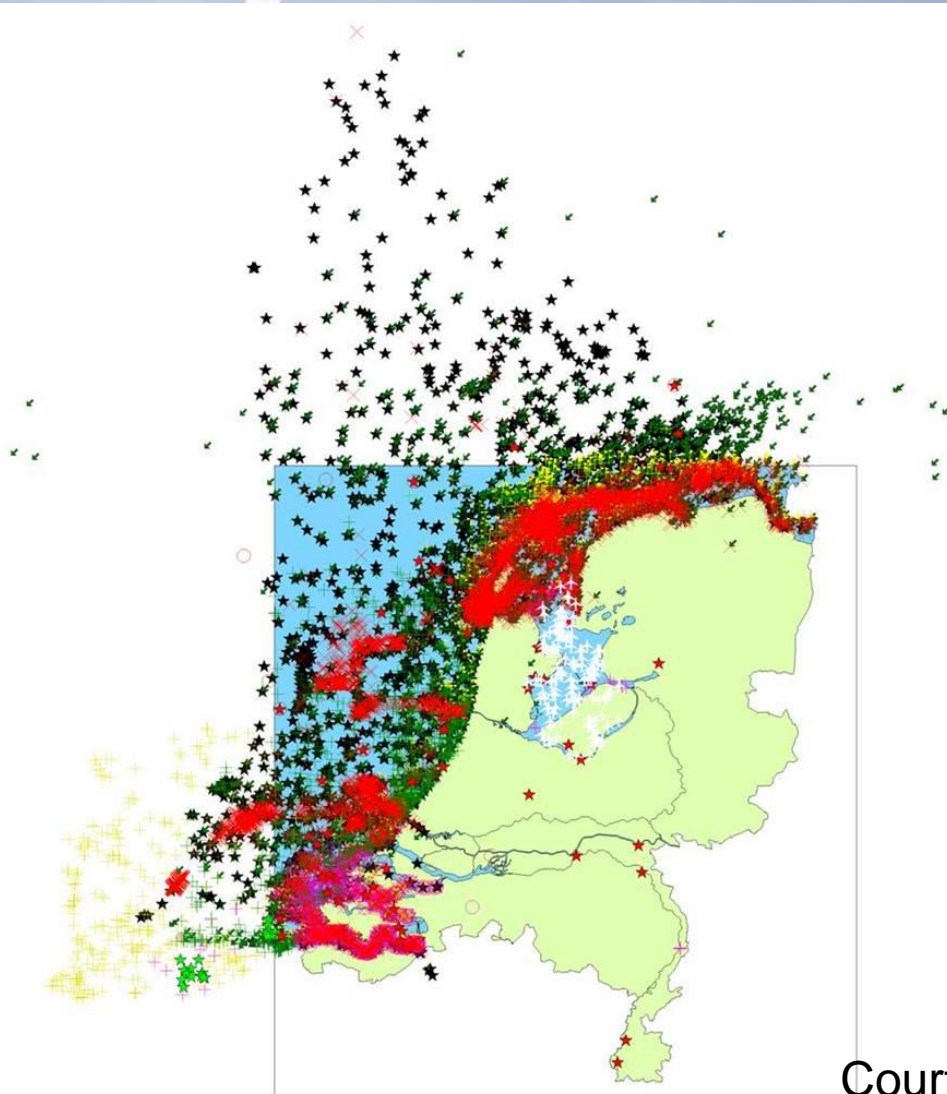


Courtesy Periplus/Archeomare



Courtesy  
RCE/RWS

# Making the known resource available for all stakeholders



Courtesy RCE

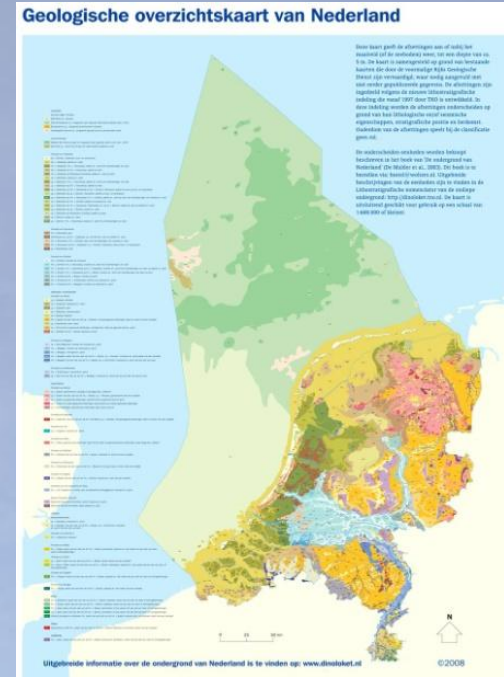
# Indicative Map Archaeological Values

An educated guess of the probability to find cultural heritage: based on e.g. geological, historical knowledge and the known resource.

Cooperating or becoming part of the European Marine Observation and Marine Spatial Planning?????

# Indicative Map North Sea

- We are dealing with the prehistorical landscapes and sites and shipwrecks up to the (early 20<sup>th</sup> C)





# Conclusion (1)

- There is a political priority and urgency to build wind farms
- In the decision where to construct, cultural heritage may not be the most important weighing factor.
- This is partly due to the fact that it is not clear for the different stakeholders what to do and who is responsible for the heritage
- Cultural heritage officers should focus on making the process clear and give indication of place and value of UCH

# Conclusion (2)

- Cultural heritage can ONLY THEN be taken up early in the planning process. With the clear policies and tools like:
  - an accurate database of Known Values,
  - an Indicative Maps of Archaeological Values and hopefully also
  - a kind of Research Agenda containing priorities of research for this area,well founded decisions can be made on what to do and especially also what not!

# Conclusion (3)

- After construction: areas and identified sites in possible danger should be monitored and budgets should be available for mitigation of the effects

Can these budgets be claimed through the developer or should states be accounted for it?