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Eine Forschungsinitiative des Bundesumweltministeriums

Offshore windfarms in the Belgian part of the North Sea

early environmental impacts and selected findings

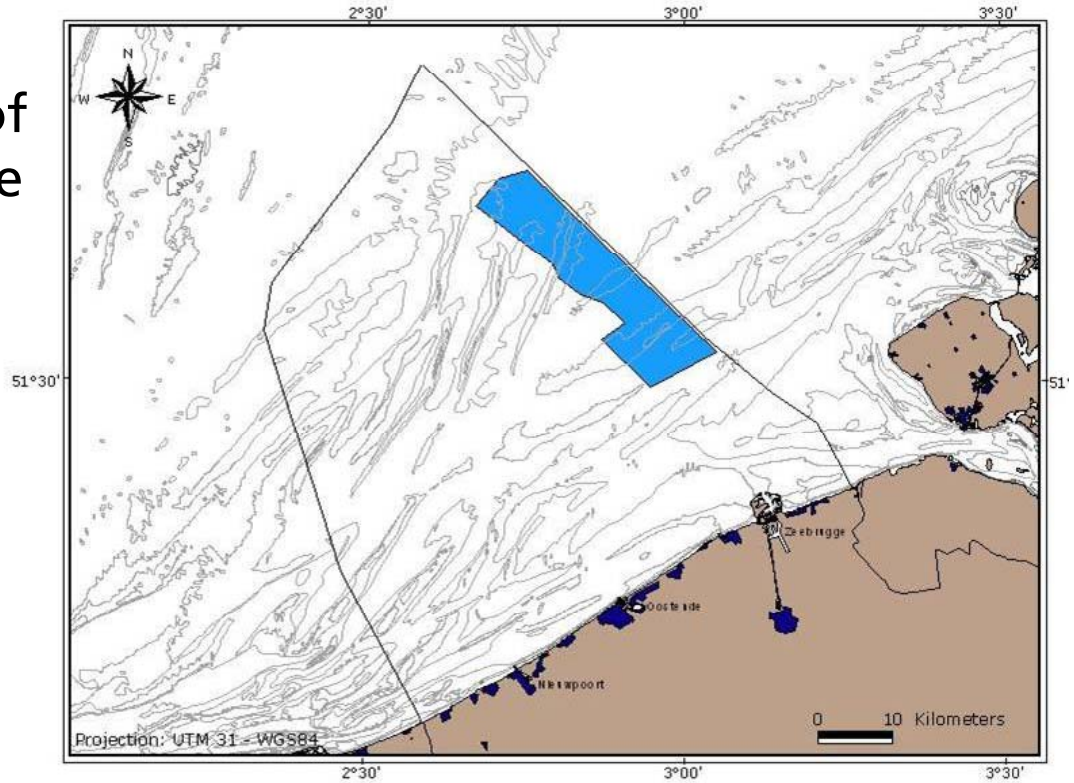
Belgian Science Policy Office
MUMM
Royal Belgian Institute for Natural Science

Offshore windfarms in the Belgian part of the North Sea

- Belgian part of North Sea (~2500km²)

Offshore windfarms in the Belgian part of the North Sea

- Belgian part of North Sea
- 2004 – definition of zone of 270km² reserved for marine renewable energy
- Goal: 2000 MW installed capacity by 2020



Offshore windfarms in the Belgian part of the North Sea

May 2012:

2 operational wind farms:

C-Power & Belwind

2 wind farms with all permits:

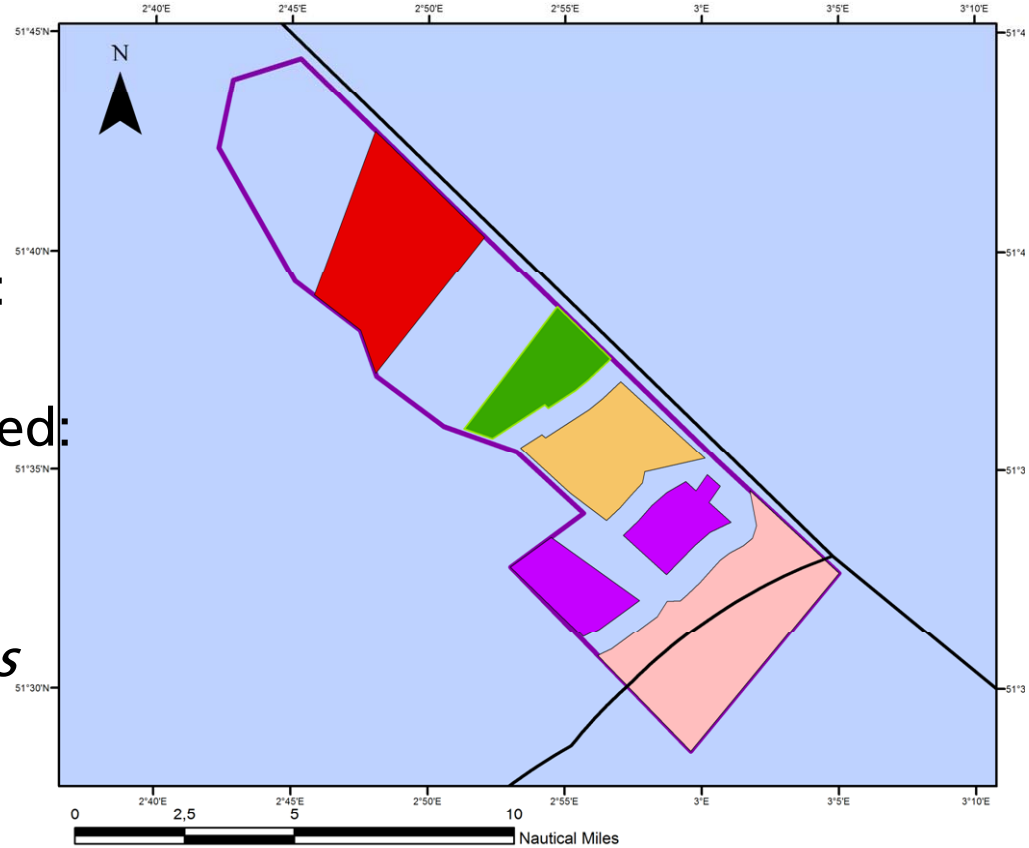
Northwind & Norther

1 additional concession granted:

Rentel

2 concessions in procedure:

2 *last remaining zones*



Offshore windfarms in the Belgian part of the North Sea

C-Power

- GBF & Jacket-foundations
- 54 RePower Turbines (48*6MW + 6*5MW)
- Phase 1: 6*5 MW operational since 2008
- Phase 2 & 3: under construction
- Distance to coast ~25 km

Offshore windfarms in the Belgian part of the North Sea

Belwind

- Monopile (& Jacket-foundations)
- 55 V90-3 MW Vestas Turbines + Phase 2
- Phase 1: 55*3 MW operational since 2010
- Summer 2012: demo-project Alstom 6MW

st ~4

Early environmental impacts and selected findings

Environmental Permit:

- based on EIS (marine consultant) & EIA (MUMM)
- specifies mitigation measures & conditions
- integrated monitoring programme for all parks

Monitoring programme:

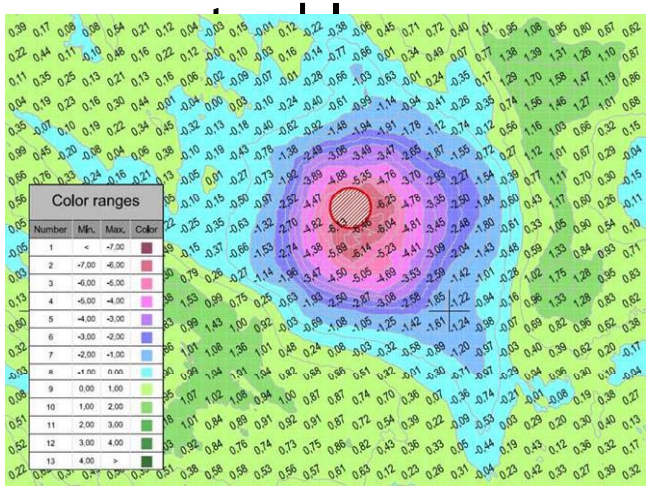
- since 2005
- baseline (impact) & targeted (process) monitoring
- coordinated by MUMM
- at cost of permit holder (& federal government)
- yearly freely available monitoring report

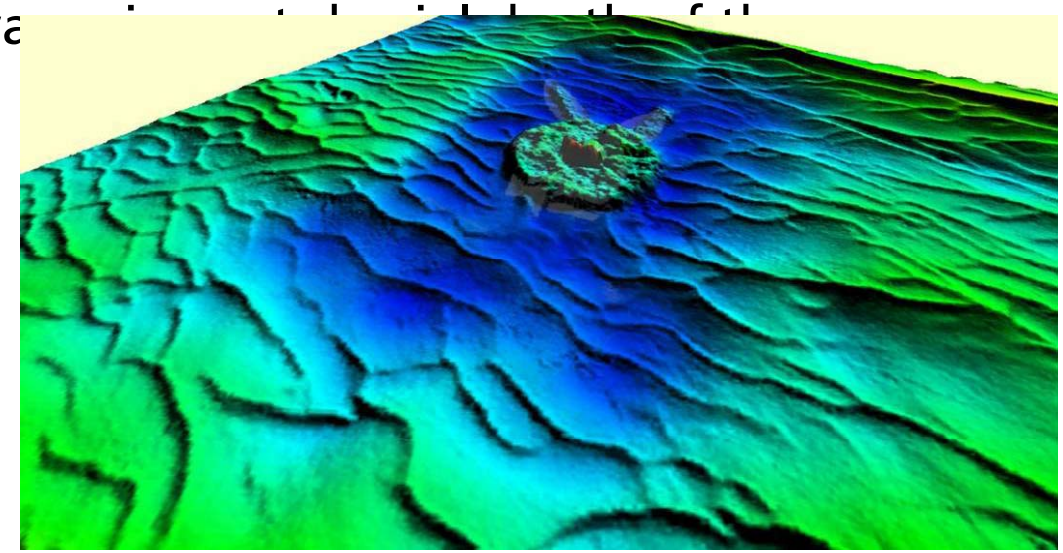
→ to reduce the environmental impact of existing and future offshore wind farms

Early environmental impacts and selected findings

<u>Seabed morphology</u>

- no secondary scour around the scour protection
- reformation of linear sandwaves (up to 7m) and ripples (15 – 30 cm)
- dynamic scour protection needed for MP & Jacket foundations
- natural mobility of sandwa





Early environmental impacts and selected findings

Underwater noise

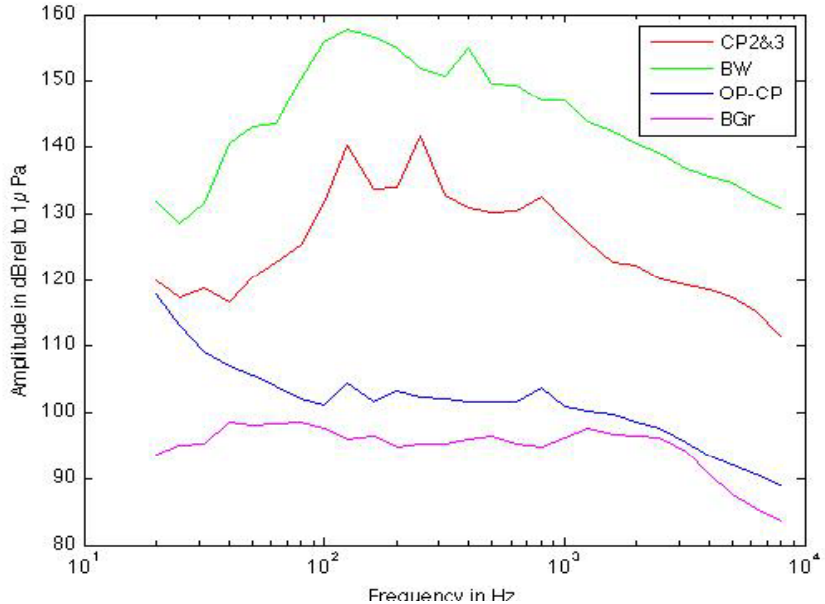
calculated peak sound pressure levels re 1µPa at the source (re 1m)

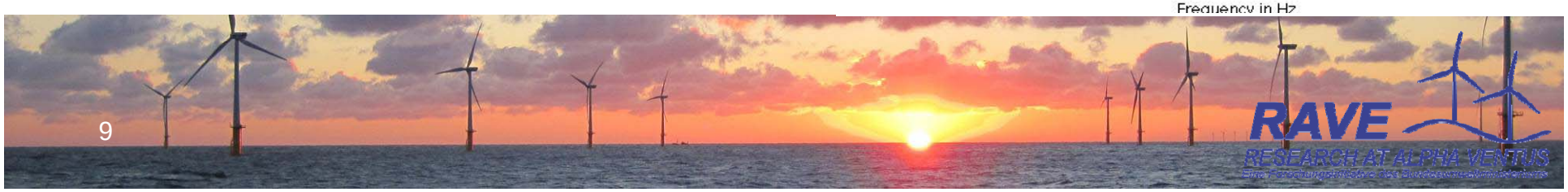
- of ~270 dB for piling of monopiles (Ø 5 m)
- of ~260 dB for pinpiles (Ø 1.7m - Jacket foundation)
- Increase of 5-25 dB for GBF installation (~shipping noise)

→ seasonal piling restrictions

→ noise reduction for MP

- Operational noise:
  - local elevation of noise levels
  - MP > GBF-foundations

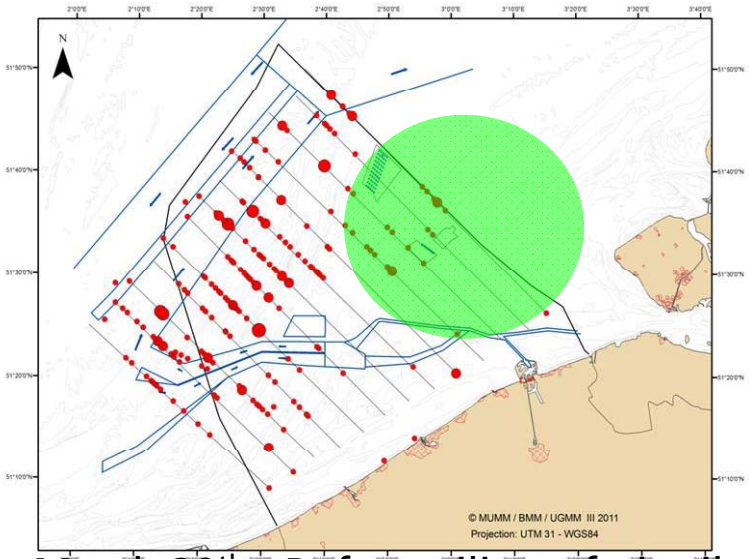




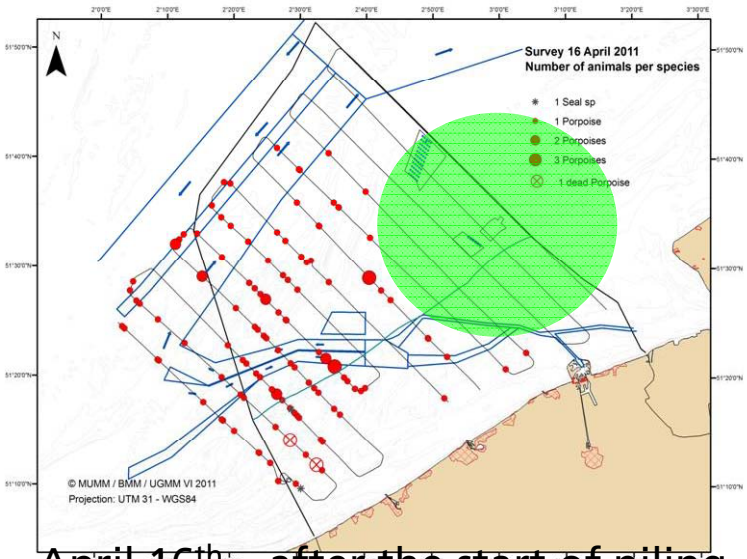
Early environmental impacts and selected findings

Marine mammals (Harbour porpoise – *Phocaena phocaena*)

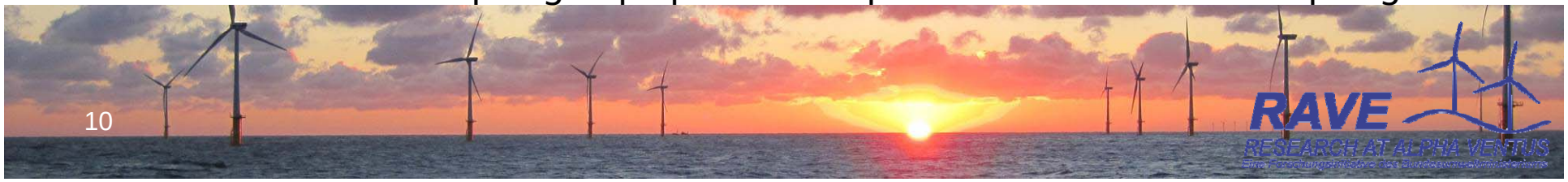
- Based on aerial surveys, passive acoustic monitoring & strandings data
- Avoidance during piling
- As yet no effect of operational noise observed



March 29th - Before piling of pinpiles



April 16th – after the start of piling



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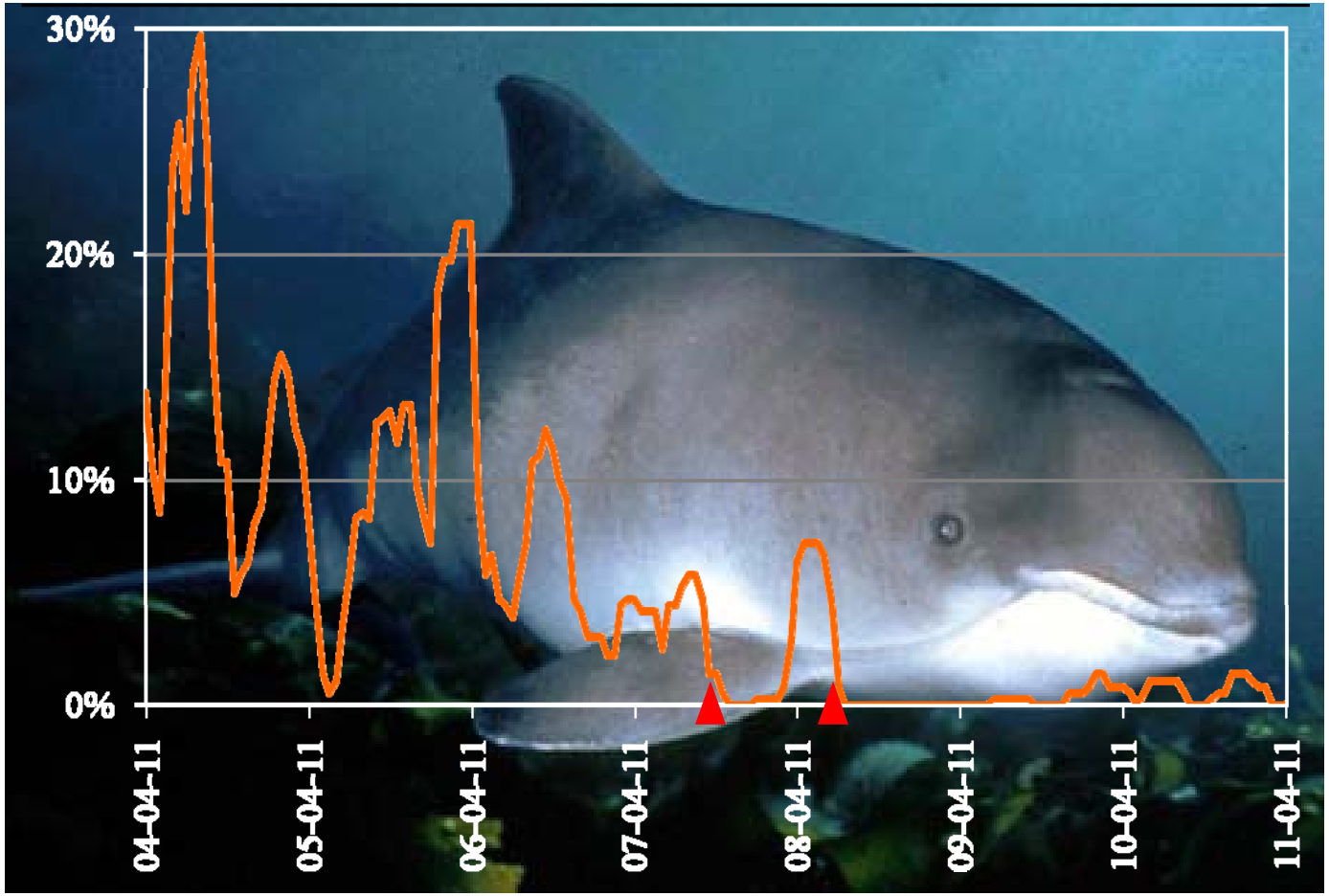


Early environmental impacts and selected findings

<u>Seabirds</u>

Ship-based counts since 2005:

- Attraction for certain species eg. terns (Common and Sandwich tern)

→ foraging in the wind farm area + resting pla

→ risk of increased mortality

- Limited avoidance effect eg. Northern Gann

→ harder to quantify statistically

→ most monitoring conducted during baseline conditions or when only six turbines were present

Early environmental impacts and selected findings

<u>Soft substratum fauna and fish</u>

- Small-scale organic enrichment of soft-bottom substrates near the foundations
- As yet no large-scale effects observed on the benthos
- Increase in size of certain fish species within the wind farm area vs. reference areas (effect of exclusion of fisheries)

→ long-term monitoring in completed wind farms needed to observe / confirm the possible environmen

Early environmental impacts and selected findings

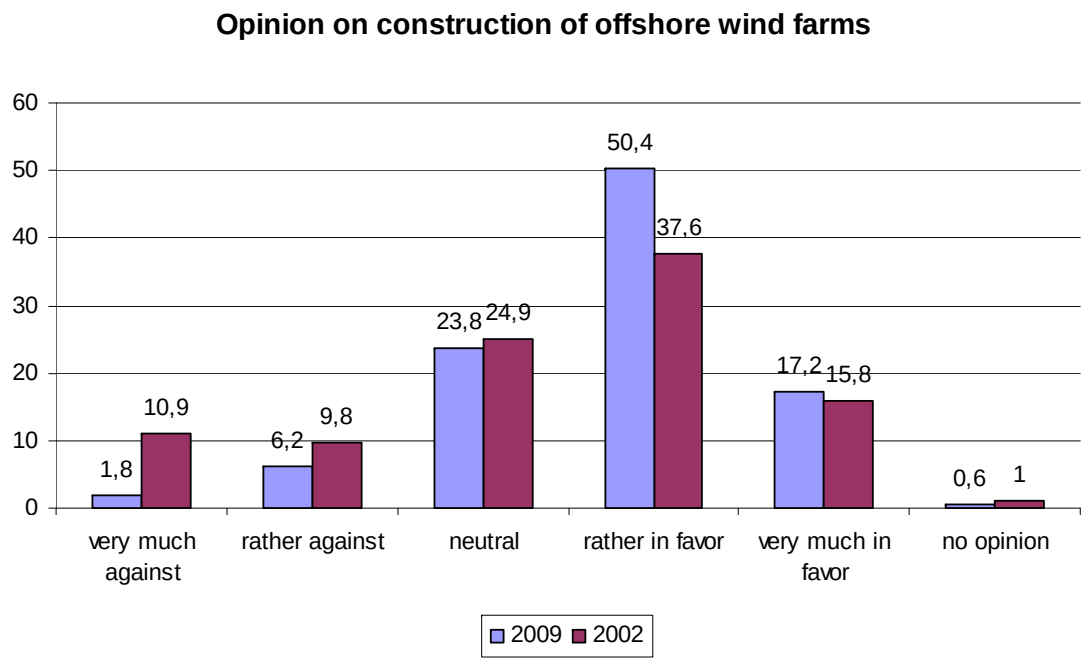
<u>Hard substratum epifauna and fish</u>

- rapid colonisation and clear succession, strong seasonal fluctuations
- difference between ‘rocky’ GBF and steel monopiles
- Intertidal zone dominated by non-indigenous species
- strong attraction to pouting and cod (up to ~30 000 per foundation)

Early environmental impacts and selected findings

Seascape

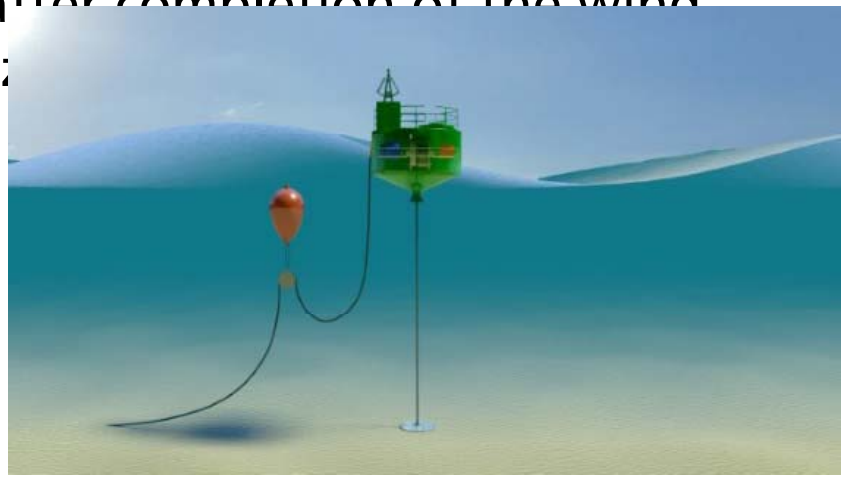
- Simulations used for the public consultation of the first wind farms underestimated the actual visibilty of the turbines
- Social acceptance of the visual impact increased after realisation of the first project



Early environmental impacts and selected findings

Future

- Migratory birds – radar installed at C-POWER OTS in March 2012
- UW Noise & fish larvae – in situ experments planned Summer 2012
- Long-term and large scale effects after completion of the wind farms (offshore renewable energy
- Developments in wave-energy
- Aquaculture and marine farming



Thanks for your attention! – Any questions?