Offshore windfarms in the Belgian part of the North Sea

early environmental impacts and selected findings
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
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

Seabed morphology

- 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 sandwaves impacts burial depth of the jackets
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
Early environmental impacts and selected findings

Marine mammals (Harbour porpoise – *Phocaena phocaena*)
Early environmental impacts and selected findings

Seabirds

Ship-based counts since 2005:
• Attraction for certain species eg. terns (Common and Sandwich tern)
  ➔ foraging in the wind farm area + resting place
  ➔ risk of increased mortality

• Limited avoidance effect eg. Northern Gannet
  ➔ harder to quantify statistically
  ➔ most monitoring conducted during baseline conditions or when only six turbines were present
Early environmental impacts and selected findings

Soft substratum fauna and fish

• 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 environmental impacts
Early environmental impacts and selected findings

Hard substratum epifauna and fish

- 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 visibility of the turbines
- Social acceptance of the visual impact increased after realisation of the first project

![Bar chart showing opinion on construction of offshore wind farms](chart.png)
Early environmental impacts and selected findings

Future

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

Thanks for your attention! – Any questions?