

Concerted Action on Offshore Wind Energy in Europe
WP 2.5

**Social Acceptance, Environmental Impact
and Politics**

Appendix

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Introduction:

During the Autumn of 2000, questionnaires concerning the subjects of Work Package 2.5, Social Acceptance, Environmental Impact and Politics, were sent out to all members of the Concerted Action of Offshore Wind Energy in Europe (CA-OWEE).

This appendix contains responses, arranged in order of subject, from all 13 represented countries.



The following guidelines were given to the CA members before filling in the questionnaires:

Guidelines for questionnaires:

This questionnaire will be used in Cluster 2.5 of OWEE with the purpose of ranking the relevant issues and collecting the information available on topics concerning Social Acceptance, Environmental Impacts, Conflicts of Interest and Politics.

Information Collection

The tables below will serve to collect the information available on each issue, and will be used as a starting point for writing the state-of-the-art summaries.

Please provide a short statement regarding the available information or a short, conclusive answer to the questions in the column **Main Conclusions**.

Please also provide in column **Reference** a (bibliographic) reference to the source of your information. You could also here refer to a number in a list of references that you write at the end of the document.

Please indicate in column **A/N** whether the source document is available (A) in your organisation or not (N).

Please indicate the language of the document in column **Language**.

You should feel free to add to the list any other issue that you consider to be important.

Importance

Please indicate for the relevant topics your evaluation of its importance, by using numbers 1, 2, 3, according to the following:

- | | | |
|---|------------------------------|--|
| 1 | HIGH
IMPORTANCE | An issue is of high importance if it is expected to have a significant impact on the large-scale development of off-shore wind energy (i.e. if no solution is found for this issue, or if the problem is being ignored, the development of off-shore wind energy will be limited or blocked) |
| 2 | MEDIUM
IMPORTANCE | An issue is of medium importance when it is considered not being of high or low importance... |
| 3 | LOW
IMPORTANCE | An issue is of low importance if it is regarded as only having importance on the large scale development of offshore wind farms at some very specific local areas or is regarded as having no impact |



WP 2.5: Social Acceptance, Environmental Impacts and Politics

The average ranking AVG has been found by taking the arithmetic average of the country specific ranking and rounding of to one decimal.

Ranking Table

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

		AVG	BE	DK	FI	FR	GE	GR	IR	IT	NL	PL	SE	SP	UK
2	Conflicts of interest														
2.a	Ships	1,3	1	1	2	1	1	1	1	3	1	1	2	1	1
2.b	Air traffic	1,7	-	2	2	2	3	1	1	1	2	1	-	3	1
2.b.i	Marking lights	2,0	3	1	2	-	3	1	1	3	-	2	2	3	1
2.b.ii	Colors	2,2	3	1	3	-	3	2	1	2	-	2	3	3	1
2.c	Defence	1,6	-	3	1	-	2	1	1	3	-	1	-	1	1
2.c.i	Radio/Radar	1,9	1	2	1	1	2	2	-	3	3	2	1	3	2
2.c.ii	Training grounds	1,8	3	1	1	3	2	1	-	2	2	1	1	2	2
2.d	Fishing interests	1,4	1	1	1	1	2	1	2	2	1	2	2	-	1
2.e	Bird interests	1,5	2	1	1	3	1	2	1	2	1	1	2	-	-
2.f.i	Cables and pipelines										2				
2.f.ii	Dredging										3				
2.f.iv	Coastal amenity														1
2.f.v	Dump sites								1						
2.f.vi	Oil drilling							1							



WP 2.5: Social Acceptance, Environmental Impacts and Politics

Answers arranged in relation to specific subject

Table 2.5.1. Environmental Impacts

1. Environmental Impacts: Please specify national experiences and/or considerations concerning environmental impacts from <i>Offshore Wind Farms</i> during construction and after installation in relation to the topics listed below:					
Importance		Main Conclusions	References	A/N	Language
1.a Subject: Birds (migrating and resting)					
BE	1	Distance from shore is important parameter. Insufficient information available on bird migration behaviour away from coastline.			
DK	1= H	Site dependent. The impact also depends on the various bird types at each site.	Different reports for diff. locations – all in Danish, some with an English summary e.g. Ref. Nr. 10 (Sørensen et. al. (1999))	A	Danish (DK), English (UK) summary
FI	1	Depending on site and species. Sea birds will rise as an important topic.	http://www.pvo.fi/merituuli/svenska/index.asp	Y	
FR	1	High dependance of the location (distance to the seashore) and of the presence of fish. Little existing knowledge on sea birds : requires specific methodology and equipment (boat)	Study for Breedt offshore wind farm, Greet Ing., 1999-2000 Identification of offshore sites in Languedoc, Meridionalis, 2000	N (auth oriza tion need ed) A	French French
GE	1	Impacts on birds are expected such as * collisions of migrating feeding birds with turbine * turbines as barriers between feeding and roosting grounds or in migration routes * ousting birds off their traditional feeding/roosting grounds [1,2,3] Detailed discussion on the above topics and many references available in [3].	[1], [2], [3] references in [3] [3] references in [3]	A A A NA	German German English English

GE cont		<p>German Bight with its Wadden Sea is seen as an important area for migrating birds as roosting and feeding grounds. Birds are migrating across the German Bight with rather unknown pattern with respect to used migration paths, migration heights and influences of weather conditions on flight behaviour. Investigations on these issues are required in Before-After-Impact Studies (ecological monitoring programmes) [2,3, refernces in 3]</p> <p>Flight behaviour of stationary birds [2,3]: *spatial intensity: how far? *frequency: how often? *general flight behaviour (hight, paths, weather influence) Some knowledge available from Dutch and Danish investigations (see references in [3]) however behaviour best known during breeding time.</p> <p>Bird populations well known for summer time deficits for winter time [2]</p> <p>Boundaries of Important Bird Areas IBAs are not yet well defined. Legally, according to EU regulations, those areas that might qualify for IBA shall be treated as IBA until a decision has been met whether they become official IBA's or not [3]</p>	[2],[3] references in [3]		
			[2],[3] references in [3]		
			[2],	A	Ger
			[3]	A	Ger
GR	2	Main considerations concern endangered species living onshore	15, 16, 17	N(*)	GR
IR	2	Through careful siting of turbines and investigations of populations and behavioural patterns, the effects of wind turbines on birds can be minimised. Do not site in main bird flight path. Impacts on migrating birds are of particular concern.	[1],[2] drawing on [3],[4],[5], [6],[7] & [8]	only [1] & [2] A	English
IT	2	Only considerations for semi-offshore farms after installation	No nex		
NL	2	<p>Possible effects :</p> <p>*Low flying, foraging birds could collide with rotating blades, especially in foggy weather. Rotor turbulence could also a cause of accidents.</p> <p>*This effect is permanent. Birds could avoid the Windpark area after a while, getting accustomed to the new situation.</p> <p>*Migrating birds (larger amount) often fly at higher altitude and will encounter less disadvantages of the Windpark.</p> <p>*The negative effects on foraging birds is small on regional ecosystem scale. On migrating birds, having their flight path often near the coast line, the effect of a near shore windpark might be larger.</p> <p>*Study on combined effects of movement and sound of windturbines on birds is done earlierⁱ</p> <p>This is the most important environmental factor according to the governmentⁱⁱ.</p>	Reports with ^{iii iv}	Yes (all)	NL (all)
PL	2	Poland lies on some major routes for migrating birds from Scandinavian countries <i>and Baltic countries</i>	Seminar "Wind Power Onshore and Offshore"	A	PL

SE	2	Impacts on migrating birds is studied on two sites in Sweden. Utgrunden and Yttre Stengrund. Serious impacts are not assumed so permission is given on both sites. The bird study is a condition for getting permission. Both plants are located in a migration path , the southeast coast of the mainland and the Kalmarsund. The study has started but no report is finished. The level of knowledge about windpower-impacts upon birds migration and resting has to be increased. There is need for many studies, but the issue should not be overemphasized. It's very clear that on-shore WECS located close to or within areas with migrating, nesting or grazing birds don't make any impacts at all on birdlife. Visiting people and predators make impacts not the windturbines. When the WECS don't impact birdlife on land why should they in the sea?			
SP	1	High importance in "Estrecho de Gibraltar" in Cádiz. As no windfarm is installed in Spain the information is not available. Huelva Harbour: Just beginning the environmental impact study.		N	
UK	2	Need to avoid migratory paths and habitats of national or international importance (RSPB – main authority). Environmental Impact Study (EIS) must address avian issues in detail, particularly if this is not the case.	1	Y	

1.b Sea mammals					
BE	3				
DK	3	In addition to larger projects, the authorities responsible for the environment ask for an assessment of the local mammal population.	Only a very few reports in Danish	A	DK
FI	2	Influence on seals important but conclusions can be drawn from Swedish projects. If building on small rocks and islands in the archipelago this question will be very important.			
FR	2	Potential influence of low frequency sound emission	Study for Breedt offshore wind farm, Greet Ing.1999-2000	N	French
GE	2	[4] expects possible loss of habitat due to disturbance mainly through noise emission from turbines and from construction- & maintenance vessels and equipment (piling); noise reception of the sea mammals not sufficiently quantifiable; According to [3] impact may rise from noise or visual impact, however, degree of impact unknown. In [3] a source is quoted that common and grey seals do not seem to be significantly disturbed; suggestion is to avoid sensible areas and to perform Before-After-Impact Studies (ecological monitoring programmes)	[1],[4] [3] references in [3]	A A N/A	German English
GR	1	Specific protection areas for sea mammals (e.g. monachus-monachus seal in West Aegean Sea, sea turtles in Ionian Sea)	14, 15, 16, 20	N(*)	GR
IR	1	Seismic surveys, construction and operating noise may disturb whales and dolphins. Assess use of proposed sites by mammals, review need for seismic surveys. Minimise duration and quantity of noise during construction. Quantify, minimise and monitor underwater noise levels during operation.			
IT	3	Only considerations for offshore farms after installation	No nex		
NL	3	The presence of vibrations could affect the sonar system to retrieve food. *This effect is permanent , but expected to be limited, both locally and regionally.			
PL	3	<i>There are only a few seals in the Polish part of the sea</i>		N	
SE	3	To avoid impacts on two grey-seal colonies was a key-factor in the struggle for permission at the Bockstigen/Valar site. Following conditions were given. Counting and observation of sealbehavior before starting construction, during construction and two years after start of operation. The report concludes: There is no evidence that windturbines affect or impact the seals in any respect.	Sundberg&Söderman "Windpower and grey seals: An impact assessment of potential effects by sea-based wind-power plants on a local seal population". Department of Animal Ecology Uppsala University	y	English
SP	3	Not high importance in Cadiz. Beginning studies in Huelva.		N	
UK	2	Study will be needed based on existing records of mammal populations necessary in EIS. Possibly also supplemented by surveys before, during and after construction.	1	Y	

1.c Fish					
BE	2	Effect may be positive or negative depending on complex food chain interactions.			
DK	3	Foundations act as natural reef and seem to increase fish life, but see "Conflicts of interest"	A few reports about specific sites, e.g. Ref. Nr. 4 and 5	A	DK, UK
FI	2	Conclusions can be drawn from Swedish projects			
FR	1	Impact on fisheries : the presence of offshore wind farms will limit the territory for fishermen			
GE	2	[1] expects possible loss of habitat due to disturbance mainly through noise emission from turbines and from construction- & maintenance vessels and equipment (piling); noise reception of fish yet totally unknown - not quantifiable; negative impact on fish larvae through water turbidity and sedimentation; another impact may arise from electric and magnetic fields around cables. [5, 3] generally see final scientific evaluation of impact on fish disabled by lack of demonstration plants offshore that might serve as a study base; sedimentation and turbidity of water has only temporary impact; population of fish might change due to changed biotope by placing foundations (hard substrates) of wind turbines on the sea bed; hard substrates are considered uncommon in the North Sea; fishing will not be allowed in the wind farms leading to a resort for fish and its larvae	[1], [5], [3] references in [3]	A NA A NA	German German English
GR	3	The effects of LSOWE on fish fauna is considered limited. However there might arise conflicts with fishing industry (see 2.d)	5, 10	N(*)	GR
IR	1	Use artificial reefs to improve habitat for fishery species. Shield and bury electrical cables appropriately to minimise electro-magnetic impacts on fisheries. Projects should seek to minimise the effect of structures and cabling on existing stocks, their food sources and spawning activity.	[1],[2]	A	English
IT	2	considerations for offshore and semi-offshore farms during construction and after installation	No nex		
NL	2	The negative effect of Vibrations will also encountered here. *The absence of fishery and shipping in and around the windpark will probably result in a safe area to rest and breed. This will affect the fish population in a positive way. Successively, foraging birds could also take advantage of this effect.			
PL	3	There is an opinion that wind turbines bases are good for fish		N	
SE	3	Very few studies. The existing windfarms are erected in areas with no or very little fish. A study is made about the impacts on fish in the first offshore windpowerproject in the world 1 x 220 kW WindWorld outside Nordersund, Blekinge.			
SP	3	No studies available. Information about fishing interesting areas in Secretaría General de Pesca Marítima (Agriculture, Fishing and Food Ministry) and autonomic communities	Silvia Revenga Tfno: 34 914025000	A	Spanish and English
UK	2	Effect of vibration on fish less well understood than on mammals. Study based on existing records of fish stocks and experience on other offshore projects necessary in EIS. Possibly also supplemented by surveys before, during and after construction.	1	Y	

1.d Marine biology (sea bed vegetation and fauna)					
BE	2				
DK	3	Foundations act as natural reef and introduces fauna	See above	A	DK
FI	3	Important but depending on site. Offshore construction in general has not taken this into consideration.			
FR	2	Very site dependant (benthos)	Study for Breedt offshore wind farm, In Vivo, 1999-2000		
GE	2	[1, 5, 3] expect possible loss of habitat and individuals due construction activities i.e. piling foundations will cause sedimentation covering benthos; changes in sediment structure may rise from changed water flow around foundations; also artificial hard substrates(foundations) might cause changes to the biotope structure – different species might find better conditions as in areas without hard substrate and with fishing activities going on. Judgements on quality (good or bad) and quantity of the possible impacts are debatable and not well known yet	[1] [6] [3] references in [3]	A A A NA	German German English
GR	3		5	N(*)	GR
IR	1	Research is ongoing, information not fully collated on the underwater ecology of sand banks. Footprint of turbine foundations and cables, traffic, electromagnetic radiation, noise may reduce abundance and diversity of seabed life. Design windfarm to maintain or improve habitats for species of importance.	[1],[2]	A	English
IT	1	considerations for offshore and semiøffshore farms during construction	No nex		
NL	2	*Seabed vegetation and fauna will suffer mostly during the construction phase. But this is not a permanent effect. Also here, the absence of fishery and shipping will have a local positive effect. The presence of the construction on the sea bottom could also have positive effect on some habitants.			
PL	3				
SE	3	No evidence of impact is found on marine biology in the Bockstigen/Valar project or the Utgrunden project. There were fears of of sedimentation of seabed before both projects because of lots of silt and mud from the monopile drilling. A little sedimentation could be seen around the monopiles the first days after drilling at the Bockstigen project. It disappeared and diluted completely after the first storm. The problem was totally avoided at Utgrunden as the monopiles were hammered down.			
SP	3	Not available studies			
UK	2	Vindeby (DK) study indicates positive impact on local populations due to artificial reef effect. EIS will have to address and surveys are likely to be necessary.	1	Y	

1.e Hydrography					
BE	3				
DK	1	Site dependent, but no observations indicating problems	No		
FI	3	Largely done by now. Only some parts not mapped.	http://www.fma.fi/english/index.html	Y	
FR	2				
GE	-				
GR	2				
IR	1	Design foundations to minimise scouring, erosion and sediment redistribution	[2]	A	English
IT	2				
NL	3				
PL	2				
SE	3	No studies. The risk of impacts on hydrography is minimal while using monopiles. The monopiles are only 3-4 m in diameter and the distance between them will be 3-600 m. Maybe it is a risk of impacts on current if much bigger concrete foundations are used, although it is not very probable.			
SP	1	Not available studies			
UK	2	Detailed modelling may be necessary depending on size of project, proximity to shore, shallowness of water and general sensitivity of local hydrography	1	Y	

1.f Sea bed					
BE	2	Seabed stability against drifting could be important			
DK	3	Covers existing fauna, but look I.d	No		
FI	3				
FR	1	Risk of scouring on sand banks : difficulty to calculate maximum scour and/or guarantee the efficiency of protection	Laboratoire National d'Hydraulique (EDF), 2000	N (authorisation needed)	French
GE	3	no major impact expected	[3] references in [3]	A	English
GR	3				
IR	1	Scouring of the seabed can be a serious issue with gravity caisson type foundations	[1]	A	English
IT	3	Some cases only during construction	MiddleGrunden Dk	y	
NL	3				
PL	3				
SE	3	Removal of WECS after finished operating period should be prepared			
SP	3	Not available studies			
UK	2	As above but must also consider construction and decommissioning phases as well as sub-sea cables	1	Y	

1.g Sea currents					
BE	2	Constitutes an extra forcing input for dynamic analysis			
DK	2	Only important at special locations	A few reports about specific sites	A	DK
FI	3				
FR	2	Induce loads on foundations	Laboratoire National d'Hydraulique (EDF), 2000	N (authorisation needed)	French
GE	3	no major impact expected	[3] references in [3]	A	English
GR	3				
IR	1	Design foundations and footprint of area to minimise alteration to current flow. The typical low ratio between turbine foundation diameter to inter turbine spacing means effects on overall tidal current flows should be low	[1],[2]	A	English
IT	2	Some cases only during construction	Bostigen SW	y	
NL	3	can cause changes, which can effect fish-spawning grounds and insect larvae development (fish food)	^{iv}		
PL	3				
SE	3	See 1e			
SP	2	Not available studies			
UK	2	As in 1f	1	Y	

1.h Water quality					
BE	3				
DK	3	No information	No		
FI	1	The state of the Baltic Sea is alarming but wind power could hardly affect that.			
FR	3				
GE	3	as sedimentation processes and turbidity of water only arises during construction phase water quality is not seen as a problem	[3] references in [3]	A	English
GR	3				
IR	1	Concerns exist regarding waste generation and disposal during construction and maintenance	[2]	A	English
IT	2	Salt content-corrosion offshore structures	General	y	
NL	3				
PL	3				
SE	3	No risks			
SP	-	Not available studies			
UK	2	Project must minimise risk of contamination during construction operation and decommissioning. Must be addressed in detail in EIS.	1	Y	

1.i Visual effect both seen from land (specify distance) and offshore					
BE	1				
DK	1	Especially coast near In general in DK 8 km from land – then minor importance – see conflicts of interest, 2.5.2.	Different examples of visualizations, e.g. Ref. Nr. 8		DK/UK
FI	1	This is the most important question. (One opinion by a regional environment authority was that wind turbines must not be seen from ferry lines.!)		N	
FR	1	Dependant of the visibility (rough statistics available) : difficult to take in account in photomontages (blur effect ?)			
GE	2	[1] sees intrusive impact to landscape due to the fact that wind turbines represent technical buildings in an otherwise structureless landscape “visual impact is a matter of the viewers taste” [3] visual impact must be considered when developments are to take place in the coastal zone [7,3] i.e. rather close to the shore line – recreational use might be impacted negatively and also general landscape conservation must be considered most developments are expected to take place in the 200-Miles zone (?Exclusive Economic Use Zone? – <i>German term translated</i>) i.e. beyond the 12 sea miles border and with large distances from shore visibility is very low – with distances larger than 45 km visibility is nill, hence no visual impact to shore based observer	[1] statement from Greenpeace Int. [7] [3]	A NA A	German German
GR	1	Visual intrusion of great importance near recreational areas and/or coastal settlements			
IR	3	Offshore generating stations will not as a general rule, be allowed within 5 km of the shore but applicants may make a case for such if they consider that the proposed construction will not interfere unduly with the visual amenity of the area in question (both seascape and landscape). Such applications will be subject to special consultation procedures.	[9]	A	English
IT	3				
NL	1 (to uris m)	A comment which seems to reflect the general opinion is: 'the near-shore windfarm has a negative impact on the landscape and possible birds. This can be reduced by moving further offshore, using smaller turbines, building a smaller windfarm and switching off the turbines when birds are flying passed' ^v The windfarm's visual impact could also have positive impacts on the visiting public, though a visitor centre, trips to see the windfarm from the coast and on boat trips. A public opinion survey concluded that visual intrusion was the most important impact factor but wouldn't necessarily result in fewer visits to the affected location. ^v			
PL	1	Wind power plants - are <u>not included</u> to a list of severely damaging the environment and/or influencing it negatively. Society is rather democratic, and usually there are always parties which will compete with the public. Possible distance of 5 km from land.	The Decree of the Ministry of Environ-ment, 14th July 1998,	A	PL

SE	2	Can not be avoided. The issue should be carefully considered during the planning period. Key-factors: 1. Distance from coast 2. Avoid coastal areas known for their magnificent sceneries! 3. Use efforts upon educating people in the necessity of off-shore windpower and how people can benefit from it. 4. The planning process must be very open and careful. 5. Start with smaller demonstration projects.			
SP	-	Because of spanish sea depth, wind farms should be built near shore, hight visual effect from land.			
UK	1	If at all visible from land, the effect on the environment and economy (e.g. tourism) of the coastal area must be assessed. Effect on offshore viewpoints is primarily related to safety (e.g. visibility, distraction effect)	1	Y	

1.j Noise impact (onshore and offshore)					
BE	3				
DK	3	The general opinion is that noise is a problem, but in practice this is not a problem	Measurement reports		
FI	1	There is some strange noise propagation experienced offshore.			
FR	3	Except for low frequency noise and its impact on marine life (unknown)			
GE	2	noise impact on sea mammals and fish from turbine noise emitted into water is regarded as a “fashionable” area of interest; noise imissions into the North Sea are already large by now so it must be assumed that noise sensitive species have already left the area airborne noise might be of equal importance as onshore considering developments rather close to shore and considering the possibility that noise may travel large distances over open water surfaces	oral information author’s opinion		
GR	1	Acoustic intrusion of great importance near recreational areas and/or coastal settlements			
IR	1	It is unlikely that airborne noise from offshore wind farms will be a major issue. The effects of underwater noise needs assessment in a site specific manner.	[1],[2]	A	English
IT	1				
NL	3				
PL	1	Public is convinced that wind power generates significant levels of noise.	Seminar “Wind Power Onshore and Offshore”	A	PL
SE	2	Noise onshore from offshore windplants can not be heard provided the distance from shore is at least 3 km and good low-noise turbines are used. There is a risk that noise-problem will be considered as non-existing by the turbine manufacturers. Long distances-no noise problem. There is a motorwaylike murmuring in distances up to 1,5 km around a big windpark with 5-600 kW turbines - even longer at special weather conditions. The turbines are expected to be 3- 5 MW size, offshore even more.. The murmuring can then be heard maybe 7-8 km if no steps are taken to make big turbines low-noise.			
SP	-	NA			
UK	3	Visibility effect will typically drive turbines far enough from shore to give inaudible levels of noise. Assessment similar to that for land-based farms will, however, be necessary.	1	Y	

1.k Raw materials					
BE	3				
DK	2	A few sites have been appointed to serve as raw material deposits, here no farms	Public sea maps		UK
FI	3				
FR		?			
GE	3	German coastal shelf is distributed into several areas with mining concessions for individual companies; these have the rights (company interest) and the obligation if considered necessary (public interest) to exploit possible fossil energy sources (s.a. oil and gas); companies have probed their areas and have partly found oil or gas; exploitation however is currently economically unattractive	oral information at hearing organised by planning authority		
GR	3		8	Y	GR
IR	-				
IT	1				
NL	3				
PL	2	Exploration of crude oil on <i>the Polish part of the sea</i>			
SE	3	A simple inquiry to the special state-authority gives the answer if the site holds any important raw materials. Extracting of raw-materials for instance oil or gravel can be possible to do in combination with offshore windpowerproduction. There are possible synergies.			
SP	-	NA			
UK	3	Case for good net energy balance and effective use of raw materials must be made in EIS.	1	Y	

1.l Marine archeology					
BE	3				
DK	2	Must be examined as all other construction works – can result in delay of project	No		
FI	3				
FR	3				
GE	3	could be a problem if wind farm site coincides with site of archaeological interest; prior scanning of the area of interest could avoid these problems	[3] references in [3]		
GR	1	Specific areas of archeological interest (e.g. Northern Crete, Central Aegean) where interventions on terrain are prohibited			
IR	1	The National Monuments Acts (1930-1994) make extensive provision for the protection and preservation of national monuments, historic monuments and archaeological areas. These acts operate in addition to the planning controls and are relevant as they apply to the sea bed, which is outside of the jurisdiction of the planning authority. Many shipwreck sites in the shallow underwater banks and shoals around the coast are under protection.	[1],[2]		
IT	2				
NL	3	possibility of damage to ship-wrecks, these are marked in ^{vi via ii} and iv			
PL	2	Many wrecks of ships			
SE	3	Sometimes a study is needed .			
SP	-	NA			
UK	3	Some listed wrecks (e.g. war graves) but typically in deeper water than is envisaged for wind farms			

1.m Recreational areas					
BE	2				
DK	1	8 km from sea shore, see 2.5.2.	Danish law about use of the coastal zone		DK
FI	1	The Finnish coastline is full of summer cottages and recreational areas. Boating is very popular in summertime, including picnics to the outer archipelago. Wind turbines will be both liked and disliked under these circumstances, as always.			
FR	1	Very sensitive to locations : "wind wall" effect	Offshore in Normandy, 2000 Offshore in Brittany, 2000		
GE	2	see visual impact			
GR	1	Visual intrusion is of great importance near recreational areas and/or coastal settlements			
IR	-				
IT	3				
NL	3	only with respect to visual impact at beach (see 1.i); little impact at the location itself ⁱⁱ			
PL	1		Seminar "Wind Power Onshore and Offshore"	A	PL
SE	3	If the planning process has been good enough there will not be any problems.			
SP	-	Wind farms near shore, problems with beach and recreational areas in countries both with a tourism based economy or depressed.			
UK	2	As II			

1.n					
GR		Environmental Policy-Legislation	1-4, 6,7, 19	N(*)	GR
NL		From several studies in the past the local and regional effects are qualitatively clear. The magnitude of impact on the environment is often not determinable yet and differs from place to place.			

WP 2.5: Social Acceptance, Environmental Impacts and PoliticsTable 2.5.2. Conflicts of Interest

2. Conflicts of Interest: Please specify national experiences and/or considerations concerning conflicts of interest in relation to Offshore Wind Farms during construction and after installation in relation to the topics listed below:					
Importance		Main Conclusions	References	A/N	Language
2.a Effect on traffic: ships					
BE	1	Marine traffic safety issues should be investigated. Also possibility for severe environmental damage in case of oil carrier collisions with wind turbines. Insufficient information on damage mechanisms.			
DK	1	Avoid official ship routes	Afmærkning af Danske Farvande (Buoying Danish Waters, 6th revised version, 2000)	A	DK
FI	2	This is a technical siting limitation.			
FR	1	The offshore wind farm has to be away from maritime routes (presence of an other sand bank between the wind farm and the maritime route)	Breedt offshore, EED, 2000		
GE	1	as the German Bight has very dense ship traffic a study on collision risk is necessary and currently being carried out	[8]	N	
GR	1	Frequent traffic on the islands especially during spring-summer. LSOWE installations might require reconsideration of routes	Ministry for Shipping		
IR	1	Certain areas will be prohibited for use as offshore wind farm sites where protection of established shipping lanes demand it. These are listed in reference [9]. As offshore structures are a potential hazard to marine navigation, it is imperative that they be marked properly and effectively, in accordance with international guidelines. The commissioner of Irish Lights and local ports authority should be consulted, in this regard. There are some concerns regarding the need to alter existing sea traffic routes and the increased collision risk which may be mitigated by avoiding construction of wind farms near major navigation routes.	[9] [2]	A	English
IT	3				
NL	1	was reason why proposed location for Near-shore Windpark was moved from IJmuiden to Egmont. ^{iv} Windfarms must avoid traffic lanes, plus cable routes must avoid locations where ships may lay anchor while waiting to enter harbours. ^{iv} Lely windfarm (in the IJsselmeer) has coloured stripes plus warning lights for ships (located about 1 km of a harbour entrance) ^{vii}			
PL	1	Polish coast has several major routes connecting Scandinavian countries and Poland		N	

SE	2	There must be lots of discussions and cooperation during planning period with cost guards and the Sjöfartsverket (shipping board). Offshore windfarms will be located on reefs, banks and other shallow waters which must be avoided by at least big ships. Thus good planned offshore windparks can contribute to the maritime safety	The Swedish Shipping Board have produced guidelines for location and illumination of windturbines in Swedish waters.	A	Swedish
SP	1	No problems in Cadiz and Huelva. Traffic ship information at	www.mfom.es/documentacion/top_documentacion.html www.mfom.es/marinamercante/top_marina.html	A	Spanish and English
UK	1	Existing rights of navigation must be safeguarded – required as part of permitting	1,2	Y,N	

2.b Effect on traffic: air traffic					
BE					
DK	2	Turbines must be below 150 m for usual navigation	?		
FI	2	This is a technical siting limitation.			
FR	2	Beaconing day and night like onshore sites			
GE	3	no major effect expected with large developments at large distances to shore	oral information and authors perception of the discussion	--	
GR	1				
IR	1	Certain areas will be prohibited for use as offshore wind farm sites where protection of air navigation demands it. The Irish Aviation Authority should be consulted.	[9]	A	English
IT	1				
NL	2	avoid landing strips and potential location for proposed offshore airport ^{iv} . The negative impacts are obstruction plus potentially additional turbulence, avionics and landing gear and pilot psychology, but none of these have been investigated scientifically ^{iv} .			
PL	1	The Ministry of Transport for civil aviation The Ministry of Defense for air force		A	
SE	-				
SP	3	No information			
UK	1	Siting must be approved by Civil Aviation Authority. Helicopter routes may be major concern for some offshore areas.	1	Y	

2.b.i Marking lights					
BE	3	No specific requirements			
DK	1	Helicopter rescue service makes demands about very visible marking lights, which may reduce public acceptance if carried out	Two-year committee work just started		
FI	2	Needed on nacelle top but has negative impact on birds.			
FR	-				
GE	3	for buildings larger than 100m marking lights are mandatory	national regulation	N	
GR	1	The illumination should clearly demarcate the outer dimensions of each machine and the entire plant. Related standards for onshore wind farms available	Ministry of Traffic, Commercial Aviation Service		
IR	1	No prescriptive conditions - it is imperative that they be marked properly and effectively, in accordance with international guidelines	[9]	A	English
IT	3				
NL		not a requirement for aircraft currently			
PL	2	Lights are obligatory			
SE	2	Marking lights and the location of those marking lights are important issues. Rescuing with helicopters can be necessary in a windpark. Then turbulent wakes behind big windturbines makes a considerable risk for loosing control of the helicopter. The phenomenon has been observed at the Bockstigen site even with the small turbines on that site with 37 m rotor and 40 m hub height. The illumination must be studied in connection with the visual impact. Safety aspects are of course the first, but good illumination for safety is best if it is beautiful at the same time. Too much marking lights can make a risk for migrating birds. They cause orientation problems for the birds.			
SP	3	No information			
UK	1	May be required for vessels and aircraft	1	Y	

2.b ii. Colors					
BE	3	No specific requirements			
DK	1	see above	Ibid		
FI	3	In some cases red blade tips has been used but nowadays nacelle lights is accepted.			
FR	-				
GE	3	for wind turbines larger than 100m signal colours on the blades are mandatory	national regulation	N	
GR	2	Related standards for onshore wind farms available	“		
IR	1	No prescriptive conditions - it is imperative that they be marked properly and effectively, in accordance with international guidelines	[9]	A	English
IT	2				
NL		not a requirement for aircraft currently			
PL	2	No regulations			
SE	3	The widespread use of good navigation equipments, radar,GPS etc can be mentioned here. It makes it less important to paint the turbines in bright and shining colours which is positive for the visual impact.			
SP	3	No information			
UK	1	May be required for vessels and aircraft	1	Y	

2.c Defense					
BE					
DK	3	Only problem at a few known sites	Official navigation maps. Most area restrictions are shown on navigation maps	A	UK
FI	1	The military owns large parts of the coast, the archipelago and the sea. There is a decision not to allow wind turbine installations on army areas. One conclusion is that this is a temporary decision that can be withdrawn when wind energy is more common. The army does not want their areas to be a demonstration site with huge public interest. Nor do they want the eventual discussion on pros and cons of WE to be related to their sites and activities.		N	
FR	-				
GE	2				
GR	1				
IR	1	Certain areas used by the Department of Defence as gunnery, bombing or firing ranges are prohibited, listed in [9]	[9]	A	English
IT	3				
NL	-				
PL	1				
SE	-				
SP	1	No information. Difficult access			
UK	1	Siting must be approved by MOD	1	Y	

2.c i. radio/radar					
BE	1	Highly dependant on location			
DK	2	Towers can disturb radio signals but problems can be avoided by links	No		
FI	1	Not presently known.			
FR	1	Real impact on radar used for marine safety. Impact equivalent to a mid sized boat	Breidt offshore, THOMSON DETEXIS, 1999		
GE	2	there are considerations that are concerned with scatter effects on ship radar	oral information at hearing organised by planning authority	--	
GR	2				
IR	-				
IT	3				
NL	3				
PL	2	There are radio/radar stations on the coast			
SE	1	Very suitable areas for offshore windpower are closed because of defence interests. Good studies are needed to show that windpower and national defence can co-exist and still better to show that windpower is a part of the total national defence. A big Swedish study concerning impacts on radar and radio system is finalised this year.			
SP	3	No information			
UK	2	Siting must be cleared by CAA, MOD and/or DTI Radcom			

2.c ii. training grounds					
BE	3				
DK	1	Impossible to move these areas, but they are well-known	No		
FI	1	Will not be accepted.			
FR	3	No feasibility for wind farms			
GE	2	there are large areas designated as training grounds while training ground status does not exclude traffic or fishing use; this will change with wind farm installations as they will discard these areas for military training use this represents a matter of political will whether or not to give up military training grounds for offshore wind energy use.	oral information at hearing organised by planning authority and authors perception of the discussion	--	
GR	1	Restricted areas near borders and on remote islands of the Aegean/Ionian Seas	Ministry of Defense		
IR	-				
IT	2				
NL	2	Will preclude certain areas. Egmont is an ex-military area, which was released for other use. ^{iv}			
PL	1	Major grounds for training on the southern coast of the Baltic sea			
SE	1	See above			
SP	2	No information			
UK	2	MOD may object in specific training areas (firing ranges, low flying zones) or in specific air corridors.	1	Y	

2.d Fishing interests					
BE	1	Major public opinion issue			
DK	1	Important for acceptance. Fishing organizations claim losses, but can be paid.	No		
FI	1	Trawling might limit possibilities. Also some flatfish interest might limit the use of banks and low water depths.			
FR	1	Conflict in use of the sea. Very power ful lobby (one boat can block the port of Dunkerque or Calais !)			
GE	2	loss of fishing grounds must probably financially be compensated for	oral information at hearing organised by planning authority and authors perception of the discussion	--	
GR	1	Nearshore fish farms, fishing navigation	Ministry for Shipping		
IR	2	There are concerns regarding loss of trawling ground, loss of areas for pot fishing, damage to spawning grounds resulting in economic loss to fishermen with consequent social impacts. The policy of the Minister of the Marine and Natural Resources is to maximise the value of offshore resources to the State, and to protect the rights of other users. In this regard, He will have regard for competing demands in granting leases.	[2],[9]	A	English
IT	2				
NL	1	Can be resolved with compensation ^{IV} .			
PL	2	Entire coast is a ground for small fisheries		N	
SE	2.	Important spawning areas must be avoided. But with careful planning windturbie foundations can serve good as artificial reefs	Report to Swedish national survey on offshore windpower.	n	Swedish
SP					
UK	1	Important interest-group with substantial public sympathy and a lot of power to disrupt projects			

2.e Bird interests (designated areas)					
BE	2				
DK	1	Important in relation to acceptance – restricted areas are to be avoided. Still discussion about how far away from the area border farms can be placed	Maps		
FI	1	Is a limiting factor. Bird interest also important outside designated areas.			
FR	3	No feasibility for wind farms			
GE	1	biggest problem here is that the Important Bird Areas have not yet been officially designated	oral information at hearing organised by planning authority and authors perception of the discussion	--	
GR	2	Main considerations concern endangered species living onshore	15, 16, 17	N(*)	GR
IR	1	Designated areas for the protection of birds are not specifically excluded for offshore wind farms currently.	[9]	A	English
IT	2				
NL	1	see previous			
PL	1	Vistula peninsula is a region for several species of birds in the region, these either will stay at that location or will deteriorate	Seminar “Wind Power Onshore and Offshore”	A	PL
SE	2	See 1a. Even if there is no evidence of impact on birdlife it will give provoking signals if developers want to use special designated areas for birds.			
SP		No studies available. Information about organisations	www.seo.org		
UK		RSPB will be key consultee in areas where avian issues are of importance.	1	Y	

2.f					
	3	Dredging : extraction of sand and dumping of canal-dredging waste can be accommodated Fejl! Bogmærke er ikke defineret.			
BE		Designated RAMSAR areas should be excluded for Windparks			
GR	1	Oil drilling : Oil platforms (Northern Aegean Sea)	Ministry of Development		
IR	1	Dump sites : Licensed dump sites for the disposal of dredge spoil will be prohibited	[9]	A	English
NL	2	Cables and Pipelines: 1km maintenance-access corridor needed around pipelines and power/communication cables (both existing and prospective). Avoid the four locations where pipelines are allowed to landfall. ^{iv}			
UK	1	2.f Coastal amenity : Wind turbines must be assessed and shown to have acceptable effect on amenity Grid connection will have to be assessed and shown to have acceptable effect on amenity and environment Construction, maintenance and decommissioning work will have to be assessed and shown to have acceptable effect on amenity and environment	1	Y	

WP 2.5: Social Acceptance, Environmental Impacts and PoliticsTable 2.5.3. Social Acceptance

3. Social Acceptance (Public Acceptance and Press Reactions): Please specify national experiences and/or considerations concerning social acceptance regarding <i>Offshore Wind Farms</i> during construction and after installation in relation to the topics listed below:				
	Main Conclusions	References	A/N	Language
3.a Does the acceptance in general differ from the reactions known from onshore farms?				
BE	General attitude seems to be somewhat more positive towards off-shore wind energy. Nevertheless NIMBY syndrome exists locally, especially due to fishery interests.(Watch for the BANANA syndrome : Build Absolutely Nothing Anywhere Near Anybody)			
DK	Positive in Denmark compared to onshore	No		
FI 1	Yes and no! Some oppose onland WE and wants it offshore, other the opposite. Offshore is not out of everyone's sight. I.e. summer recreation.			
FR	Not really, but different public : “marine people” are less aware about energetic issues especially offshore (“develop first onshore” is a main issue in France). Difficulty linked to the fact that “terrestrial developers know nothing about the sea and its harsh environment”. Lack of communication because of no common language.	Development of offshore projects in Normandy, Brittany, Mediterranean and North Sea, 1998-2000	A	French
GE	Generally not: the closer the more concerned – not in my backyard phenomenon reaction of public living close to development i.e. island communities is rather sceptic with the expectation of negative impact on the touristic attractiveness of the islands otherwise people living far from coast have mostly no or a positive conception of the issue; positive feelings arise from a rather high environmental awareness in Germany and the wish to avoid fossil fuels	oral information and authors perception of the discussion	--	
GR	There are no LSOWE plants installed yet. Onshore WE installations have not caused remarkable public reactions yet, as wind energy is exploited up to date in less frequented or uninhabited areas.	9, 11, 12	N(*)	GR
IR	Some of those who object to onshore wind farms see offshore wind farms as the solution due to the reduction in visual impact. This may change as the farms are developed offshore.			
IT				
NL	generally similar; the main points are impact of birds and landscape			
PL	Not yet known	Seminar “Wind Power Onshore and Offshore”	A	PL

SE	Bockstigen/Valar. Very high acceptance all the time. Utgrunden: Still better acceptance. Very good opinion and very good press. Yttre Stengrund: The construction period has just started. The acceptance has been very good during the planning period. Klasården (a 42 MW windfarm under planning outside the Näsudden peninsula): Some criticism because of vicinity to the shore (2 km to the nearest turbine) In general offshore windpower is more accepted than onshore.			
SP	Not available data			
UK	Too early to judge, as only Blyth Harbour (2 turbines) has been realised to date.			

3.b How is the organization behind offshore wind farms?				
BE	Currently known projects are developed by consortia consisting of utilities, offshore contracting companies and wind energy developers.			
DK	Mostly utility owned, but efforts to involve cooperatives in order to raise public consciousness about energy and environment.	No		
FI 1	Largely bit utilities that can afford large EIAs but lack "real" local connection.			
FR	The main problem is that there is no rule for building permission. A study has been launched in Languedoc Roussillon in order to define a framework for authorization.			
GE	mostly private investors, some companies noted at stock exchange	oral information and authors perception of the discussion	--	
GR				
IR	The planned offshore wind farms will be privately owned, in some cases consortia. The Irish Wind Energy Association recently established an Offshore Committee to promote and support the development of offshore wind energy in Ireland.	[10]	A	English
IT				
NL	business consortia			
PL	No any offshore farm at all hence difficult to predict.	Seminar "Wind Power Onshore and Offshore"	A	PL
SE	Development by small developing companies like Vindkompaniet and Eurowind. Constructing by german or danish windturbine manufacturers. Financing by private investors.			
SP	Not available data			
UK				

3.c. Does public involvement influence on public acceptance?				
BE	Unknown			
DK	We think so, but have no investigations to confirm this assertion. The Middelgrunden offshore farm has received broader acceptance than many wind Farms in Denmark – we believe the explanation to be the public involvement in the cooperative.	No		
FI 1	Not experienced			
FR	Yes. An offshore requires the support from all “terrestrial” communities : local community, General Council (department), Regional Council (region). But public is not involved directly in the project (no specific law in France for public involvement).			
GE	no experience available as there has been no wind farm built yet financial involvement might be more difficult than onshore as investment volumes are expected to be much larger offshore, if a positive effect is to be achieved local public must become involved in the projects	oral information and authors perception of the discussion	--	
GR				
IR				
IT				
NL	not known			
PL	Yes	Seminar “Wind Power Onshore and Offshore”	A	PL
SE	Yes			
SP	Not available data			
UK				

3.d Others				
FI	<p>How is the public acceptance in relation to environmental impacts? (Please specify cases): 1Not yet offshore experiences.</p> <p>On Åland the next to the closest neighbor to a windfarm has lifted a case. All other neighbors (~20) are in favor.</p> <p>Some summer residents have objected to other installed windfarms but cases have been overthrown.</p> <p>In Espoo, outside Helsinki, an initiative was withdrawn after fierce opposition by neighboring summer residents. This has happened also elsewhere.</p>			
PL	<p>Barriers obstructing development of RES including offshore power onshore and offshore :</p> <p>Legal and financial barriers Lack of applicable legal solutions describing the strategy in the RES utilisation, Inadequate economical mechanisms, particularly fiscal ones, Relatively high investment costs of RES technologies</p> <p>Information barriers Lack of general access to information about distribution of energy potential of particular kinds of renewable energy, Lack of information on manufacturing companies and design engineers and consultants from that area, Lack of generally accessible information on procedures in entering investments, typical costs and benefits from RES utilisation</p> <p>Lack of state-of-the-art knowledge on RES Insufficient amount of domestic organisations involved in the process of serial production of equipment utilising the renewable energy, Lack of tax preferences for imports and exports of equipment utilising the renewables</p> <p>Educational barriers Inadequate scope of educational curricula, Lack of educational and training programmes on RES addressed to interested parties</p> <p>Principle of landscape preservation barriers Lack of developed methods of refraining conflicts with the protection of environment and landscape</p>			

WP 2.5: Social Acceptance, Environmental Impacts and PoliticsTable 2.5.4. National Policies

4. Politics: Please specify national experiences and/or considerations concerning policies regarding <i>Offshore Wind Farms</i> during construction and after installation in relation to the topics listed below:				
	Main Conclusions	References	A/N	Language
4.a How is the general reaction and attitude to offshore wind farms?				
BE	Important political support for off-shore wind energy development (and for renewable energy development in general).			
DK	Positive	No		
FI 1	The general opinion is in favor but there is a nimby effect. Opposition not organised but loud.			
FR	Appears as a “new frontier” and a technological challenge for terrestrial politics. Why in the sea for marine organizations.			
GE		authors perception of the discussion	--	
GR				
IR	None built yet but political support does exist in general. No specific targets for offshore wind energy yet.	[9],[11]	A	English
IT 3				
NL	* Positive : The Government has planned to provide 10% of the total energy consumption by renewable energy by the year 2020. The contribution of wind energy is about 2750 MW, and 40-50% of this must be offshore. To create a deeper insight concerning the environmental impacts, among other things, several study projects were done in the recent past. * Many eco-organisations, local as well as international, are participating in these studies. Their attitude is generally positive within a certain corridor of environmental requirements. Imp. : High.	Report ^{viii}	Y	Yes
PL	Rather positive. A positive response due to a rather scarce knowledge on wind energy in general.	Seminar “Wind Power Onshore and Offshore”	A	PL
SE	Positive except when developers propose provocative projects in highly appreciated recreational areas.			
SP	Very bad attitude in Cadiz. No problems in Huelva			
UK	Much more positive than in the case of on-shore wind farms but it is difficult to judge as developments are at a very early stage.			

4.b Which national planning rules and regulations do exist?				
BE	<p>Off-shore wind energy legal framework is clearly defined, in :</p> <ul style="list-style-type: none"> • Law on concessions for off-shore wind and wave energy plants (as part of general electricity regulation law). • Law on (environmental) authorisations for all off-shore installations • Law on environmental impact reporting for all off-shore installations <p>Some remaining uncertainties due to necessity of regional autorisations for grid connection.</p>			
DK	<p>The Danish Energy Agency is authorising offshore wind farms inside as well as outside territorial waters.</p> <p>Planned 4000 MW before 2030. A national committee has pointed at specific potential areas of which 750 MW will be utility developed and serve as pilot projects to be established before 2008. There are ongoing negotiations to have 150 MW of these 750 MW owned and developed by cooperatives. After 2008, the offshore wind energy sector will be subject to the same rules as for offshore gas and oil exploitations, i.e. open bidding procedures.</p>	<p>Ref. Nr. 9 Ref Nr. 1 The Danish National Budget 2001</p>	<p>A A A</p>	<p>UK UK DK</p>
FI 1	<p>EIA requested from >50 MW power plants. Suggested for > 10 MW wind farms.</p> <p>Regional planning authorities.</p> <p>Protected areas</p> <p>Local planning permission needed. (Depending on regional land use plan)</p> <p>National "Waters Act" "Environmental Protection Act"</p>	<p>http://www.pvo.fi/merituuli/svenska/index.asp</p> <p>www.vuh.fi</p>	<p>A</p>	
FR	<p>No specific rules. Our work is taken as a guide for future rules (like for onshore wind farms in the 80's)</p>			
GE	<p>Within 12 to 200 miles zone the national authority for sea traffic and hydrography is the entity for permissions, legal basis is the international bill of sea rights together with a national regulation for building and operation of plants in the 12 to 200 miles zone</p> <p>for developments near shore and grid connection through coastal sea the regional governments of the german countries bordering the North Sea are the permitting authorities, regional planning procedures are required in which all relevant national laws and regulations are to be applied – may be rather time consuming</p>	<p>oral information at hearing organised by planning authority and authors perception of the discussion</p> <p>[9]</p>	<p>-- A</p>	<p>German</p>
GR	<p>Legislation for RES applies also to large-scale offshore wind energy</p>	<p>22, 23, 24</p>	<p>A</p>	<p>GR</p>
IR	<p>Procedures for applying for foreshore licenses (to investigate site suitability) and foreshore leases (to develop wind farms) published. Applications made to Department of the Marine and Natural Resources</p> <p>Offshore wind farms will not, as a general rule, be allowed within 5 km of shore. Certain areas are identified as prohibited to ensure safety at sea, protection of established shipping lanes, air navigation, telecommunication needs and defence requirements</p> <p>Planning permission required from relevant local authority for onshore infrastructure associated with offshore wind farms.</p>	<p>[9]</p>	<p>A</p>	<p>English</p>

4.b Which national planning rules and regulations do exist?				
IT 3	<p>Planned 2500 MW on- and offshore within 2010 according to the National White Paper of 1999. Only a small fraction of this target expected to be offshore. Total offshore potential is about 3000 MW.</p> <p>The Italian Navigation Code (INC) and the Application Guide of INC (AGINC) are the reference legislation for offshore wind farms installation in the Italian national waters; specifically art.36 and following of INC and art.5 and following of AGINC (for the type and format of application documents).</p> <p>Special permits should be considered for offshore Wind Farms, because of the long time limitation related to their presence for the activity of navigation, fishing, marine sport, and others.</p> <p>Many other Administrations are involved in processing the installation permits: Ministry of Transport, of Defence, of Environment, of Industry, of Civil Works, of Sea and Terrestrial Resources (General Direction of Maritime Fishing) and others.</p> <p>The Environmental Impact Evaluation should be considered necessary, even though no clear policy is applied today.</p> <p>At the end of the procedure the Permits are issued by the Compartment of Maritime Transport and shown to public office of interested Municipality and Province for public information and possible opposition.</p> <p>The installation of Offshore Wind Farm and Permit applications is under the control of the local Harbour Authorities by their presence Coastal Guard.</p> <p>Safety features for navigation and aviation are requested in the Permit. Information on the offshore plants is due to Marigrafico office for its inclusion on the nautical charts.</p>	Oil platforms		
NL	<p>Within the 12-mile-zone, apart from a near shore wind farm pilot project (NSW), no wind farms will be allowed.</p> <p>There are practically no Dutch regulations and rules existing for large-scale offshore wind energy outside the 12-mile-zone. This could be positive or negative depending on political will.</p> <p>However, there are several laws and regulations that have to be considered when licenses in the Dutch Exclusive Economical Zone of the North Sea must be gained.</p> <p>These regulations are:</p> <ul style="list-style-type: none"> • Sea Water Pollution Law (Wet Verontreiniging Zeewater) • Environmental Administration Law (Wet Milieubeheer) • Spatial Arrangement Law (Wet Ruimtelijke Ordening) • Environmental Protection Law (Natuurbeschermingswet) • Governmental Water Works Administration Law (Wet Beheer Rijkswaterstaatswerken) • Wreckage Law (Wrakkenwet) • Monuments Law (Monumentenwet) • Excavation Works Law (Ontgrondingenwet) • North Sea Installations Law (Wet Installaties Noordzee) • (Sea) Bottom Protection Law (Wet Bodembescherming) • Mining Laws 1810, 1903 & EEZ (Mijnwetten 1810, 1903 & NCP buiten 12 mijl – From recent studies, it seems that this law has no implications for offshore wind farms) <p>Route Law (Tracéwet – This law is important for the seaways to be chosen)</p>	viii pg.16		No

4.b Which national planning rules and regulations do exist?				
PL	Very broad planning rules of the Construction Law referring to constructions at sea, Energy Law pointing at the necessity of implementation of renewable resources.	Seminar "Wind Power Onshore and Offshore" Energy Law Construction Law	A	PL
SE	<p>Legal framework under construction. In a recently published study carried out by the Swedish Energy Agency (, and initiated by the government with aims to make standards for the future offshore wind power, it is proposed that 3,300 MW of offshore wind power is to be developed within the next 10 to 15 years. Seven offshore areas have been suggested as locations of special interest, first of all in the Southern part of Sweden.</p> <p>For the moment a number of pilot projects are planned, and the intention is to follow these carefully during the whole planning and construction-process.</p> <p>It is expected that the current regulations (2001) are soon to be revised and simplified:</p> <ul style="list-style-type: none"> • Building Permit required from local authorities' (municipality) building and planning committee, according to the Planning and Building Act. • Permit required from local County Administrative Board concerning environmental issues (according to the Environmental Code). For projects larger than 10 MW, permits are issued by the Environmental Court concerned. • Application for water operation permits shall be considered by the Environmental Court • The government shall assess the permissibility of wind farms inside territorial waters if they are consisting of clusters of three or more wind turbines with a total output of not less than 10 MW. • Construction of wind farms outside territorial waters requires permission from the government. <p>The Swedish Energy Agency issues permits regarding cabling</p>	The governmental directives are available.		
SP	Neither national off-shore plans nor regulations			
UK	<p>Procedure for obtaining consents is being formulated and probably includes [2,3] but may also include [4,5,6]</p> <ul style="list-style-type: none"> • Defined procedure for obtaining site lease from Crown Estates (who is the "landowner" of most areas within the 12 nautical mile limit). First round of site allocations was made April 2001, where the location of 13 potential offshore wind farm sites was announced. Each site will consist of 30, 60 or 90 turbines. <p>Consents process still evolving but expected to include:</p> <ul style="list-style-type: none"> • Dept of Trade and Industry (DTI) provide "one-stop" consenting assistance but Dept for Transport Local Government and the Regions (DTLR) and Dept for the Environment Food and Rural Affairs (DEFRA) also involved. • Undertake Environmental Assessment and consultation leading to EIS. • Apply to DTI under the Electricity Act 1989. • Apply to DEFRA under Food and Environmental Protection Act 1985 • .Apply to DTLR under the Coastal Protection Act 1949, or Transport and Works Act 1992. 	2,3,4,5,6	N	

4.c Which national incentives do exist and how have they worked? (Give a brief evaluation)				
BE	Currently existing incentives are limited to IPPs and to projects smaller than 10 MW. A new system based on green certificate trading and a renewable energy quota with penalties for the 2 main Belgian regions (Flanders and Wallonia)is expected soon.	Flemish decree from July 17 2000		Y (Dutch)
DK	<ol style="list-style-type: none"> Utilities have until now been obligated to buy the energy produced by wind turbines. The feed-in tariff is currently DKK 0.33/kWh (EUR 0.044/kWh) plus green certificates varying from DKK 0,1/kWh to DKK 0,27/kWh (EUR 0.013-0.036/kWh) running for the first 42,000 hours of an offshore project with the rated power in typical places, app. 10 years. For the Horns Rev and Rødsand projects, a tariff of DKK 0,453/kWh (EUR 0,06/kWh) has been set. After 42,000 hours with the rated power the price will be based on the day-to-day market electricity prices plus green certificates. The green certificate system has been progressively delayed and following the outcome of a public hearing on the subject (September 2001), its introduction is postponed for minimum two more years starting up from 2005. Public support for feasibility studies for cooperatives <p>The uncertainty not knowing the prices (due to the introduction of green certificates) makes people reluctant.</p>	Departmental order about Grid Connection	A	DK
FI	3 Investement subsidy of 25-30 % given by the Ministry of Trade and Industry. A part of the energy tax is refunded (0.04 FIM/kWh).			
FR	No specific incentive for offshore, onshore: Guaranteed access, fixed feed-in tariff at app. 0.07 over 15 years			
GE	There is no firm governmental planning to develop offshore wind energy in Germany; Germany's Renewable Energy Sources Act (EEG – Erneuerbare Energien Gesetz) [10] continues the reimbursement at a fixed feed-in tariff. The Development of wind energy in Germany under the umbrella of a fixed feed-in tariff system is seen as a major success and as an appropriate tool to develop a strong market. In the reformed EEG a specially raised tariff is foreseen during the first nine years of operation of an offshore wind farm. This regulation is limited to projects coming online before the end of 2006; no evaluation as of yet – indication for attractiveness is the large number of projects applying for permissions in the German Bight	oral information at hearing organised by planning authority and authors perception of the discussion [3,10]		
GR	i) Subvention of up to 50% of the capital investment, ii) subsidization of loan interest, iii) tax-exemptions			
IR	No specific incentive for offshore wind farms. The Alternative Energy Requirement (AER) competitive bidding process is open to offshore wind energy. The target in AER V for wind energy is 240 MW, 40 MW of which is reserved for small-scale (3 MW) wind farms. There are also plans for a Grid Upgrade Development Programme to accommodate additional renewable energy based generating capacity. While AER V is open to offshore wind energy projects, planning permission must be evidenced in order to participate in the competition, which will effectively exclude offshore wind farms.			

4.c Which national incentives do exist and how have they worked? (Give a brief evaluation)					
IT	3	Moving from relaxed fixed price system, with 2001 buy-back prices being EUR 0.124/kWh for the first eight years and EUR 0.069/kWh for the remaining lifetime, to green certificates market in 2002	Green certificates, region structural funds		
NL		<p>* System of Green Certificates : More stability in the renewable energy market, which is a main requirement for potential investors.</p> <p>* Spotmarket mechanism combined with a “Balancing Market” in the Amsterdam Power Exchange will positively affect the windenergy market. (ref. Functionele eisen van offshore windparken, Kema, dec. 1998, pg. 15)</p> <p>* Fiscal incentives: Subsidies, REB (eco-tax), Vamil, Fiscal incentives do not yet apply outside the 12 nm zone.</p>	^{viii} pg.16		
PL		None.	Seminar “Wind Power Onshore and Offshore”	A	PL
SE		<p>There are no earmarked incentives focused on offshore windpower.</p> <p>The general support for introducing windpower in the powersystem is:</p> <ol style="list-style-type: none"> 1. Investment aid, 15% of the total investment in a windpower plant is paid as a state subsidy. 2. Environmental bonus which is connected to the tax system for electric power , from 1 jan 2001, 0,181 SEK (0,02 EURO) 3. Special support in order to make relief the consequences of fast decreasing power prices after deregulation 0,09 SEK (0,01 EURO) 4. Right to connect a small scale power station to the electric grid (small scale < 1,5 MW) 5. Special pay for decreasing losses in the electric grid up to 0,02 SEK (0,002 EURO). <p>A recent study initiated by government shall investigate how the above mentioned support system can be replaced of a green certificate system 1 Jan 2003.</p> <p>Brief evaluation: The support system has been working the way it was intended – to develop an annual production of 0,5 TWh electric power from wind- but it has not given the long time security which is needed to interest investors and creditors. For example, todays support system finishes 31 december 2002 with only promises of a new one which nobody knows how it will be designed.</p>	Law and regulations texts edited by the Parliament, the Government and the energy Board	some	english

4.c Which national incentives do exist and how have they worked? (Give a brief evaluation)				
SP	<p>No differences with onshore farms:</p> <p>The strategy of the Spanish government is summarized in the new "Program for Promotion of Renewable Energies" (Reference 1) approved by the Parliament to maintain the situation of the Royal Law 2818/1998-23 December 1998, about the Electrical Special Regime for Renewable Energy Plants connected to the grid. That law fixed the price and the bonus of the electricity produced by renewable energy plants, price that will be up-dated every year by the Spanish Ministry of Energy and Industry according to the annual variation of the market price. All owners of installations using renewable energies as primary source, with an installed power equal to or lower than 50 MW, have two choices, one is a fixed priced for the kWh generated, and a second option is a variable price, calculated from the average price of the market-pool, plus a bonus per kWh produced. In 2000 the bonus added to the base price was 0,0288 Euro/kWh and the fixed price was 0,0626 Euro/kWh.</p> <p>This program was prepared by IDAE (the national Diversification and Energy Saving Agency) and is the response to the undertaking Law 54/19976 on the Electricity Sector which defined the target of achieving at least a 12% of contribution to electricity demand in Spain from renewable energies by the 2010. The work was, at the same time, the Spanish incorporation of the European recommendations made in the White Paper on Renewable Energies.</p>			
UK	<p>Primary market is likely to be Licensed UK Electricity Suppliers to fulfil their Renewable Energy Obligation commitments.</p> <p>Revenue will consist of:</p> <ul style="list-style-type: none"> • Energy sale to supplier on a "negative demand" contract or through amalgamation mechanism on NETA power exchanges. • Sale of Renewables Obligation Certificates (ROCs). • Sale of Climate Change Levy Exemption Certificates • Use of system charge or benefit <p>Net value of the above expected to be around GBP 0.05/kWh (EUR 0.08/kWh). Internationally traded Green Certificates may also play a role.</p> <p>Capital grant budget recently announced of £39m from DTI plus £50m from National Lottery for offshore wind power (mainly) and biomass. Distribution method under discussion.</p>	7	Y	

Country specific list of relevant references:

Ref. Nr.	References	Content
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2	EC Directives 85/337/EEC and 97/11/EEC	On documentation and monitoring of environmental impact from large public and private construction projects.
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4	Elsam (2000) Høring om Havvindmøllepark ved Rødsand (Environmental Impact Report on offshore wind power park at Rødsand)	Case Study: Report on environmental Impact of an offshore wind power project prepared for the public hearing process. Available at http://www.ens.dk/nyt/Hoeringer/VindRoedsand/hoering_Roedsand.htm with English summary
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2	Development of a 7.5 MW offshore wind project in Dunkerque, EED for SAEML/Shell Renewable/Total and Jeumont, 1998-2000	Technical and economical definition of the project. Approval in EOLE 2005 call for tender.

3	Offshore identification in Brittany, EED, 1998 (for ADEME)	GIS, environmental and technical constraints, wind potential, identification of potential sites, pre-development of one site
4	Development of offshore site in Northern Finistere, EED/Total, 2000	Development of the project. Wind measurement in progress. Measures on site (bathymetry, geotechnics)
5	Offshore identification in Normandy, EED, 1999-2000 (for ADEME and regional Council)	GIS, environmental and technical constraints, wind potential, identification of favourable zones for offshore (3 zones)
6	Development of offshore site in Normandy, EED/Total, 2000	Development of the project. Wind measurement in progress. Measures on site (bathymetry, geotechnics)
7	Offshore identification in Normandy, EED, 1999-2000 (for ADEME and regional Council)	GIS, environmental and technical constraints, wind potential, identification of potential sites, pre-development of one site
8	Development of offshore site in Normandy, EED/Total, 2000	Development of the project. Wind measurement in progress. Measures on site (bathymetry, geotechnics)
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5	Ehrich, S.: Auswirkungen von Offshore-Windkraftanlagen auf Fische. In: Fachtagung Offshore-Windparks 30.05.2000. NNA Alfred Toepfer Akademie für Naturschutz (Editor): Workshop Proceedings. Schneverdingen: NNA, 2000.	see previous pages
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9	Hübner 2000:Offshore Windenergieanlagen: Planungs-und Genehmigungsrechtliche Grundlagen für die errichtung und den Betrieb von Windenergieanlagen in Küstengewässern und in der Ausschließlichen Wirtschaftszone –ZUR 2/2000.	see previous pages
10	Germany’s Act on Granting Priority to Renewable Energy Sources (Renewable Energy Sources Act).	see previous pages
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ii	Project-Planologische Kernbeslissing Locatiekeuze Demonstratieproject 'Near Shore Windpark', <i>Ministerie van Economische Zaken en Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer</i> , 2000	
iii	Wind mee of wind tegen, a preliminary study to the ecological effects of an offshore windturbinepark <i>Grontmij groep</i> , 1998	

iv	Milieu-effectrapport, Locatiekeuze Demonstratieproject 'Near Shore Windpark', <i>Ministerie van Economische Zaken en Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer</i> , 2000	
v	Een windpark op zee - een kwalitatief onderzoek, <i>Infomart</i> , 1999	
vi	North Sea Atlas, for Netherlands Policy and Management, Amsterdam, <i>Interdepartmental Co-ordinating Committee for North Sea Affairs (ICONA)</i> , 1992	
vii	van de Sande A.M.C., Windfarm Lely - first off-shore project in the Netherlands, <i>OWEMES Conference</i> , 1997	
viii	Haalbaarheidsstudie Demo. Project, Near Shore Windpark, <i>Novem</i> , 1997	
PL 1	Energy Law, 10th April 1997, with changes -June 2000	<p>Art. 15, p. 7. Foundations for national energy policy are required to designate development of renewable energy sources utilisation.</p> <p>Art. 16, p. 3.2. Energy plans prepared by energy companies are required to include renewable energy sources.</p> <p>Art. 19, p. 1 & 2.3. Municipal authorities are required to prepare projects of energy plans foundations including utilisation of renewable energy sources</p> <p>Art. 32, p. 1.1. Power production in sources of more than 5 MW capacity requires obtaining a concession in the Energy Regulation Office.</p> <p>Art. 9, p. 3. The Minister of Economy is required to issue a decree obliging energy utilities to buying power from renewable energy sources</p>
2	Spatial Planning Law, 1994	
3	Protection and Shaping the Environment Law, 1980	
4	Nature Protection Law , 1991	
5	Regulations on Transport and Communication Safety	
6	Construction Law	<p>Art. 3, p. 3. Structures serving as energy producing devices are so called constructions. This means that it is necessary to fulfill all the investment process requirements for constructions of that kind to construct, exploit and take them into pieces.</p> <p>Art. 34, p. 3. Applications for construction permits for structures that are not included in the Polish Norms and legal regulations, should be supplemented by a specialised expertises issued by an organisational body or a person, pointed by the Minister.</p> <p>Art. 59, p. 1. A constructing supervision organ in the construction permit may oblige an investor to obtain a utilisation permit.</p> <p>Art. 56, p. 1. Investor should inform an appropriate National Environmental Protection Inspection organ about finishing construction works.</p>
7	Decree on obligation of buying power and heat from non-	Paragraph 1.

	<p>conventional energy sources and the scope of the obligation <i>Ministry of the Economy</i>, February, 2nd, 1999</p>	<p>Energy utilities carrying on economic activity in the field of power or heat trade, described further on as “turnover companies”, are obliged to buying, from domestic producers, proposed amounts of power and heat from non-conventional sources, including renewable energy sources, described further on as “sources”, in particular heat and power from: hydro power plants, wind turbines, biogas produced in particular in: animal waste utilisation systems, waste water treatment plants, local waste dumps, biomass, photovoltaics, thermal solar collectors, geothermy.</p> <p>Paragraph 2. Obligation in question in Par.1, does not refer to buying power nad heat produced in: sources belonging to the turnover companies or being under turnover companies’ control, sources which rated power is higher than 5 MW, sources using fissile fuels in production process, sources constructed within national investments.</p> <p>Paragraph 3. Turnover companies are not obliged to buying power and heat from the sources, if the price: of a power unit is higher than the highest valid price of a power unit in the company, binding in the tariff for a power unit supplied to the end-users, connected to the low voltage grid, of a heat unit higher than the highest price of a heat unit offered by other suppliers producing heat from conventional sources.</p>
8	Proceedings of a international seminar: Wind Power Onshore and Offshore, Sopot, 15-17 December 2000	
SE 1	STEM (Swedish Energy Agency), 2001: Vindkraften i Sverige [Wind Power in Sweden]	
SP 1	Plan de Fomento de las Energías Renovables en España. 1999. Instituto para la Diversificación y Ahorro de la Energía, IDAE.	
2	Díez, JM., 1996. Guía Física de España. Tomo 6. Las Costas. D. L., Alianza Editorial.	
3	Saenz García de Albizu, J.C., 1995. El Desvío de Ruta en el Transporte Marítimo. Servicio Central de Publicaciones del Gobierno Vasco. 158 p.	
4	Ley 22/1988, de 23 de julio, de Costas.	
5	González, J.L. La Necesidad de Espacios Protegidos y sus Beneficios Esperados. Secretaría General de Pesca Marítima.	
6	Saenz García de Albizu, J.C., 1995. El Desvío de Ruta en el Transporte Marítimo. Servicio Central de Publicaciones del Gobierno Vasco. 158 p.	
7	The 1999 IEA Wind Energy Annual Report, Published by NREL, Colorado, USA	

<p>UK</p>	<ol style="list-style-type: none"> 1. UK DTI. An assessment of the environmental effects of offshore wind farms. ETSU W/35/00543/REP. Contractor Metoc PLC, Published 2000. 2. Transport and Works Act 1992. 3. Food and Environmental Protection Act 1985. 4. Coast Protection Act 5. Electricity Act 1989 6. Town and Country Planning Act 1990. 7. UK DTI. The Renewables Energy Obligation – preliminary consultation. October 2000. Additional DTI, Ofgem and ministerial statements October – December 2000. 	
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