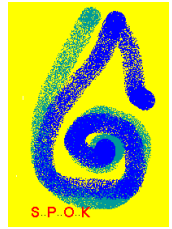
Concerted Action on Offshore Wind Energy in Europe



Environmental Impacts, Social Acceptance and Politics: A State of the Art Review

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Objectives

Review current knowledge regarding offshore wind energy in relation to:

- Environmental impacts
- Social acceptance
- Conflicts of interest
- Policies - National planning rules and incentives

Identification of problem areas/barriers
(excluding benefits of offshore wind energy)

Approach

- Questionnaires
- Interviews
- Review of references
- Draft reports
- Feed-back
  - CA members
  - industry
  - authorities
- Final report

		AVG	BE	DK	FI	FR	GE	GR	IR
1	Environmental Impacts								
1.a	Birds	1,5	1	1	1	1	1	2	2
1.b	Sea mammals	2,4	3	3	2	2	2	1	1
1.c	Fish	2,2	2	3	2	1	2	3	1
1.d	Marine biology	2,3	2	3	3	2	2	3	1
1.e	Hydrography	2,1	3	1	3	2	-	2	1
1.f	Seabed	2,5	2	3	3	1	3	3	1
1.g	Sea currents	2,4	2	2	3	2	3	3	1
1.h	Water quality	2,5	3	3	1	3	3	3	1
1.i	Visual effect	1,5	1	1	1	1	2	1	3
1.j	Noise Impact	2,0	3	3	1	3	2	1	1
1.k	Raw materials	2,6	3	2	3	-	3	3	-
1.l	Marine archaeology	2,4	3	2	3	3	3	1	1
1.m	Recreational areas	1,8	2	1	1	1	2	1	-

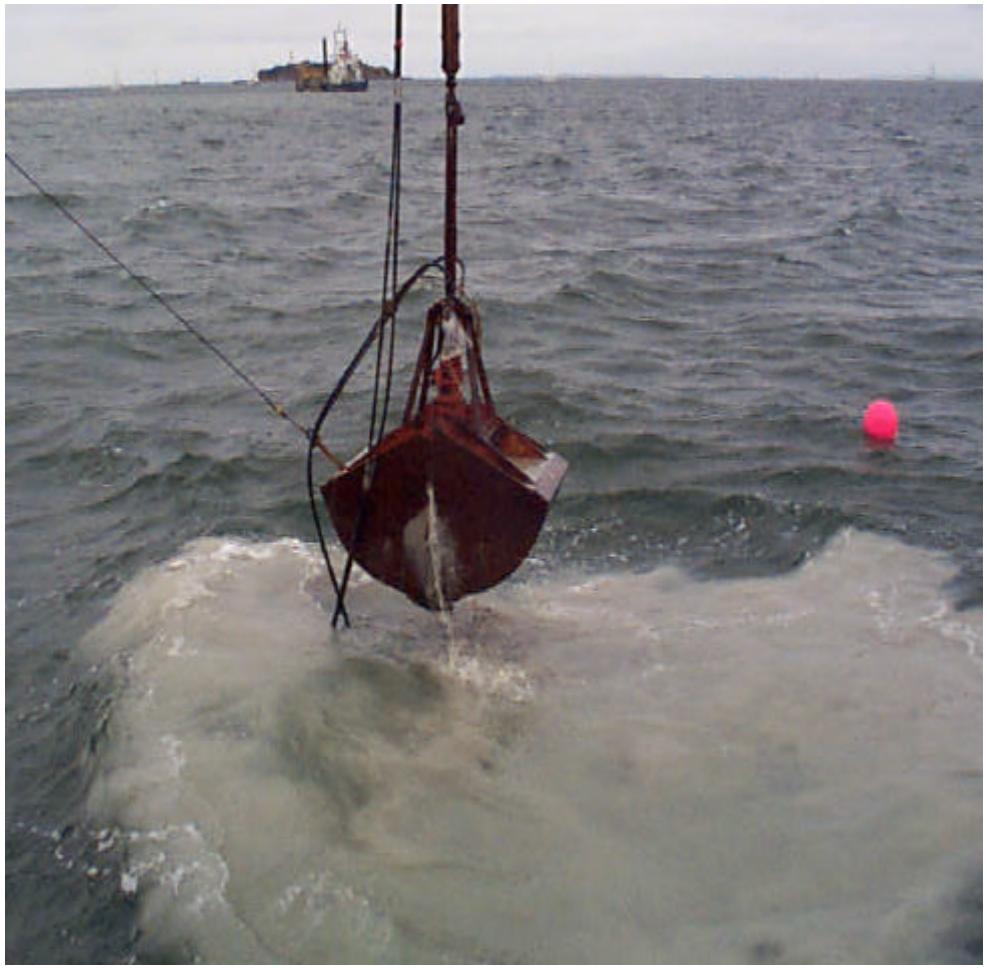
Potential barriers:

- Environment:
  - birds
  - visual impact
- Social Acceptance
  - ecological aspects
  - visual/noise impact
  - influence/ownership
- Conflicts of interest:
  - ships (collision risk)
  - radar
- Policies
  - legal framework
  - support mechanisms

Environmental Impacts I

- Construction/Dismantling
  - sedimentation (flora, fauna)
  - noise/vibrations (birds, mammals, fish)

* Temporary effects,
  - avoid sensitive periods



Environmental Impacts II

Operating phase - Birds

Onshore experience

- Limited effects on birds
  - Disturbance effects: max distance <500m
  - Collision: Tarifa

Birds and Offshore Wind Turbines

- Limited experience
  - Dutch near-shore
  - Utgrunden/Yttre Stengrund
  - Tunoe Knob

* Feeding possibilities more important, but results only valid for wintering eiders

Birds and Offshore Wind Turbines

- Potential effects: collision, ousting, barrier
- Parameters:
  - species
  - migratory paths
  - site (distance to shore, water depth, feeding possibilities, natural reef effect, ...)
  - time of day/year
  - weather
  - noise
  - layout (farm/turbines, incl. marking lights)

Birds and Offshore Wind Turbines

- "Protected" areas - IBAs/SPAs
  - definition
  - distance
* More studies needed
  - generic
  - impact (before/after)
  - develop mitigation measures, e.g.
    - operating strategies
    - farm layout

Social Acceptance

- Perceived ecological impact, negative and positive
- Noise aspects (!)
- Visual aspects
  - distance to shore
  - farm layout

* Promote openness and public influence (Middelgrunden) especially near shore
 - make use of the farm (Roedsand/Nysted)

Conflicts of Interest

Ships

- Collision risk
- Effects difficult to predict
  - type of ship (cargo)
  - size of ship
- Positive effect?

* Mitigation measures
  - marking lights (but...)
  - emergency procedures
  - standardized, "reliable" risk analyses

Conflicts of Interest

Radar

- Potential problem (e.g. UK/SE):
  Moving blades causing false signals/disturbance, depending on
  - system (age, GPS, satellite)
  - turbine tower
  - number of turbines

* No serious problems if exact coordinates of wind turbines are known - unless radar equipment is surrounded by turbines.

National policies

- Legal Framework
  - not fully clarified (often)
  - country specific (DK/Germany)
  - often different framework within one country (>12 nautical mile zone<)
  - several legal institutions

* "One-desk" policy beneficial

- Market support mechanisms
  - feed-in tariff
  - green certificates
  - investment subsidies
  - tax exemptions
  - guaranteed access
- 0.046-0.124 EUR/kWh
  - frequent changes

* Long-term support mechanisms needed - sufficient, secure

Conclusions

- In general: Sense & Sensibility
- Additional studies needed - offshore projects necessary in order to achieve more knowledge regarding:
  - environmental impacts (e.g. Roedsand/Nysted)
  - radar effects
  - collision risk
- Collate data/international co-operation - OWE-TN (web) (Wheel invented too many times)
- Social acceptance: Early, active public involvement
- Policies: One-desk-policy beneficial, sufficient and secure market support mechanisms.

Acknowledgement & Sources

- Acknowledgement: EC funding through CA-OWEE

- Sources, e.g.
  - Greenpeace (North Sea Offshore Wind - a Powerhouse for Europe)
  - ETSU (An Assessment of the Environmental Effects of Offshore Wind Farms)
  - EIAs
  - NOVEM/Ecofys (Inventory of Policy, Regulations, Administrative Aspects and Current Projects for Offshore Wind Energy in Northern Europe)
- Reference: CA-OWEE Report (conference bag)
  - www.offshorewindenergy.org