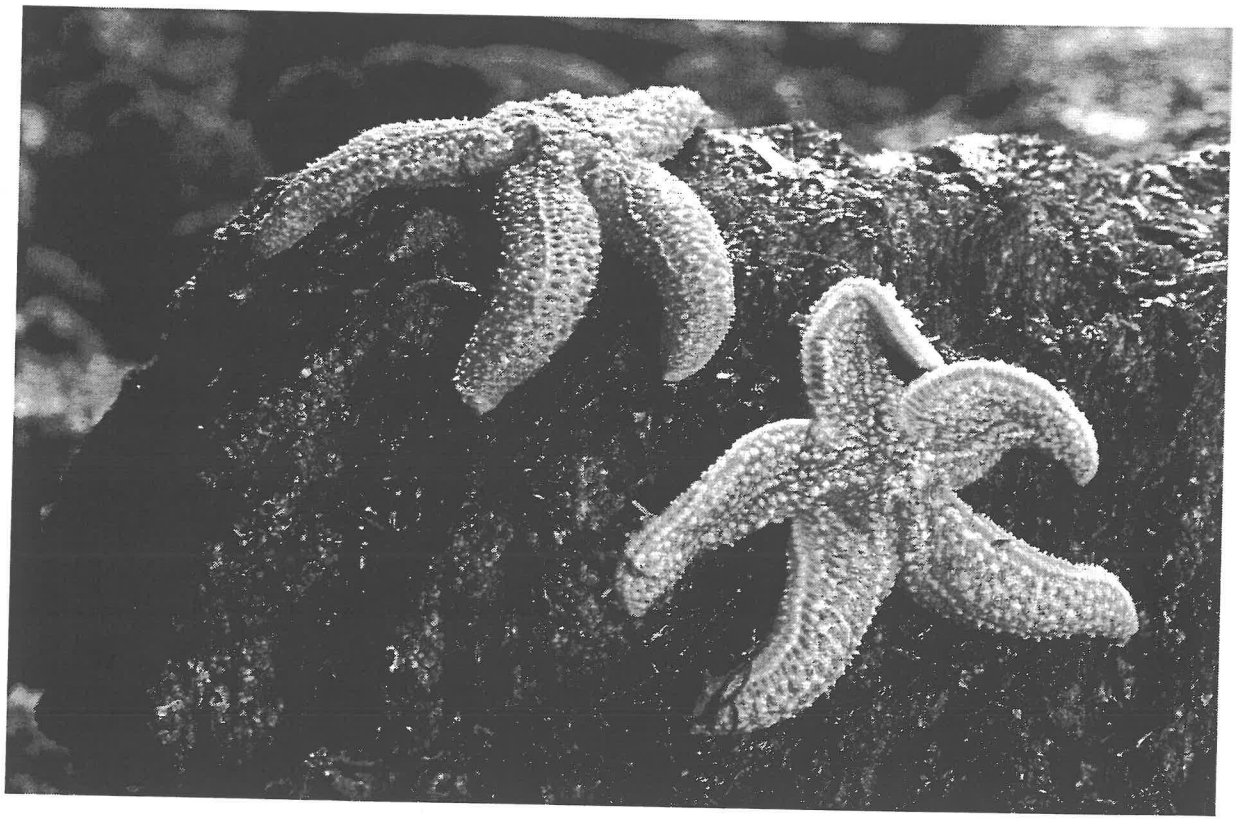

ENABLING OFFSHORE WIND DEVELOPMENTS

AUTHORS

S. Shaw, M.J. Cremers, G. Palmers
3E nv – www.3E.be
Verenigingsstraat 39 – B 1000 Brussels – Belgium

EWEA

European Wind Energy Association – www.EWEA.org
The Renewable Energy House – Troonstraat – B 1000 Brussels – Belgium

Pictures : Vlaams Instituut voor de Zee - Photographer : M. Decleer, Brugge

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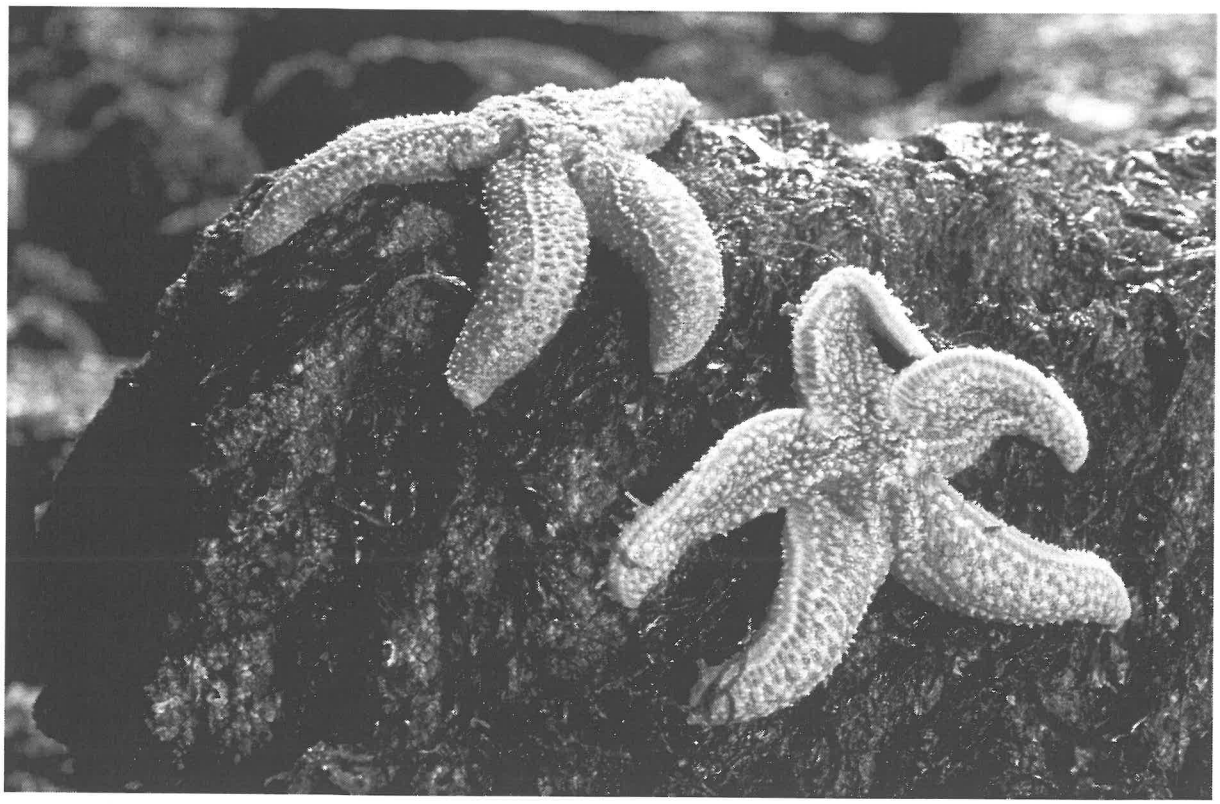

ENABLING OFFSHORE WIND DEVELOPMENTS

SPONSORS

European Commission, Directorate General for Energy and Transport – ALTENER Programme

Secretary of State for Energy and Sustainable Development, Belgium

NOVEM, The Netherlands

List of acronyms

ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie
CHP	Combined Heat and Power
DG	Directorate-General
DGEMP	Direction Générale de l'Energie et des Matières Premières
EC	European Commission
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EU	European Union
GHG(s)	Greenhouse Gas(es)
ICES	International Council for the Exploration of the Sea
LC	London Convention
LDC	London Dumping Convention
LOSC	Law of the Sea Convention
M/Mill	Million
MAP	Mediterranean Action Plan
MB (=BS)	Moniteur Belge (=Belgische Staatsblad)
MS	Member State
MUMM	Management Unit of North Sea Mathematical Models
R&D	Research and development
RD&D	Research, development and demonstration
TAC	Total Allowable Catch
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Council
UNEP	United Nations Environment Programme
WEC	World Energy Council

Prefixes

K	Kilo	10^3
M	Mega	10^6
G	Giga	10^9
T	Tera	10^12
P	Peta	10^15

Summary

Offshore wind development is the new challenge for the international wind industry. In Northern Europe alone, more than 20 000 MW of capacity is being 'tentatively explored', a limited part of which is in 'advanced' planning phase. Table 1 gives a summary of existing and prospective offshore wind energy sites in the EU, and a visual reference of these is provided in the map of Figure 1. Eventually, this new offshore business could challenge oil and gas production on the home territory [EWEA, Greenpeace, 2002].

Investment costs for offshore wind have been reduced from 2200 €/ kW, as seen for the first Danish offshore wind projects (e.g. Vindeby, in 1991), to 1650 €/ kW, as seen for the recently operational project at Horns Rev (in operation since autumn 2002). Technology has evolved quickly to a stage where frequency control, dynamic stability during faults, and advanced remote control to optimise maintenance can be applied. Energy costs have decreased from 8 € cents/kWh (first demonstrations) to 4,7 € cents/kWh[1] (Horns Rev) [CAOWE, 2001]. These costs relate to first generation offshore wind turbines – completely new and more cost-effective designs will arise if the next decade of offshore wind developments produces sufficient investor confidence, and if policy frameworks are sufficiently stable.

Economics aside, a number of other risks can hinder the large-scale development of offshore wind. Risks associated with large-scale offshore wind deployment arise from operation, grid interaction, market access, and other regulatory risks [O'Connor, 2001]. This report focuses on the regulatory and legislative risks.

In the body of the report, the international and European legal framework is presented as a guideline for offshore wind project developers. A review is done of the national offshore wind policy for countries having a significant short to medium term offshore wind potential (Belgium, Denmark, France, Germany, Ireland, Sweden, The Netherlands and UK).

This review is presented according to the following structure:

- Delineation of the national seas
- Competent authorities for offshore wind development
- Legal and procedural requirements
- Economic framework of offshore wind development and exploitation

Best practice guidelines have been extracted from existing legislation and procedures.
Recommendations are formulated in the way of primary 'best practice' policy initiatives:

- 'One stop shop' procedure
- Transparency in financial burden for project developer
- Anti-speculation clauses
- Enhanced communication and public involvement
- Burden sharing for grid connection
- Allowances for innovation in technology
- Securing pioneering risks
- Risk hedging schemes
- Monitoring requirements
- Decommissioning and rehabilitation guarantees

[1] Provisional value

New policy initiatives have been identified which are urgently required if offshore wind is to make a significant and sustainable contribution in the short to medium term. These initiatives are mainly; the development of standards in environmental impact assessment, the realisation of an EU offshore electric grid infrastructure, the reinforcement of RD&D programmes for new generation offshore wind turbines and related equipment for installation, operation and maintenance, and finally, on longer term, the development of harmonised procedures for areas beyond national jurisdiction of coastal states.

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Preamble

Wind energy represents a major form of sustainable electricity generation. By the end of 2001, worldwide installed capacity for wind power reached a level of 25 000 MW, which is equivalent to the consumption of 14 million households. In the European Union, installed capacity is roughly 15 000 MW.

Generating costs of 4 to 6 € cents/kWh have been attained for onshore wind energy, at wind speeds of 6 m/s at a height of 50 m. In comparison to traditional energy sources, wind energy is currently competitive at very good sites, even without compensation for environmental advantages. However, in order to achieve large penetration levels within the EU, further cost reductions are required and are expected to occur [EUREC Agency, 2001].

Under the European Commission's (EC) Renewable Energy Strategy [EC, 1997], wind energy – with a target of 40 GW by 2010 – is expected to provide the second most important contribution from renewable energy sources (RES). The European Wind Energy Association (EWEA) has gone a step further in anticipating a feasible target of 60 GW for all wind energy by 2010, 5 GW coming from offshore resources. To-date, only approximately 250 MW of the 15 000 MW currently installed in the EU comes from offshore wind.

Offshore wind development is the new challenge for the international wind industry. In Northern Europe alone, more than 20 000 MW of capacity is being 'tentatively explored', a limited part of which is in 'advanced' planning phase. Figure 1 gives a visual overview of existing and potential offshore projects in the EU, characterised in greater detail in Table 1. Eventually, this new offshore business could challenge the oil and gas production on the home territory [EWEA, Greenpeace 2002].

Offshore wind energy projects typically entail higher investment costs compared to onshore wind, due to increased costs of grid connection (typically 25%), foundations (typically 30%), operation and maintenance (expected lower availability) and marinisation of turbines. The result is an overall increase of 30 to 70% in capital costs – to be offset by higher energy yields of up to 50%. Investments costs have been reduced from 2200 €/ kW, as seen for the first Danish offshore wind projects (e.g. Vindeby, in 1991), to 1650 €/ kW for Horns Rev (operational in 2002). Energy costs have decreased from 8 € cents/kWh (first demonstrations) to 4,7 € cents/kWh[2] (Horns Rev) [CAOWE, 2001]. These costs relate to first generation offshore wind turbines – completely new and more cost-effective designs will arise if the next decade of offshore wind developments produces sufficient investor confidence, and if policy frameworks are sufficiently stable.

Economics aside, a number of other risks can hinder the large-scale development of offshore wind. Risks associated with large-scale offshore wind deployment arise from operation, grid interaction, market access, and other regulatory risks, as depicted in Box 1 [O'Connor, 2001].

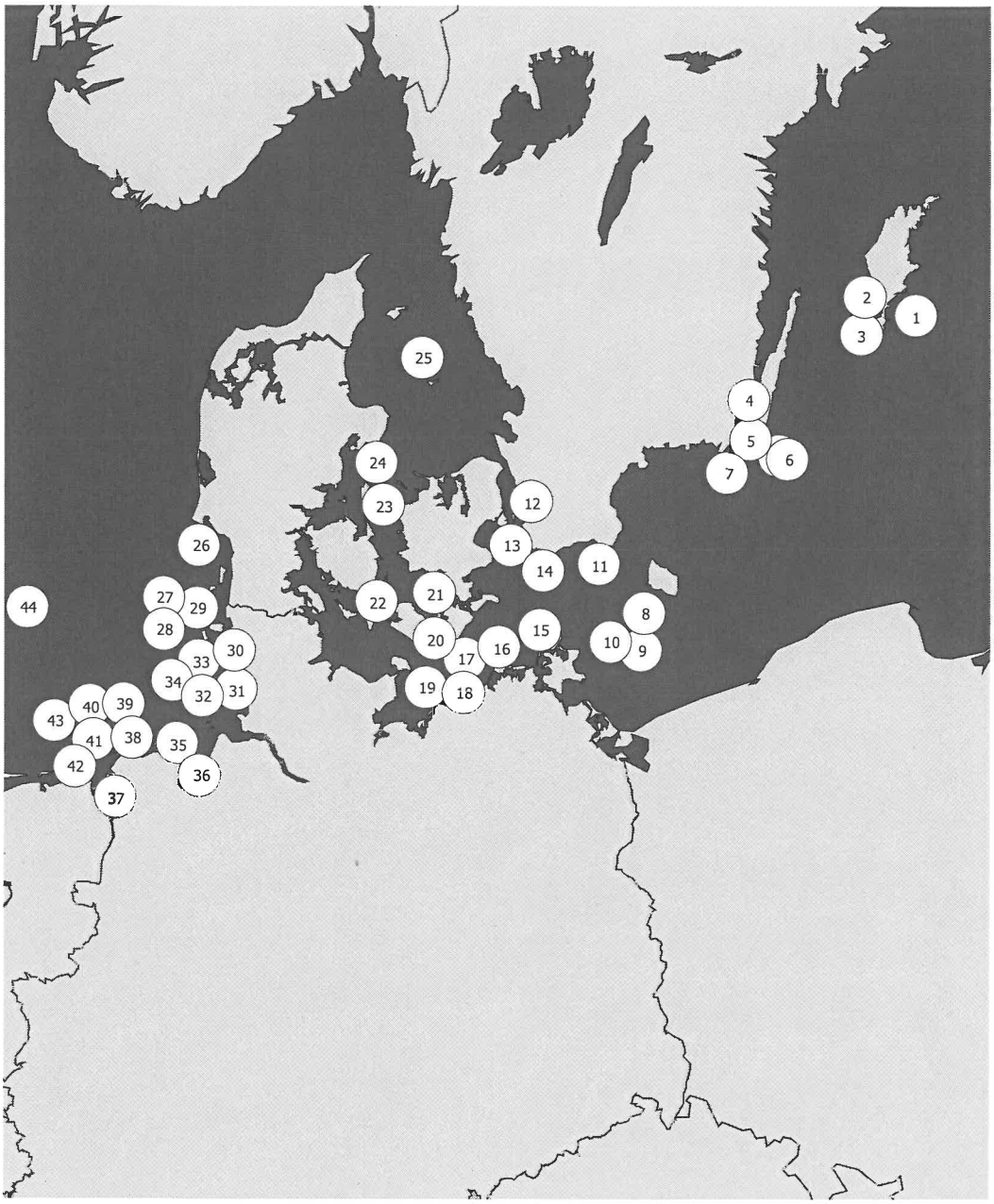
This report focuses on the legal and regulatory risks. Regulatory risks are of primary importance since these dictate the ease with which projects move from concept to reality, allowing investors to see the outcome and due benefits of their investments. Regulatory risks are therefore critical in determining the rate at which offshore wind potential is realised. In its current stage and form, the legal framework surrounding offshore wind power installations is not sufficiently clear-cut, and represents a serious limiting factor in attracting investment.

[2] Provisional value

Table 1: Offshore wind sites realised and prospected in the European Union (status 2002); the indicated numbers correspond with the numbers on Figure 1.(n.a. indicates no information available)

No.	Country	Name of park	In Operation (Y/n)	Commissioned	Installed Capac. MW	No. Turbines	Type of Turbine	Production GWh/yr	Dist. from coast km	Sea
47	Belgium	Thornton Bank	n.a.	end-2005	n.a.	60-120	2.5-3.6 MW	1000	n.a.	North Sea
48	Belgium	Vlakte van de Raan	n.a.	2003	100	50	Vestas V80 2.0 MW	n.a.	12	North Sea
12	Denmark	Middelgrunden	Y	2001	40	20	Bonus 2.0 MW	81	1.7 à 3.5	n.a.
17	Denmark	Gedser Rev	on hold	n.a.	144	96	n.a.	n.a.	6-20	n.a.
20	Denmark	Roedsand	N	2003	165.6	72	Bonus 2.3 MW	480	9-10	Baltic Sea
21	Denmark	Omo Stalgrunde	on hold	n.a.	150	96	n.a.	n.a.	10	n.a.
22	Denmark	Vindeby	Y	1991	4.95	11	Bonus 450 kW	11.73	1.5 à 3.0	Baltic Sea
23	Denmark	Samso	N	2003	23	10	Bonus 2.3 MW	n.a.	n.a.	n.a.
24	Denmark	Tuno Knob	Y	1995	5	10	Vestas 500 kW	12.7	6	Kattegat Sea
25	Denmark	Laeso	on hold	2003	150	78	n.a.	n.a.	40	n.a.
26	Denmark	Horns Rev	Y	2002	160	80	Vestas V80 2.0 MW	n.a.	14-20	North Sea
71	France	Nord-Pas-de-Calais	n.a.	n.a.	775	n.a.	n.a.	2400	5-8	n.a.
72	France	Manche, Basse-Normandië	n.a.	n.a.	3500	n.a.	n.a.	10800	5-10	n.a.
73	France	Bretagne	n.a.	n.a.	2050	n.a.	n.a.	6300	3-10	n.a.
74	France	Languedoc-Roussilon	n.a.	n.a.	2800	n.a.	n.a.	10600	3.5-10	n.a.
8	Germany	Pommersche Bucht	N	n.a.	1000	200	5 MW	n.a.	42	Baltic Sea
9	Germany	Arkona Becken Südost	N	n.a.	945	189	4-5 MW	n.a.	n.a.	Baltic Sea
10	Germany	Adlergrund	N	n.a.	790	158	3-5 MW	n.a.	40	Baltic Sea
15	Germany	Kriegers Flak	N	n.a.	315	75	3-5 MW	n.a.	35	Baltic Sea
16	Germany	Pilot Mecklenburg-Vorpommern	N	n.a.	40	21	Nordex, Neptun, Brand Elektro	n.a.	15	Baltic Sea
18	Germany	Beltsee	N	n.a.	415	83	3-5 MW	n.a.	30	Baltic Sea
19	Germany	Sky 2000	N	n.a.	100	50	2 MW (1/3 Vestas, rest open)	n.a.	19	Baltic Sea
27	Germany	Dan Tysk	N	n.a.	1500	300	5 MW	n.a.	60	North Sea
28	Germany	Weisse Bank	N	n.a.	600	120-170	3.5-5 MW	n.a.	60	North Sea
29	Germany	Butendiek	N	n.a.	240	80	3 MW	n.a.	30	North Sea
30	Germany	Offshore Helgoland	N	n.a.	200	100	2 MW (Vestas)	n.a.	13	North Sea
31	Germany	Schleswig Holstein Nordsee	N	n.a.	800-1000	200	4-5 MW	n.a.	15	North Sea
32	Germany	Amrumbank West	N	n.a.	up to 288	72	3-4 MW	n.a.	35	North Sea
33	Germany	Amrumbank/Nordsee-Ost AWZ	N	n.a.	1250	250	5 MW (96x Repower NOK 5)	n.a.	17	North Sea
34	Germany	Meerwind	N	n.a.	819	234	3.5 MW	n.a.	n.a.	North Sea
35	Germany	Nordergründe	N	n.a.	>200	76	2.5-5 MW	n.a.	12-15	North Sea
36	Germany	Willemshaven	N	n.a.	4.5	1	4.5 MW (Enercon E-112)	n.a.	<10	North Sea
37	Germany	Dollart	N	n.a.	9	5	1.8 MW (Enercon)	n.a.	n.a.	North Sea
38	Germany	Juist	N	n.a.	1400	280	5 MW	n.a.	n.a.	North Sea
39	Germany	Borkum III (or Borkum West)	N	n.a.	60 (later 1000)	12 (later up to 285)	3.5-5 MW	n.a.	40	North Sea
40	Germany	Borkum Riffgrund	N	n.a.	840	180	3.5 MW	n.a.	34	North Sea
41	Germany	Borkum IV	N	n.a.	400	90-160	2.5-4.5 MW	n.a.	n.a.	North Sea
42	Germany	Riffgat	N	n.a.	135	30	4.5 MW (Enercon)	n.a.	15	North Sea
43	Germany	Borkum Riffgrund West	N	n.a.	1800	458	2.5-5 MW	n.a.	45	North Sea
44	Germany	Sandbank 24 (Europe Pipe West)	N	n.a.	2600 (1st phase 360)	120	3 MW	n.a.	120	North Sea

No.	Country	Name of park	In Operation (Y/n)	Commissioned	Installed Capac. MW	No. Turbines	Type of Turbine	Production GWh/yr	Dist. from coast km	Sea
65	Ireland	Blackwater Bank 1	N	n.a.	260	n.a.	n.a.	n.a.	n.a.	n.a.
66	Ireland	Blackwater Bank 2	N	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
67	Ireland	Arklow Bank	N	2003-2006 (phased)	520	200	n.a.	n.a.	7-12	n.a.
68	Ireland	Codling and Greater CodlingBank	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
69	Ireland	Bray Bank and Kish Bank	N	2003	up to 300 MW	n.a.	n.a.	n.a.	n.a.	n.a.
70	Ireland	Dundalk Bay	N	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1	Sweden	Rone Gotland	n.a.	n.a.	35	35	Nordic 1 MW	n.a.	n.a.	n.a.
2	Sweden	Klasärden	n.a.	2003	42	21	NEG Micon 2.0MW	n.a.	n.a.	n.a.
3	Sweden	Gotland-Bockstigen	Y	1998	2.75	5	Wind World 550 kW	n.a.	4.5	Baltic Sea
4	Sweden	Utgrunden	Y	2001	10.5	7	Tacke TW1.5s	n.a.	12.5	Baltic Sea
5	Sweden	Blekinge Oland Southern Skane	n.a.	n.a.	30	30	1 MW	n.a.	n.a.	n.a.
6	Sweden	Blekinge Oland	n.a.	n.a.	300	100	n.a.	n.a.	n.a.	n.a.
7	Sweden	Yttre Stengrund	Y	2001	10	5	NEG Micon 2.0MW	n.a.	5	n.a.
11	Sweden	Ystad Skane	n.a.	n.a.	10	n.a.	n.a.	n.a.	n.a.	n.a.
13	Sweden	Lillgrund Bank	n.a.	n.a.	86.4	48	Enercon E66/18.70	n.a.	n.a.	n.a.
14	Sweden	Barsebank	n.a.	n.a.	750	n.a.	n.a.	n.a.	n.a.	n.a.
45	The Netherlands	Q7	N	2003	120	60	Vestas V80 2MW	350	23	North Sea
46	The Netherlands	Egmond aan Zee	n.a.	2004	100	36	NEG Micon 2.75MW	n.a.	n.a.	North Sea
49	UK	Kentish Flats	n.a.	n.a.	n.a.	30	n.a.	n.a.	8	n.a.
50	UK	Gunfleet Sands	n.a.	n.a.	29.8	n.a.	n.a.	n.a.	7	n.a.
51	UK	Scroby Sands	N	n.a.	50	25	Vestas V80 2.0 MW	98	2.3	n.a.
52	UK	Cromer	n.a.	n.a.	n.a.	30	n.a.	n.a.	6.5	n.a.
53	UK	Lynn	n.a.	n.a.	n.a.	60	n.a.	n.a.	5.2	n.a.
54	UK	Inner Dowsing	n.a.	n.a.	n.a.	60	n.a.	n.a.	5.2	n.a.
55	UK	Teesside	n.a.	n.a.	n.a.	30	n.a.	n.a.	1.5	n.a.
56	UK	Blyth Offshore	Y	2000	3.8	2	Vestas V66 2.0 MW	n.a.	0.8	North Sea
57	UK	Solway Firth	n.a.	n.a.	n.a.	60	n.a.	n.a.	9	n.a.
58	UK	Barrow	n.a.	n.a.	n.a.	30	n.a.	n.a.	10	n.a.
59	UK	Shell Flat	n.a.	n.a.	n.a.	90	n.a.	n.a.	7	n.a.
60	UK	Southport	n.a.	n.a.	n.a.	30	n.a.	n.a.	10	n.a.
61	UK	Burbo	n.a.	n.a.	n.a.	30	n.a.	n.a.	5.2	n.a.
62	UK	North Hoyle	n.a.	n.a.	n.a.	60	n.a.	n.a.	6	n.a.
63	UK	Rhyl Flats	n.a.	n.a.	n.a.	60	n.a.	n.a.	8	n.a.
64	UK	Scarweather Sands	n.a.	n.a.	n.a.	30	n.a.	n.a.	9.5	n.a.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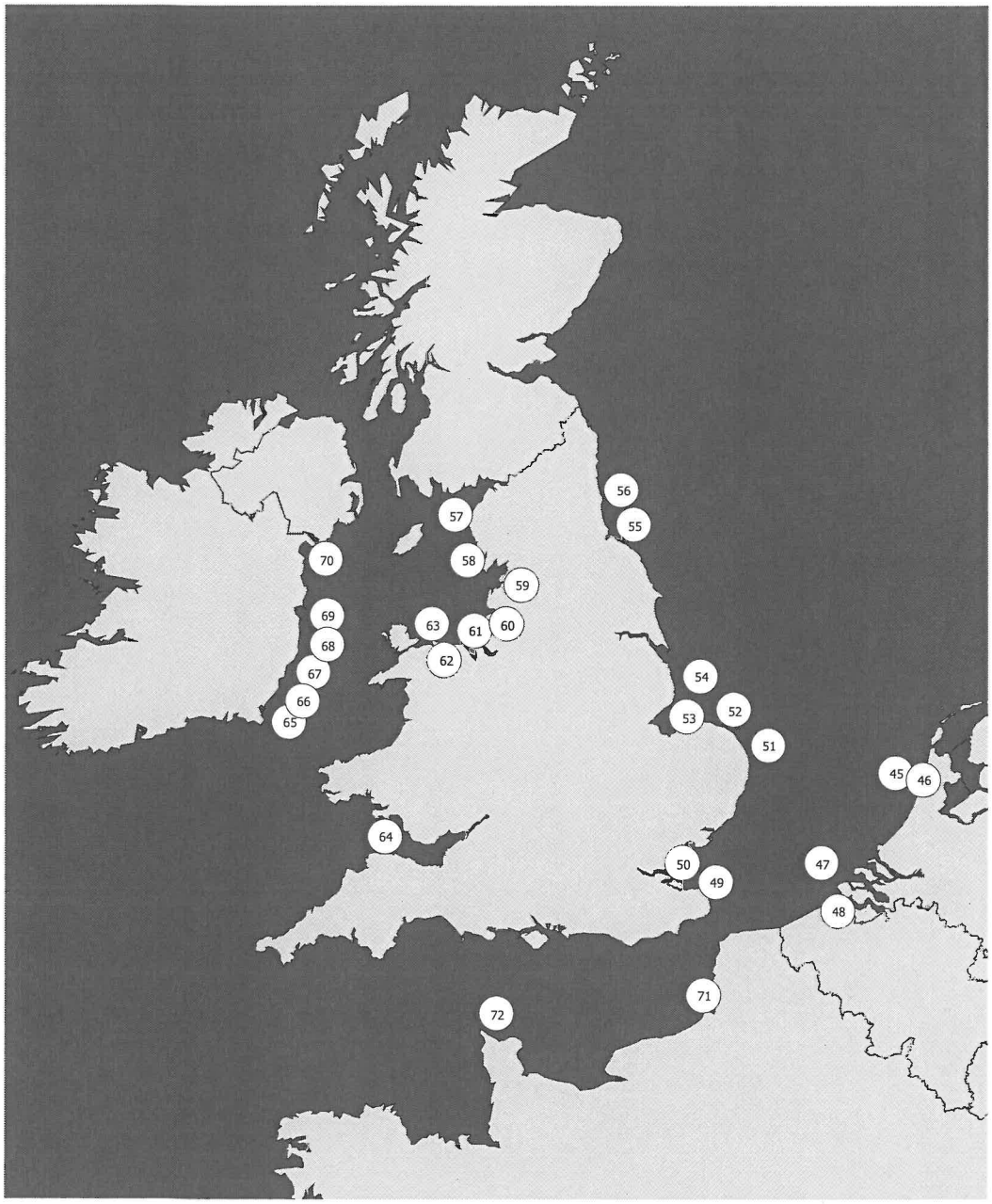


Figure 1: Offshore wind energy locations realised or prospected (status 2002); the indicated numbers correspond with the numbers in Table 1.

This project was initiated to act as a guideline for government institutions and potential investors by outlining and clarifying the existing legal framework surrounding offshore wind energy projects. It provides information on the core regulatory factors influencing or expected to influence each country's offshore wind energy sector, and which are expected to remain relatively stable in the short to medium term. In addition, it gives details on contact points, web-sites and other references to enable project developers and policy makers to access updated information on those factors which are more subject to change.

The project formulates proposals for ways in which the existing legal framework may be best adapted and tailored to produce an efficient and harmonised support structure for the exploitation of offshore wind power. It focuses on EU member states having a significant offshore wind potential short to medium term, namely: Belgium, Denmark, France, Germany, Ireland, The Netherlands, Sweden and the United Kingdom (UK).

The objective of this report is to contribute to a rational and successful offshore wind development by taking a pro-active position in regulatory matters, environmental impact assessment, economic valuation, as well as in the R&D policy prospect.

Box 1: Risks for offshore wind developments [O'Connor, 2001]

Market risks

- Power price dependent on the method by which power output variability is accounted for
- Offshore wind turbine market limited to mainly Western EU on medium term

Grid risks

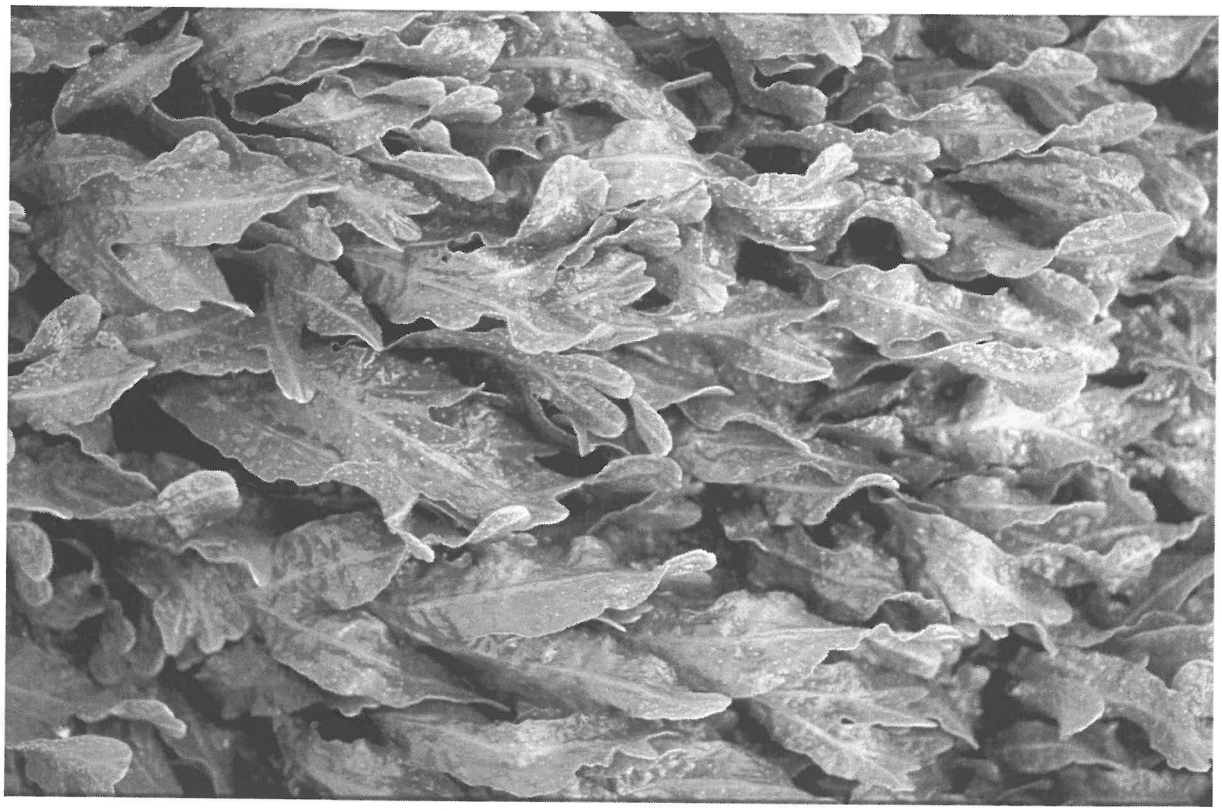
- Output variability causing transmission system instability and non-optimal power usage if adapted system management not applied and (in the case of large-scale offshore wind developments) if dedicated offshore grid investments not realised.
- Limited EU harmonisation of grid codes, hindering significant offshore wind penetration into multi-markets

Operation risk

- Availability uncertain with first generation multi-MW turbines – marinisation process only at the starting point. New generation dedicated offshore wind turbines will depend on first generation successes.
- 'Weather Window' for installation, operation and maintenance, and high costs of 'marshalling' dedicated construction equipment

Regulatory risk

- Lack of harmonisation and standards for wide range of regulations on regional, national and international levels



PART 1 - International and European framework

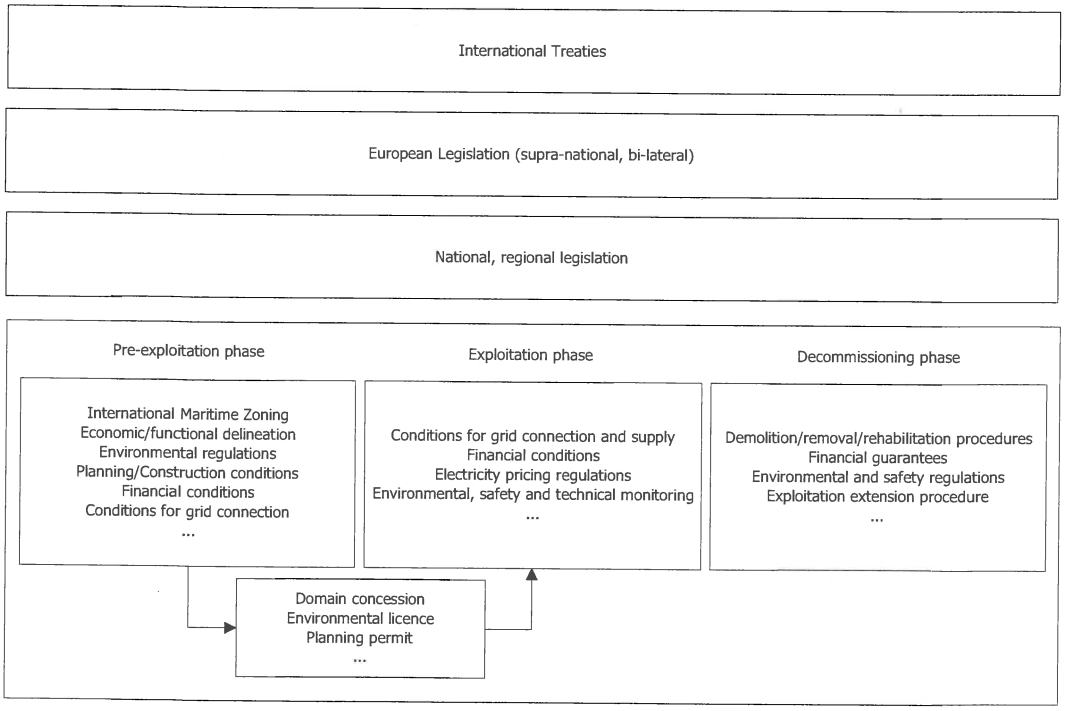
1 Introduction

In its present state, the legal framework for offshore wind exploitation in the European Union (EU) Member States (MS) may be considered as a patchwork combination of national, EU and international level legislation, each applicable to one or several stages in the development and implementation of an offshore wind park. Figure 2 below shows the hierarchy of legislation from international through to European and national levels, and the various stages of a wind park that are ultimately subject to legislatory and procedural requirements.

Part 1 of the document aims to provide an overview of the relevant legal and regulatory stipulations, at the international, European (EU) and national levels, pertaining to the production of offshore wind energy in EU countries, namely those having a significant potential in offshore wind exploitation in the short to medium term: Belgium, Denmark, France, Germany, Ireland, The Netherlands, Sweden, U.K.

The text therefore deals with the relevant topics on an international level and continues further on with the more specific European Union-level and national-level regulations. The national level is treated in further detail by giving an overview of the different legal and administrative requirements in each country as regards the procedure for implementation of an offshore wind farm in offshore waters within the country's jurisdiction. It should be noted however, that this section is not intended to be an exhaustive legal inventory, but an outline of the major legal instruments – at all levels – influencing the resulting procedure for offshore exploitation at a particular location. Furthermore, it should be noted that although an effort was made to preserve as far as possible the same structure and subdivisions for each country, this was not always possible due to the differences in the various national legal and administrative systems.

Figure 2: Legal stratification and hierarchy for the development, exploitation and decommissioning of offshore wind parks



2 International regulations

This chapter outlines the international-level regulations and policies of relevance in offshore wind exploitation. The regulations are categorised according to the interests they serve: territorial delineation of the sea; economic/functional delineation of the sea; and environmental issues. It should be noted that 'international' regulation pertains to legislation imposed on 'more than one nation', except in the case where it emanates from one or more legislative bodies of the European Union and applies to the nations of the EU – this is dealt with in a separate chapter.

2.1 Delineation of international seas

2.1.1 Geographic delineation of maritime zones: The United Nations Convention on the Law of the Sea (LOSC) (1982[3])

The 1982 Law of the Sea Convention (LOSC) codifies the different maritime zones at sea and defines the legal status of these zones. The LOSC lays down a comprehensive regime of law and order in the world's oceans and seas and establishes rules governing all uses of the oceans and their resources. The maritime zones defined by the Convention are shown in Table 2 below. The distances of maritime zones are measured from the baseline. The LOSC recognises two baselines:

- The normal baseline or the low-water line along the coast, as marked on large-scale, officially recognised charts
- A straight baseline, which can be: a line connecting two or more points in localities where the coastline is deeply indented and cut into; or connecting a fringe of islands along the coast; or connecting the outermost permanent harbour works of a coastal port; or connecting the mouth of a river flowing directly into the sea; or connecting the natural entrance points of a bay in the legal sense.

2.1.2 Rights and obligations of states in maritime zones

The Internal Waters

In internal waters, coastal states have full sovereignty[4]. There is no right of innocent passage for foreign ships, except where the establishment of straight baselines has the effect of enclosing as internal waters those areas that had not previously been considered as such.

The Territorial Sea

In the territorial sea a coastal state has sovereignty over the water, the air space above, the bed and the subsoil. This sovereignty means that a coastal state can adopt and enforce laws and regulations with regard to: navigation, laying and protection of cables and pipelines, fisheries, prevention of pollution, conservation of living resources, exploitation of non-living resources, scientific research, customs, fiscal matters, immigration, sanitary regulations and offshore activities. This sovereignty is limited by the customary right of innocent passage, for ships of all states, through the territorial sea. Passage has to be continuous and expeditious, except in cases of *force majeure* or distress. Passage is innocent so long as it is not prejudicial to the peace, good order, or security of the coastal state. The meaning of innocent passage is further elaborated in article 19 LOSC. All ships, whether in innocent passage or not, must comply with the laws of the coastal state while in its territorial sea. These laws and regulations must be in conformity with rules of international shipping conventions and the provisions of the LOSC.

[3] United Nations Convention on the Law of the Sea, Montego Bay, 10 December 1982 and Agreement relating to the implementation of Part XI of the United Nations Convention on the law of the Sea of 10 December 1982, New York, 28 July 1994.

[4] Sovereignty means that a state can decide in a sovereign or independent way upon the activities occurring within its territory and, more specifically, upon the exploitation of the soil and subsoil of the territory

Table 2: Maritime zones of the United Nations Law of the Sea Convention (LOSC)

Maritime Zone	Definition
The internal waters	The waters of a coastal state on the landward side of the baseline, including bays, estuaries, rivers, coastal harbours and inland waters.
The territorial sea	The sea on the seaward side of the baselines up to a limit not exceeding 12 nautical miles, measured from the baselines ("The twelve miles zone")
The contiguous zone	The zone adjacent to the territorial sea up to 24 nautical miles, measured from the baselines
The continental shelf	The continental shelf of a coastal state comprises the sea-bed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance
The exclusive economic zone (EEZ)	The EEZ is an area beyond and adjacent to the territorial sea, extending up to but not beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured and includes, besides the sea-bed and its subsoil, the waters superjacent to the sea-bed
The high seas	All parts of the sea that are not included in the EEZ, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State
The Area	The seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction[5]

The Contiguous Zone

The contiguous zone is not considered part of the territory of the coastal state, and as such, States are not the regulatory authority. However, the coastal state can exercise control in this zone to prevent infringements of its customs, fiscal, immigration or sanitary laws, or of regulations within its territory or territorial sea, and is also able to punish infringements of these laws committed within its territory.

The Continental Shelf

The Convention[6] gives the coastal state exclusive and automatic sovereign rights over its continental shelf for the purpose of exploring and exploiting its natural resources. Natural resources refer to the mineral and other non-living resources of the seabed and subsoil, together with living organisms belonging to sedentary species - that is, organisms which, at the harvestable stage, are either immobile on or under the seabed, or are unable to move except where they are in constant physical contact with the seabed or the subsoil. These sovereign rights are exclusive in the sense that if the coastal state does not explore the continental shelf or its natural resources, no one may undertake these activities without the express consent of the coastal state. These rights are automatic in that they do not depend on occupation, effective or notional, or on any express proclamation.

[5] States without a continental shelf, can claim an EEZ (e.g. Peru, Chili, ...)
[6] Article 77

The Exclusive Economic Zone.

In the exclusive economic zone (EEZ) the coastal state has sovereign rights. These rights, jurisdiction and duties of the coastal state in the EEZ are defined as follows[7]:

- Sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the sea-bed and of the sea-bed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds;
- Jurisdiction as provided for in the relevant provisions of this Convention with regard to: the establishment and use of artificial islands, installations and structures; marine scientific research; the protection and preservation of the marine environment;
- Other rights and duties provided for in the LOSC

The LOSC[8] also outlines the rights and duties of other states in the EEZ. In the EEZ, all states, whether coastal or land-locked, enjoy, subject to the relevant provisions of the Convention, the freedoms of navigation and overflight[9] and of the laying of submarine cables and pipelines, and other internationally lawful uses of the sea related to these freedoms. These uses include those associated with the operation of ships, aircraft and submarine cables and pipelines and compatible with the other provisions of the Convention.

Surface areas of claimed EEZs of some of the EU Member States are given in Annex 2.

The High Sea

The LOSC[10] accords to all States the same freedoms of the high seas. These freedoms comprise freedom of navigation, freedom of overflight, freedom to lay submarine cables and pipelines[11], freedom to construct artificial islands and other installations[12], freedom of fishing[13], and freedom of scientific research[14]. These freedoms must however be exercised with due regard for the interests of other states in their exercise of the freedom of the high seas, and also with due regard for the rights under this Convention with respect to activities in the Area.

The Area

The seabed, ocean floor, and subsoil outside the EEZ or the continental shelf is called the Area. The Area and its resources belong to the common heritage of mankind. The body empowered to administer the Area and to regulate its exploration and exploitation is the International Seabed Authority (ISBA) – an international organisation open to membership by all states. The principles governing the Area and the legal status are defined in Part XI, LOSC.

2.1.3 Different maritime zones in the seas surrounding Europe

With respect to states having opposite or adjacent coasts, the maritime zones under the LOSC are delimited in bilateral maritime boundary agreements or decided upon by the International Court of Justice (North Sea Continental Shelf Case, 1969) or arbitration (delimitation of the continental shelf between UK and France, 1977) in cases of disagreement.

Details of LOSC-related national legislation and maritime delimitation treaties of all European States may be found at http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/europe.htm

[7] Article 56, LOSC.
[8] Article 58
[9] Article 87
[10] Article 87
[11] subject to Part VI
[12] subject to Part VI
[13] subject to the conditions laid down in section 2
[14] subject to Parts VI and XIII

2.2 Economic/functional delineation of the sea

Certain zones in the sea are less suited to, or cannot be considered for, the construction of wind farms due to the fact that they are reserved for activities that are not compatible with offshore wind energy generation, mainly for the sake of safety of shipping. International shipping activities are regulated within the International Maritime Organisation (IMO), which is a specialised organisation of the United Nations.

2.2.1 Shipping routes

The delineation of shipping routes is important for ensuring the safety of marine traffic. In the territorial sea a coastal state may, where necessary for the safety of navigation, require foreign ships to use such sea-lanes and traffic separation schemes as it may designate or prescribe for the regulation of passage of ships. In so doing, the coastal state shall take into account the recommendations of the International Maritime Organisation, channels customarily used for international navigation, special characteristics of particular ships and channels, and the density of traffic. These sea-lanes and traffic separation schemes have to be clearly indicated on charts[15].

In straits used for international navigation (e.g. Strait of Dover, Gibraltar) between one part of the high seas or EEZ and another part of the high seas or EEZ, all ships enjoy the right of transit passage. Bordering states designating sea-lanes and prescribing traffic separation schemes in those straits shall submit their proposal to the IMO with a view to their adoption[16]. In the EEZ and on the high seas, all ships enjoy the freedom of navigation[17]. Proposed traffic lanes have to be adopted within the IMO. Two IMO conventions are important (described below):

Convention on the International Regulations for Preventing Collisions at Sea (COLREG 1972)

This is the main convention for regulating international maritime traffic. It specifies the "rules of the road" for particular traffic situations and organises the traffic flow by means of "traffic separation schemes" (TSS) (Rule 10), the aim of which is to separate opposite-going traffic in high traffic density areas such as the Dover Strait, Gibraltar Strait, etc. The area between land and a traffic separation scheme is called an "inshore traffic zone". A vessel of more than 20 meters in length, except fishing vessels, shall not use an "inshore traffic zone" when it can safely use a traffic lane within the adjacent traffic separation scheme, except when on route to or from a port.

International Convention for the Safety of Life at Sea (SOLAS 1974/78)

The SOLAS Convention introduces (Chapter V, regulation 8) the possibility to establish "areas to be avoided" and other routing measures. These ships' routing systems contribute to the safety of life, safety and efficiency of navigation and/or the protection of the marine environment. Ships' routing systems are recommended for use by, and may be made mandatory for, all ships, certain categories of ships or ships carrying certain cargoes, when adopted and implemented in accordance with the guidelines and criteria developed by the IMO. An "area to be avoided" is a routing measure comprising an area with defined limits in which navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships or certain classes of ships.

2.2.2 Fishery zones

International rules and regulations for fishery are formulated primarily to determine the competencies of the coastal states, and the measures needed to protect living marine resources from over-exploitation. According to the LOSC[18], coastal states have sovereign rights in a 200-nautical mile EEZ over natural living resources. The coastal state therefore has the right to determine the allowable catch of the living resources in its EEZ and in doing this, it shall ensure through proper conservation and

[15] Art. 22, LOSC
[16] Art. 41, LOSC
[17] Arts. 58 & 87, LOSC
[18] Art. 56, 1.a

management measures that the maintenance of the living resources in the EEZ is not endangered by over-exploitation[19]. Within the 200 nautical-mile fishery zones of the EC member states, fishery management is part of the agriculture policy of the EC and lies fully within the EC competence. The EC determines on a yearly basis the total allowable catch (TAC) for certain important species and sets technical standards for fishing nets (mesh size) and the minimum size or weight of fish landed. Each TAC is distributed among the member states in the form of quotas.

2.2.3 Safety zones

According to the LOSC[20], the coastal state may in its EEZ or above its continental shelf, where necessary, establish reasonable safety zones around the artificial islands, installations and structures, in which it may take appropriate measures to ensure the safety of navigation and of the artificial islands, installations and structures. The breadth of these safety zones shall be determined by the coastal state, taking into account applicable international standards. The designation of such zones must be reasonably related to the nature and function of the artificial islands, installations or structures. Furthermore, they are not to exceed a distance of 500 metres around them, measured from each point of their outer edge, except where authorised by generally accepted international standards or where recommended by the IMO. In the territorial sea a coastal state can proclaim whatever safety zone around artificial islands, installations and structures, as far as this zone does not have the practical effect of denying or impairing the right of innocent passage or does not interfere with internationally-recognised sea-lanes of traffic regulations schemes.

2.3 Environmental issues

With regard to the planning and the establishment of an offshore wind park, various measures must be observed for ensuring the protection of the environment.

Firstly, specific administrative rules or procedures have been established to ensure that the environmental impact of human activities is sufficiently assessed, and that any possible adverse impacts are avoided or minimised. Additionally, specific environmental programmes have led to the delineation of protected areas wherein certain human activities are restricted or forbidden. Both of these measures could act to restrict offshore wind developments.

On the other hand, other environmental programmes may have an indirect and/or positive impact on the establishment of offshore wind developments. For instance, programmes aimed at reducing the emission of greenhouse gases generally encourage renewable energy projects, including offshore wind energy. The following sections outline the various environmental regulations of relevance to offshore wind energy projects. These are grouped according to the particular aspect of the environment to which they pertain: general environmental protection; protection of the sea; protection of the atmosphere; protection of species and habitats.

2.3.1 Protection of the General Environment

The protection of the environment is regulated by international convention and through i.a. environmental impact assessments (EIAs). Through the following Conventions and treaties offshore wind projects may be directly or indirectly subject to EIA.

Convention on Environmental Impact Assessment (EIA) in a Transboundary Context (Espoo, 1991)

This convention obliges Parties to assess, at an early stage of planning, the environmental impact of certain projects entailing possible transboundary impacts. It also lays down the general obligation of states to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact on a transboundary level.

[19] Art. 61
[20] Arts. 60 and 80

It is important to note that the Convention does not establish an international EIA-procedure but that it outlines specific conditions to be incorporated into national environmental impact assessment procedures[21].

The Convention gives a list (Appendix I) of activities likely to have a significant adverse transboundary impact. Any Party to the Convention wishing to undertake an Appendix I activity ("Party of origin") is required, for the purposes of ensuring adequate and effective consultations under Article 5 of the Convention, to notify as early as possible, any Party which it considers may be an affected Party. The EIA-procedure only takes place if the Affected Party(ies) respond to the Party of origin within the time specified in the notification, acknowledging receipt of the notification and indicating whether it (they) intend(s) to participate in the EIA-procedure[22].

With regard to activities not listed in Appendix I, the concerned Parties are required, at the initiative of any such Party, to enter into discussions as to whether one or more of the proposed activities is likely to cause a significant adverse transboundary impact, and whether it should thus be treated as if it were Appendix I- listed. Where the Parties so agree, the activity or activities shall be thus treated. General guidance for identifying criteria to determine significant adverse impact is set forth in Appendix III of the Convention[23].

In the context of offshore wind energy projects, neither building nor exploitation activities are featured in the list of Appendix I. These activities would therefore only be subject to the latter mentioned procedure where the concerned parties agree on the adverse transboundary impact of the project.

The Energy Charter Treaty (1994)

This treaty specifically subjects certain activities in the energy sector to an EIA. According to the specific provisions of the treaty[24], states are required to "minimise in an economically efficient manner harmful Environmental Impacts occurring either within or outside its Area from all operations within the Energy Cycle in its Area". This is to be done through taking precautionary measures and using the polluter pays principle. The treaty specifically requires Parties to "promote the transparent assessment at an early stage and prior to decision, and subsequent monitoring, of Environmental Impacts of environmentally significant energy investment projects". This implies that offshore wind energy projects undertaken by Parties to this Treaty would be subject to an EIA.

2.3.2 Protection of the Sea

Various international agreements contain important obligations on the protection of marine waters from pollution, and therefore have significant implications for offshore wind projects.

The United Nations Convention on the Law of the Sea (LOSC 1982)

The LOSC endeavours to reconcile global or community needs with the demands of national sovereignty and jurisdiction. It is in this sense that the Convention as a whole has struck an important balance between the protection of the marine environment and use of the ocean and its resources. In particular, the Convention has sought to accommodate both the need to protect the marine environment and the necessity to preserve the freedom of navigation. It is therefore important that the issues relating to the protection and preservation of the marine environment should not be dealt with in isolation from other aspects of the law of the sea if the balance achieved is to be maintained. The Convention devotes an entire Part - Part XII (articles 192-237) – to the protection and preservation of the marine environment. In addition, several other Parts of the Convention also contain provisions relevant to the subject.

The LOSC also stipulates obligations for Parties with respect to environmental monitoring and assessment. States are required to assess, as far as practicable, and communicate to the competent international organisations, the potential marine environmental effects of activities under their jurisdiction or control that they believe may cause substantial pollution of, or significant and harmful changes to, the marine environment (Art. 206). Article 206 may be considered a soft obligation for

[21] Articles 3.5 to 3.8 and Arts. 4 to 7 of Convention
[22] Article 3
[23] Article 2.5
[24] Article 19 "Environmental aspects"

states, since an environmental impact assessment is required 'when states have reasonable grounds for believing' that those activities may cause those effects. Furthermore an assessment is obligatory only 'as far as practicable' and leaves quite some discretion for states to use or not to use environmental impact assessments for planned activities. Several conventions for the protection of regional seas introduce more elaborated obligations for monitoring and to conduct environmental impact assessments

The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)

MARPOL 73/78 and amendments apply to ships of all types and cover all technical aspects to prevent and reduce pollution from ships, with the exception of the disposal of waste into the sea by dumping.

MARPOL 73/78 covers operational and accidental pollution from ships. A new feature was the concept of "special areas". The 1973 Convention identified the Mediterranean Sea, the Black Sea, the Baltic Sea, the Red Sea and the Gulf area as special areas. Under Annex I, the Gulf of Aden, Antarctica, the North Sea, Irish Sea, Celtic Sea and English Channel have been added. In "special areas" more stringent discharge standards apply and ports bordering these areas have to supply sufficient reception facilities. MARPOL has two Protocols dealing, respectively, with Reports on Incidents involving Harmful Substances and Arbitration, and six Annexes, which contain regulations for the prevention of various forms of pollution.

Annex I deals with pollution by oil. It introduces discharge limits for oil and oil contaminated water from ships of more than 400 BT (gross tonnage), equipment regulations to fulfil the discharge standards, technical standards for oil tankers to limit oil spills after an accident (collision, stranding or grounding), such as subdivision of cargo spaces, damage stability requirements and the double hull concept.

Annex II deals with pollution by noxious liquid substances carried in bulk. Discharge criteria are established for different types of chemicals in different operating environments, and standards have been established for tank washing and associated pumping and piping arrangements. Initially some 250 substances were evaluated and included in the list appended to the Convention. The discharge of residues of those chemical substances is allowed only to reception facilities until certain concentrations and conditions (which vary according to the category of substances) are complied with. In any case, no discharge of residues containing noxious substances is permitted within 12 miles of the nearest land. More stringent restrictions apply to the Baltic and Black Sea areas.

Annex III is the first of the convention's optional annexes and deals with pollution by harmful substances carried in packages, portable tanks, freight containers, road or rail tank wagons, etc. It contains general requirements for the issuing of detailed standards on packing, marking, labelling, documentation, stowage, quantity limitations, exceptions and notifications for preventing pollution by harmful substances. "Harmful substances" covered by Annex III are those substances which are identified as marine pollutants in the IMO International Maritime Dangerous Goods Code (IMDG Code).

Annex IV (not yet in force) deals with pollution by sewage from ships and is, at the moment, only applicable to ships sailing under the flags of Baltic States in the Baltic Sea, or other ships during their sailing in the territorial waters of the Baltic States and their stay in Baltic ports (1992 Helsinki Convention).

Annex V – on pollution by garbage from ships – deals with different types of garbage and specifies the distances from land for garbage disposal and the manner in which this may be done. The requirements are much stricter in a number of "special areas" (such as, the Baltic Sea, Black Sea, Mediterranean Sea, Persian Gulf, Red Sea, Caribbean (+ Gulf of Mexico), Antarctica & North Sea/Irish Sea/Celtic Sea/English Channel). However, perhaps the most important feature of the Annex is the complete ban imposed on the dumping into the sea of all forms of plastic.

Annex VI (not yet in force) deals with regulations for the prevention of air pollution from ships. The rules, when they come into force, will set limits on sulphur oxide (SO_x) and nitrogen oxide (NO_x) emissions from ship exhausts and prohibit deliberate emissions of ozone depleting substances. The new Annex VI includes a global cap of 4.5% m/m on the sulphur content of fuel oil and calls on the IMO to monitor the worldwide average sulphur content of fuel once the Protocol comes into force. Annex VI contains provisions allowing for special "SOx Emission Control Areas" to be established with more stringent control on sulphur emissions. In these areas, the sulphur content of fuel oil used on-board ships must not exceed 1.5% m/m. Alternatively, ships must fit an exhaust-gas cleaning system or

use any other technological method to limit SOx emissions. The Baltic Sea is designated as a SOx Emission Control area in the Protocol.

International Convention for the Safety of Life at Sea (SOLAS 1974/78)

SOLAS specifies minimum standards for the construction, equipment and operation of ships in order to improve safety at sea. The convention has been frequently amended to keep pace with new developments in shipping safety. From an environmental perspective the routing of ships (Chapter V – Safety of navigation: see supra) and the carriage of dangerous goods (Chapter VI) are important. The latter chapter made the International Maritime Dangerous Goods (IMDG), the International Bulk Chemical Code and the International Gas Carrier Code mandatory. Through SOLAS the International Safety Management Code (ISM Code) became mandatory.

Convention on the Prevention of Marine pollution by Dumping of Wastes and other Matter (London, 1972 - LC)

The London Convention (LC) regulates "dumping at sea" on a universal level. Dumping means the deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures, as well as the deliberate disposal of these vessels, aircraft or platforms themselves.

In the beginning, the LC (then called the London Dumping Convention or LDC), allowed dumping of wastes under certain conditions, depending on the substances to be dumped and the allocation of those substances to the annex (Annex I listed waste categories which could not be dumped, Annex II listed waste categories which could be dumped if a permit was issued). In 1993, a resolution was adopted to ban the dumping into sea of low-level radioactive substances, to ban the incineration at sea of industrial waste and to phase out the dumping of industrial waste by the end of 1995. In 1996 a Protocol was adopted to replace the 1972 Convention. This Protocol introduces a general prohibition on dumping of any wastes or other matter at sea, with the exception of those materials explicitly mentioned in Annex 1. These materials are: 1. dredged material; 2. sewage sludge; 3. fish waste, or material resulting from industrial fish processing operations; 4. vessels and platforms or other man-made structures at sea; 5. inert, organic geological material; 6. organic material of natural origin; 7. bulky items primarily comprising iron, steel, concrete and similar unharmful materials in limited circumstances. Any exception requires a permit, and permit conditions shall comply with Annex 2. In addition, a special regulatory system has been introduced with the aim of achieving a stepwise reduction of the exceptions necessary. Furthermore the protocol lays out a general prohibition against the incineration of wastes or other matter at sea.

Convention for the Protection of the Marine Environment of the North-East Atlantic (1992) (OSPAR Convention)

This is a combination of two existing conventions: the Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (1972), and the Paris Convention for the Prevention of Marine Pollution from Land-Based Sources (1974).

The so-called OSPAR Convention was the result of a renegotiation of the Oslo and Paris Conventions in 1992. It has been ratified by all of the signatories to the Oslo and Paris Conventions and entered into force in March 1998. It is structured with a Framework text setting out the overall principles of the Convention and the legal and managerial aspects. The detail of the Convention is expressed in four separate annexes dealing with the prevention of pollution 1. from land-based sources 2. by dumping or incineration 3. from offshore sources, and furthermore 4. with the assessment of the quality of the marine environment. In 1998 a new annex was accepted; Annex V on the protection and conservation of the ecosystems and biological diversity of the maritime area.

In Annex II, the dumping of all wastes or other matter is prohibited, with the exception of the following: (a) dredged material; (b) inert materials of natural origin, that is solid, chemically unprocessed geological material the chemical constituents of which are unlikely to be released into the marine environment; (c) sewage sludge until 31st December 1998; (d) fish waste from industrial fish processing operations; (e) vessels or aircraft until, at the latest, 31st December 2004. The dumping of low and intermediate level radioactive substances, including wastes, is prohibited.

The Convention further aims to prevent and eliminate pollution from land-based sources (Annex I) and offshore sources (Annex III). The latter Annex applies only to offshore sources where offshore

installations and offshore pipelines are used to carry out activities for the purpose of the exploration, appraisal or exploitation of liquid and gaseous hydrocarbons. Annex III does not apply to offshore wind farms.

The Convention stipulates, as a general obligation, that contracting parties must take the necessary measures to protect the maritime area against the adverse effects of human activities, in order to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas that have been adversely affected.

The sea area covered by the OSPAR Convention is defined as extending westwards to the East Coast of Greenland, eastwards to the continental North Sea coast, south to the Straits of Gibraltar and northwards to the North Pole. This maritime area does not include the Baltic or Mediterranean seas; the Helsinki and Barcelona Conventions apply in these sea areas. OSPAR established a Commission (OSPARCOM) which can take recommendations and decisions. The latter are legally binding under the OSPAR Convention. Some of the former recommendations and decisions of the Oslo Commission and the Paris Commission are still in force.

The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (the Barcelona Convention (1995), (the amended version of the Barcelona Convention of 1976)) and its Protocols

Since its adoption by all Mediterranean states and the EC, the Mediterranean Action Plan (MAP) has served as the basis for the development of a comprehensive environment and development programme in the region involving the Mediterranean coastal states, specialised organisations of the United Nations system, Intergovernmental and Non-governmental Programmes and Organisations. The Action Plan (MAP) covers coastal zone management, pollution assessment and control, protection of ecosystems and preservation of bio-diversity. In 1995, it was revised to become more action-oriented and an instrument for sustainable development in the region.

The Convention on the Protection of the Marine Environment of the Baltic Sea Area (1992)

The 1992 Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area (in force since 17 January 2000) is the successor of the 1974 Helsinki Convention. The present contracting parties to Helsinki Convention are Denmark, Estonia, European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden.

The 1992 Helsinki Convention can be considered as one of the most progressive regional marine environmental protection conventions in existence today. The first ecological success of the 1974 Helsinki Convention was a ban on the disposal of waste at sea. The 1992 Helsinki Convention is more severe than the universal London Convention (LC) as regards the prohibition of dumping at sea. Moreover, the 1992 Helsinki Convention is more progressive than the 1992 Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (including the North Sea), for instance concerning dumping restrictions, offshore exploitation and pollution from ships. The 1992 Helsinki Convention applies to the marine environment of the Baltic Sea, comprising the water-body, the seabed, including their living resources and other forms of marine life. The Baltic Sea also includes the internal waters, extending its scope to the catchment area.

The Contracting Parties undertake to prevent and eliminate pollution of the Baltic Sea caused by harmful substances from all sources. For the prevention of pollution from land-based sources, parties are required to co-operate in the development and adoption of specific programmes, guidelines, standards or regulations concerning emissions and inputs to water and air, environmental quality, and products containing harmful substances and materials and the use thereof. The Convention provides for measures on the prevention of pollution from ships, the prohibition of incineration and the exploration and the exploitation of the seabed and the subsoil thereof. It updates the definition of dumping to specifically include disposal into the seabed, and prohibits all dumping except for dredged material.

The 1992 Convention establishes the Baltic Marine Environmental Protection Commission (BMEPC) (also known as the Protection Commission or the Helsinki Commission), whose functions include the following: to keep the implementation of the Convention under continuous observation; to make recommendations on measures relating to the purposes of the Convention; to keep under review the contents of the Convention; to define pollution control criteria and objectives for the reduction of pollution; to promote in close co-operation with appropriate governmental bodies additional measures

to protect the marine environment; and to seek, when appropriate, the services of competent regional and other international organisations to collaborate in scientific and technological research. The Helsinki Commission meets annually and, from time to time, meetings are held at ministerial level. Decisions taken by the Helsinki Commission (which are reached unanimously) are regarded as recommendations to the governments concerned. These HELCOM Recommendations are to be incorporated into the national legislation of the member countries.

2.3.3 Protection of the Atmosphere (Climate Change).

The United Nations Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol (1997)

Under the Framework Convention, Parties accepted a number of important principles relevant to the issue of climate change. Parties acknowledged recognition of climate change as a common concern of mankind (preamble), and also the importance of a number of principles in tackling the problem, such as: common but differentiated responsibilities, and the precautionary principle.

Furthermore Parties have the obligation to make inventories of anthropogenic emissions of greenhouse gas gases (GHGs) from sources, and their removal by sinks, and to co-operate and stimulate technology transfer from developed to developing countries. Parties are also required to implement measures so as to reduce their collective emissions of greenhouse gases to 1990 levels with a view to minimising human induced climate change and related adverse impacts.

The Kyoto Protocol shares the principles set out in the Climate Change Convention and introduces new and stringent commitments to reduce GHG emissions by setting legally binding targets and timetables for developed countries (Annex I countries).

The Kyoto protocol assigns an overall emissions reduction target of 5% for 6 GHGs during the first commitment period (2008-2012), compared to the levels of emissions in 1990[25]. This is a commitment for 38 developed countries together. The individual emissions reduction target for each developed country or region, is further specified in Annex B. In Annex B, the EU and each of its member states accept to reduce those GHG emissions by 8% during the period 2008-2012, in comparison with 1990 levels. Following article 4 of the Kyoto Protocol, the EU has redistributed, amongst its member states, its collective emissions reduction target of –8% in what is called "the burden sharing agreement" or the "bubble agreement". The Belgian commitment in the EU burden sharing agreement for example, has been set at -7,5% (that is, 7.5% GHG-emissions reduction) against 1990 levels.

To enable flexibility and cost effectiveness in the achievement of the emissions reductions targets, the Kyoto Protocol provides for the use of three mechanisms for GHG emissions reduction: emissions trading[26], joint implementation[27] and the clean development mechanism[28].

All Annex I countries are required to show, by 2005, "demonstrable progress" in achieving its commitments[29].

Moreover, all Parties are specifically required[30] to implement policies and measures pertaining to the research, promotion, development and increased use of renewable energies and innovative and advanced environmentally sound technologies.

Fifth North Sea Declaration (Bergen, 21 March 2002)

In the fifth North Sea Declaration, the Ministers of Environment from the North Sea states politically agreed upon the promotion of renewable energy. The Ministers welcomed the development of renewable energy technology, *inter alia*, offshore wind energy, as offering the potential to make a significant contribution to tackle the problems of climate change. They agreed to take action in order to exploit this potential fully and safely, taking into account the global and European commitments linked

[25] Art. 3.1 of the Kyoto Protocol
[26] Art. 17
[27] Art. 6
[28] Art. 12
[29] Art. 3.2
[30] Article 2 Kyoto Protocol

to the Kyoto protocol. The Ministers from the EU Member States affirmed their commitment to implement the EU Directive 2001/77 on renewable energy, as part of their commitment to the Kyoto protocol on climate change.

In order to ensure a consistent and coherent approach to future developments of offshore wind energy, which, *inter alia*, takes account of environmental and nature-conservation issues, the Ministers:

1. encourage the competent authorities to develop indicative guidance on areas suitable for offshore wind energy developments, taking account of local wind conditions, ecological importance, shipping, the possibility of connections to national electricity grids, and other users of the North Sea;
2. agree that offshore wind energy parks should be developed taking account of environmental impact data and monitoring information as it emerges and taking account of exchange of information and experience provided through the spatial planning processes;
3. note that the stage of development of offshore wind energy gives the opportunity to apply the precautionary principle from the outset; and
4. stress that, in particular, Strategic Environmental Assessments provide the opportunity to evaluate both the potential for cumulative impacts on the marine environment from offshore wind development, and the potential positive benefits of renewable energy in combating global climate change.

The Ministers further invite OSPAR in co-operation with the European Union:

5. to develop a comprehensive set of criteria to assist competent authorities when deciding on applications for the development of offshore wind energy installations; and
6. to develop a description of best available techniques for the location, construction, operation and removal of offshore wind energy parks with a view to facilitating their development and to protect the marine environment.

2.3.4 Protection of Species and Habitats

The Convention on Wetlands of International Importance especially as Waterfowl habitat (Ramsar, 1971)

The Ramsar Convention provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources. For the purpose of the Convention, wetlands are areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres. Waterfowl are birds ecologically dependent on wetlands[31]. Each Contracting Party shall designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance. The boundaries of each wetland shall be precisely described and also delimited on a map and they may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands, especially where these have importance as waterfowl habitats. Wetlands should be selected for the List on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology. The inclusion of a wetland in the List does not prejudice the exclusive sovereign rights of the Contracting Party in whose territory the wetland is situated[32].

Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)

The Convention was drawn up within the Council of Europe by an *ad hoc* Committee for the Protection of Wild life. The aims of the Convention are threefold: to conserve wild flora and fauna and natural habitats, to promote co-operation between States, and to give particular attention to endangered and vulnerable species, including endangered and vulnerable migratory species. It is an important instrument for the protection of wildlife and natural habitats. To-date the Convention has 44 Contracting Parties, including 39 Council of Europe member States, the European Community, Monaco and three African States. It includes help for implementation (technical assistance on legal and scientific issues) and the setting-up of the Emerald Network – a Network of Areas of Special Conservation

[31] Art. 1
[32] Art. 2

Interest (ASCI's) created in 1998 and compatible with the EU network Natura 2000 – as well as work on monitoring and control of threatened species.

Convention on the Conservation of Migratory Species of Wild Animals (1979) (Bonn Convention) (CMS)

Under this Convention, Parties acknowledge the need to take action to avoid the endangerment of migratory species. In particular the Parties undertake to promote, co-operate in, and support research relating to migratory species. In addition, Parties are to endeavour to provide immediate protection for migratory species included in Appendix I to the Convention, and to conclude Agreements covering the conservation and management of migratory species included in Appendix II.

The Convention on Biological Diversity (1992)

This Convention stipulates an obligation for the contracting parties to develop strategies, plans or programmes for the conservation and sustainable use of biological diversity and also offers the possibility to create a network of protected areas.

The OSPAR Convention (1992)

In 1998, annex V to the Ospar Convention was adopted. This Annex stipulates that the contracting parties to this treaty shall designate protected maritime areas, draw up programmes and measures for the control of the human activities that affect ecosystems and biological diversity, and institute protective, conservation, restorative or precautionary measures related to specific areas or sites or related to particular species of habitats.

3 European legislation (The European Union)

This chapter outlines European Union (EU) policies of relevance in offshore wind exploitation. As in the previous chapter, the regulations are categorised according to the interests they serve: economic/functional delineation of the sea; environmental issues; and renewable energy.

3.1 Economic/functional delineation

3.1.1 Fishery zones

The EU has the exclusive rights with respect to the exploitation of fish stock in the EU Fisheries zone, which mostly coincide with the EEZ of the Member States. EU regulations for fishery were developed on the basis of scientific advice from the International Council for the Exploration of the Sea (ICES).

The Common Fisheries Policy (1992) [33]

This policy relates to exploitation activities involving living aquatic resources, and aquaculture, as well as to activities involved in the processing and marketing of fishery and aquaculture products, where such activities occur in the territory of Member States or in Community fishing waters or by Community fishing vessels. The predominant objective of this regulation is to prevent over-fishing and to restore fishery resources by determining quota and technical measures.

The policy came into effect in 1983, and was subject to a limited mid-term review of access arrangements in 1992. A thorough review is planned for 2002. Up until now the European Fishery Policy has not yet established zones in which fishing activities are prohibited or restricted.

3.2 Environmental issues

3.2.1 Protection of the General Environment

European Commission Sixth Environmental Action Programme - 'Environment 2010: Our Future, Our Choice' (2001)

This Commission proposal outlines the overall environmental objectives and main priorities for action to be achieved over the next five to ten years. The proposal focuses on four major areas for action: climate change, health and the environment, nature and bio-diversity, and natural resource management. For each of the four priority areas, the Programme explains the issues, defines the objectives and lists the priority actions to be undertaken. In addition, the proposal establishes a number of so-called 'thematic strategies' for those areas in which only a combination of co-ordinated measures can be used to achieve the desired results. Each Strategy elaborates the overall policy approach and package of measures required to achieve the environmental objectives in the most cost-effective way. Furthermore, the Programme incorporates a strategic approach, outlining five main paths of action for meeting the objectives. Of particular note are those approaches concerned with integrating environmental considerations into policies of other sectors such as transport, energy and agriculture, and those relating to the enhancement of spatial planning and action at the local and regional levels, with a view to promoting sustainable development.

The Programme will have significant implications for the specific areas of climate change and renewable energy (see individual sections below). The Programme proposal has gone to the Council and the European Parliament for adoption by co-decision procedure.

[33] Council Regulation (EEC) No 3760/92 of 20 December 1992 establishing a Community system for fisheries and aquaculture

Environmental Impact Assessment Directive (1985)[34]

This Directive establishes a procedure to enable decision-makers to make appropriate decisions regarding the environmental impact of proposed projects falling under specified categories. The main objective is to introduce general principles for the assessment of environmental effects with a view to supplementing and co-ordinating development consent procedures governing public and private projects. In keeping with the principle of subsidiarity, each MS decides on the particular policies and measures needed to implement the Directive.

The Directive establishes the EIA-procedure as an integral part of the development consent procedure. The EIA must be conducted on the basis of the (appropriate) information supplied by the developer. This information may be supplemented by the authorities and by the people who may be concerned by the project in question. MS are required to adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment due to their nature, size or location, are made subject to a requirement for development consent, and to an assessment regarding their effects. In this respect, two distinctions for projects are made: projects listed in Annex I of the directive are subject to an obligatory assessment, whereas projects listed in Annex II may be subject to a conditional assessment. In the latter case, the need for an assessment is determined by the concerned MS, either on a case-by-case basis, or using established thresholds or criteria. Here, the relevant selection criteria regarding the characteristics, location and potential impact of the project, as set out in Annex III of the directive, have to be taken into account.

The environmental impact assessment requires the concerned parties to identify, describe, and assess, in an appropriate manner, the direct and indirect effects of a project as regards:

- "human beings, fauna and flora;
- soil, water, air, climate and the landscape;
- material assets and the cultural heritage;
- the interaction between the factors mentioned in the first, second and third indents"[35].

The Directive also establishes the specific procedure to be followed when a Member State is aware that a project is likely to have significant effects on the environment in another Member State (transboundary impact)[36].

In the context of offshore wind energy projects, it should be noted that activities concerned with offshore wind generation are not contained in the list of Annex I projects. However, the installations for the harnessing of wind power for energy production (wind farms) are included in Annex II and, in taking into account the criteria of Annex III, each MS can decide whether the project shall be subject to an assessment. Given the criteria listed in Annex III, it has to be assumed that offshore wind farms must be subject to an EIA.

The assessment (described in the articles 5 to 10) relates to the information and consultation procedure for ensuring that all parties concerned are informed and have the opportunity to express their opinion before the development consent is granted. The content of the information that a developer is required to supply is specified in Annex IV. However this is only required where:

1. The Member States consider that the information is relevant to a given stage of the consent procedure and to the specific characteristics of a particular project or type of project, and the environmental features likely to be affected;
2. The Member States consider that a developer may reasonably be required to compile this information having regard *inter alia* to current knowledge and methods of assessment

[34] Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment as amended by Council Directive 97/11/EC of 3 March 1997
[35] Article 2
[36] Article 7

The "Strategic" Environmental Impact Assessment Directive (2001)[37].

The EIA Directive of 1985 (as amended by Directive 97/11/EC) describes the EIA procedure on the project-level. The so-called Strategic Directive provides that an environmental assessment must be carried out for plans and programmes which are likely to have significant environmental effects. It relates in particular to agriculture, forestry, fisheries, energy, industry, transport, and town and country planning or land use, and sets out the framework for the future development consent of projects listed in Annexes I and II to EIA Directive 85/337/EEC. The associated environmental report must include all information that may reasonably be required, taking into account current knowledge and methods of assessment. It must also contain information on the contents and level of detail in the plan or programme, its stage in the decision-making process, and the extent to which certain matters may be appropriately assessed at different levels in the process, in order to avoid duplication of the assessment.

Member States are also required to ensure that, when a plan or programme is adopted, the authorities, the public, and any Member State consulted, are informed and provided with information on the adopted plan or programme, as well as with a statement summarising how environmental considerations have been integrated into the plan or programme.

Member States are required to bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 21 July 2004.

3.2.2 Protection of the Sea

The European Water Policy[38]

This Directive establishes a framework for Community action in the field of water policy, notably the protection of inland surface water, transitional waters, coastal waters up to one nautical mile, and ground water. Although this Directive applies mainly to inland waters, it also aims to contribute towards enabling the Community and Member States to meet their commitments under various international agreements containing important obligations on the protection of marine waters from pollution, since land-based sources account for more than 70% of the pollution of the seas and oceans. In particular, the Convention on the Protection of the Marine Environment of the Baltic Sea Area[39], the Convention for the Protection of the Marine Environment of the North-East Atlantic[40], and the Convention for the Protection of the Mediterranean Sea Against Pollution[41], and its Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources[42].

Member States are required to bring into force the laws, regulations and administrative provisions necessary to comply with this Directive at the latest 22 December 2003.

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[37] Council Directive 2001/42/EC of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment.
[38] The Council Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (*JO L 327 , 22/12/2000 P. 0001 - 0073)*
[39] The Convention on the Protection of the Marine Environment of the Baltic Sea Area signed in Helsinki on 9 April 1992 and approved by Council Decision 94/157/EC.
[40] The Convention for the Protection of the Marine Environment of the North-East Atlantic signed in Paris on 22 September 1992 and approved by Council Decision 98/249/EC.
[41] The Convention for the Protection of the Mediterranean Sea Against Pollution signed in Barcelona on 16 February 1976 and approved by Council Decision 77/585/EEC.
[42] Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources signed in Athens on 17 May 1980 and approved by Council Decision 83/101/EEC.

3.2.3 Protection of the Atmosphere (Climate Change)

EC Sixth Environmental Action Programme (2001)

Climate change is one of the four priority action areas established under this Programme. Here, the immediate objective of the Programme is the achievement of the Community's 8% emission reduction target for 2008-2012, as required under the Kyoto Protocol.

The approach for achieving the objectives signifies important changes for the energy sector. The Programme points to the need for structural changes especially in the transport and energy sectors, and calls for stronger efforts in energy-efficiency and energy-saving, the establishment of an EU-wide emissions trading scheme, further research and technological development, and awareness-raising activities for enabling citizens to contribute to emissions reductions.

3.2.4 Protected Species and Habitats

Directive on the Conservation of Wild Birds (1979) (Birds Directive)[43]

Under this Directive, Member States are required to take the measures needed to preserve, maintain or re-establish a sufficient diversity and area of habitat for all species of wild birds naturally occurring in the European territory of Member States, at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking into account economic and recreational requirements.

Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (1992) (Habitats Directive)[44]

This Directive is a complement to the Birds Directive. It aims to contribute towards ensuring bio-diversity through the conservation of natural habitats and wild fauna and flora in the European territory of Member States, with particular attention being paid to threatened species. The central feature of the Directive is the creation of a network of special areas of conservation, entitled Natura 2000.

This network, composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II of the Habitats Directive, shall enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range. Member States are required to designate a competent authority for the implementation of this Directive, to designate special areas of conservation, to take measures to protect habitats and species, to monitor those habitats and species extensively, and to encourage wildlife protection.

[43] Council Directive 79/409/EEC of 2nd April 1979 on the conservation of wild birds, as amended.
[44] Council Directive 92/43/EEC 21st May 1992 on the conservation of natural habitats and of wild fauna and flora, as amended.

3.3 Promotion of renewable energy

3.3.1 Development of Renewable Energy Sources (RES)

"Energy for the Future: Renewable Sources of Energy: White Paper for a Community Strategy" (1997) [45]

This European Commission proposal sets the objective of doubling the share of renewable energies in gross domestic energy consumption in the European Union by 2010 (from 6% in 1995 to 12% in 2010). It also outlines a Strategy and Action Plan to achieve this objective. The main features of the Action Plan include internal market measures in the regulatory and fiscal spheres; reinforcement of those Community policies which have a bearing on increased penetration of renewable energies; proposals for strengthening co-operation between Member States; and support measures to facilitate investment and enhance information dissemination in the field of renewable energy.

An integral part of the Community Strategy and Action Plan is the so-called 'Campaign for take-off'. This sets out the framework for action to encourage funding from both public and private sectors. In order to encourage and enhance the visible commitment of actors in the Campaign, the concept of a "Renewable Energy Partnership" between the Commission on the one hand, and public authorities, industries and/or associations on the other, has been launched. Members of such Partnerships will, within the scope of their responsibilities and possibilities, join and promote the Campaign and contribute to the fulfilment of its objectives.

Directive on the promotion of electricity produced from renewable energy sources (RES) (2001)[46].

The Directive on the promotion of electricity produced from renewable energy sources (RES) establishes a framework to increase the share of electricity produced from RES (RES-E) in total gross electricity consumption in the EU from 13.9% in 1997 to 22.1% in 2010.

Each MS is responsible for setting national indicative targets to enable the overall objective to be obtained and in this context a set of reference values for national indicative targets for each MS are presented in the Annex of the Directive. Although these targets are for indicative purposes, the Commission has indicated the possibility of future mandatory targets in the case where national indicative targets and progress towards such do not appear consistent with the global indicative target. The Commission is to conduct an assessment of progress towards the target and the need of additional measures to this end, the final results of which are to be published by 27 October 2004 at the latest.

The Directive also refers to support schemes for renewables – the Commission has undertaken to evaluate such measures existing in the various MS, and to assess the effectiveness and economic effect of such with respect to the achievement of the national indicative targets. The findings are to be reported by 27 October 2004, possibly accompanied by a proposal for a Community framework for support schemes.

Other issues addressed by the Directive are the simplification of national administrative measures for authorisation and guaranteed access to transmission and distribution of electricity from RES.

Research & Development in Renewable Energy (Framework programme)

The EU provides research, development and demonstration support through Energy Framework Programmes.

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[45] Com (97) 599 final (26/11/1997)

[46] Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market, published in the Official Journal of the European Communities 27.10.2001 (L 283/33).

Under the Fifth Framework programme, the energy sub-programme had a budget of € 1 042 Million for the period 1998-2002, geared towards actions in the sector of cleaner energy (including renewables), and towards research and development. Under the new, Sixth Framework programme, research into sustainable energy systems has a budget of € 810 Million. Research into renewable energy sources and their integration into the energy system (including storage, distribution and use) is one of the main areas targeted for research in the short to medium term.

In parallel, other programmes support non-technical issues related to renewable energy, such the Altener Programme.

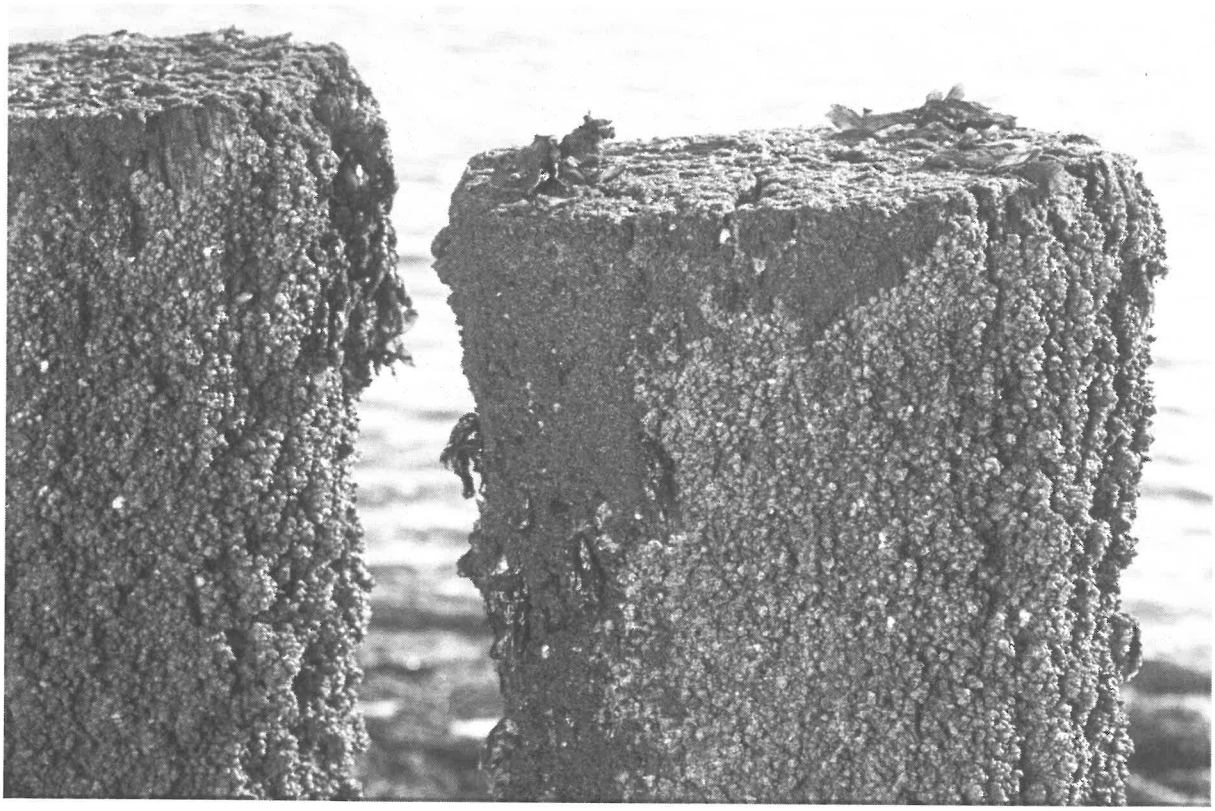
3.3.2 Development of Electricity from RES

Directive on common rules for the internal electricity market (1996) [47].

The Directive establishes common rules for the generation, transmission and distribution of electricity, and sets out the rules relating to the organisation and functioning of the electricity sector, access to the market, the criteria and procedures applicable to calls for tender, the granting of authorisations, and the operation of systems.

The Directive provides for the promotion of renewable energy sources by establishing a priority rule that grants MS the possibility to require the transmission[48] and distribution[49] system operator to give priority access to RES or waste or CHP (combined heat and power) installations, when dispatching generating installations. This is considered as an exception to Article 8. 2 (of this Directive), which states that the dispatching of generating installations and the use of interconnectors must be determined on the basis of criteria, approved by the Member State

[47] Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market in electricity, published in the Official Journal L 027, 30/01/1997 P. 0020 – 0029.
[48] Article 8.3
[49] Article 11.3



PART 2 - National Offshore Wind Policy

4 Overview of Member States' Policy

4.1 Belgium

4.1.1 Delineation of Belgian seas into zones

Baseline

Belgian maritime zones are measured from a normal baseline, which is the low-water line along the coast as indicated on official large-scale charts. The outermost permanent harbour extension of the port of Zeebrugge forms an integral part of the harbour and constitutes part of the coast. Here the baseline is a straight baseline between the two outermost points of the eastern and western outer harbour.

Territorial sea

In implementing the law on the agreement to the Convention on the law of the sea and the agreement to the execution of part XI of the convention of 18 June 1998[50], Belgium agrees to the Law of the Sea Convention, and is therefore subject to the definition of the territorial sea as stated in the Convention. The delineation of sea areas with neighbouring and opposite countries is determined by bilateral and multilateral delimitation agreements.

The Belgian territorial sea extends 12 nautical miles from the baseline. The boundary of the Belgian territorial sea with France consists of a rhumb-line connecting the points expressed in the co-ordinates 02°32'37"E-51°05'37"N and 02°23'25"E-51°16'09"N (1990 Agreement). The boundary of the Belgian territorial sea with the Netherlands consists of an orthodromic line connecting the points expressed in the co-ordinates 03°21'52, 5"E-51°22'25"N, 03°21'14"E-51°22'46"N, 03°17'47"E-51°27'00"N, 03°12'44"E-51°29'05"N and 03°04'53"E-51°33'06"N (1996 Agreement).

Contiguous zone

The contiguous zone is 12 nautical miles beyond the territorial sea. In this area Belgium can exercise the control necessary to prevent and punish infringements of its customs, fiscal, immigration, or sanitary laws and regulations within its territory or territorial sea.

Continental shelf

The continental shelf is defined according to the law of 13 June 1969 on the exploitation and exploration of the territorial sea and the continental shelf, amended by the law of 22 April 1999 on the Exclusive Economic Zone[51]. Article 28 delineates the Belgian continental shelf, which is defined with the same limitation co-ordinates as those determining the EEZ. The area of Belgian continental shelf and that of the Belgian EEZ therefore coincide.

The surface of the Belgian continental shelf is about 2,017 km^2, with a maximum seaward breadth of 47 nautical miles (87.06 km). The boundary of the Belgian continental shelf with France consists of a rhumb-line connecting the points expressed in the co-ordinates 02°23'25"E-51°16'09"N and 02°14'18"E-51°33'28"N (1990 Agreement). The boundary of the Belgian continental shelf with the UK consists of a rhumb line connecting the points expressed in the co-ordinates 02°14'18"E-51°33'28"N, 02°15'12"E-51°36'47"N and 02°28'54"E-51°48'18"N (1991 Agreement). The boundary of the Belgian territorial sea with the Netherlands consists of an orthodromic line connecting the points expressed in the co-ordinates 02°32'21,599"E-51°52'012"N and 03°04'53"E-51°33'06"N (1996 Agreement).

[50] M.B. 16 September 1999
[51] M.B. 10 July 1999

Exclusive economic zone

In 1999, Belgium proclaimed an EEZ (Law of 22 April on the Exclusive Economic Zone of Belgium in the North Sea[52]), adhering to the principles laid down in the 1982 Law of the Sea Convention. Articles 2 and 3 of the 1999 EEZ Law define the Belgian EEZ as the area (containing the waters, the seabed and the subsoil) within the North Sea, situated beyond the territorial sea and bound by the line connecting the co-ordinates as specified above for the continental shelf. The boundaries and surface area of the EEZ are therefore the same as those for the continental shelf.

Fishery zones

In 1978 Belgium installed a fishery zone, the boundaries of which are adjusted by the law on the Belgian EEZ to coincide with the boundaries of the Belgian continental shelf. Fishing within the 12-nautical-mile zone is exclusively reserved for Belgian fishermen and, under certain conditions, also for French and Dutch fishermen. Outside the 12-nautical-mile zone, the general principle of free access applies. In the area between 3 and 12 nautical miles, Dutch fishermen are allowed to catch all species of fish and French fishermen are allowed to catch herring (EC Regulation 3760/92). A Belgian-French Agreement (1975) allows French fishermen to catch herring and sprat in the Belgian territorial sea, between 3 and 6 nautical miles for vessels whose gross tonnage does not exceed sixty or whose engines do not exceed 400 horse power, and within the 3 nautical miles zone for vessels whose gross tonnage does not exceed 35 or whose engines do not exceed 250 horse power. Fishing is totally prohibited on the Paardenmarkt, as indicated on the official charts, because war munitions have been dumped there.

4.1.2 Competent authorities for Belgian sea zones

Government structure

Belgium is Federal State consisting of communities and regions. As such, the decision-making power does not lie solely with the Federal Government and the Federal Parliament. In fact, the management of the country is delegated to several co-operating authorities, which exercise their competencies independently in different fields. With regards to economic issues, competencies are divided amongst the three regions, each having autonomous power: the Flemish Region, the Brussels Capital Region and the Walloon Region. The country is further divided into ten provinces and 589 communes.

Competencies between the Federal- and Regional- level authorities are attributed according to territorial and material concerns. The basic rules regarding the material repartition of competencies between the federal and regional authorities are set out in Article 6 of the Special Law of 8 August 1980 with regard to the reform of the institutions[53]. According to this law, the Federal State retains certain important areas of competence including: foreign affairs, defence, justice, finances, social security, important sectors of public health and domestic affairs, etc. The regions are competent in the fields of nature and water management, land zoning and nature conservation, spatial planning and public works housing, agricultural policy, economy, energy management and renewable energy, local authorities, employment, transport and research and development. However, within any given territory, the repartition of material competencies between the federal and regional authority is based not only on the kind of economic activity but also on the importance and the scope of the economic implications of the activity.

[52] M.B. 10 July 1999
[53] M.B. 15 August 1980

On energy matters, the federal government retains competency for:

- The national indicative programme
- The nuclear cycle
- Large energy infrastructure and storage facilities
- Tariffs
- Offshore energy production

Authority over sea zones and activities

The classification of Belgian offshore areas is done according to the international Law of the Sea Convention (LOSC), to which Belgium is Party. In Belgian law, Article 1 of the Law of 13 June 1969 on the exploitation and exploration of the territorial sea and the continental shelf (amended by the law of 22 April 1999 on the Exclusive Economic Zone) [54] enacts the sovereignty of the Belgian State over its territorial sea[55].

Competent authorities for sea zones for offshore wind development

Competencies *rationa loci* at sea remain with the federal government, who is competent seawards from the baseline.

Some material competencies at sea, such as pilotage and beaconing to and from the ports, rescue operations, towing services, coastal defence works, harbour works and dredging permits (a dumping approval for dredged material remained a federal competence), have been transferred to the Flemish region, bordering the North Sea. Landwards of the baseline, the Flemish region is fully competent.

4.1.3 Legal and procedural requirements for offshore wind exploitation

4.1.3.1 Introduction

The following sections describe the administrative and procedural requirements that must be fulfilled in each stage involved in the implementation and exploitation of an offshore wind park, namely in the:

- The pre-exploitation phase
- The exploitation phase
- The decommissioning phase

In Belgium, the procedural requirements typically relate to environmental protection, and the physical siting of wind parks within Belgian waters. Because the majority of legal and procedural requirements relate to the pre-exploitation phase, this phase is treated in greater detail. Wherever possible, reference is given to the relevant competent authority involved in each procedural phase.

4.1.3.2 The pre-exploitation phase

Introduction

The procedure for the pre-exploitation phase essentially involves two parallel procedures: one relating to the site acquisition for the windpark (domain concession), and the other related to the environmental impact of the project (environmental permits). The legal bases for these two procedures lie in the following main laws:

- The Law on the organisation of the electricity market (29 April 1999) [56]

[54] M.B. 10 July 1999
[55] The territory of the Belgian coastal zone falls in its entirety in the Flemish Region, and is thereby subject to the Flemish regional authority.
[56] M.B. 11 May 1999

- The Law on the Protection of the Marine Environment in the Areas at Sea under Belgian Jurisdiction (20 January 1999)[57]

The Law on the organisation of the electricity market stipulates the requirement for a domain concession. According to Article 6 of the law, the Minister can – on the proposal of the Commission for the Regulation of Electricity and Gas (C.R.E.G.) – grant domain concessions for the construction and exploitation of installations for the production of electricity from water, streams or winds, in the areas at sea under Belgian jurisdiction.

Article 6 of the law also makes specific reference to the law on the Protection of the Marine Environment, which relates to the requirement for the consideration of environmental aspects in developments. According to Article 25 of the law on the Protection of the Marine Environment, certain activities associated with offshore wind energy exploitation require environmental permits – that is licence or authorisation. This further entails a requirement for an Environmental Impact Statement (EIS) (milieu effectenrapport (MER)) to be provided by the developer.

The two procedures are treated separately below.

Domain Concession

Article 6 of the Electricity law stipulates that certain conditions and a specific procedure must be fulfilled for granting an offshore concession. This was implemented by:

- The Royal Decree of 20 December 2000 concerning the conditions and procedure for the granting of domain concessions for the construction and exploitation of installations for the production of electricity from water, streams and winds in the areas at sea under Belgian jurisdiction[58]

The Decree does not establish specific delimitation zones or technical criteria for the siting of a wind park. Instead it sets out a procedure and a set of selection criteria for the granting of domain concessions for the construction and exploitation of installations producing electricity from water, streams and winds in the sea areas.

It is important to note that the Decree refers to the environmental procedure by stipulating[59] that the holder of a domain concession for the building and exploitation of a wind farm has to take the necessary measures in order to protect and conserve the marine environment, as determined by the licence or authorisation granted by virtue of Article 25 of the Law on the Protection of the Marine Environment. Therefore, although a concession can be granted before the procurement of an environmental permit, the concession is not valid until the environmental permit is granted.

Licence and authorisation (environmental permits)

The implementing legislation concerning the licensing/authorisation and EIA/EIS aspects of Law on the Protection of the Marine Environment with regard to offshore wind farm developments are (respectively):

- Royal Decree of 20 December 2000 concerning the procedure for licensing and authorisation for certain activities in the areas at sea under Belgian jurisdiction[60]
- Royal Decree of 20 December 2000 with regard to the rules applicable to the Environmental Impact Assessment (EIA Decree)[61]

According to the Decree for licensing and authorisation[62] an applicant for an offshore wind park will need two permits relating to environmental protection: a licence for the exploitation of the wind park,

[57] M.B. 12 March 1999
[58] M.B. 30 December 2000
[59] Art. 14.8
[60] M.B. 25 January 2001
[61] M.B. 25 January 2001
[62] According to the Decree, the difference between a licence and an authorisation as follows: 1. "licence": a decision made by the Minister giving the licensee general permission to carry out activities during a specific time and under specific conditions; 2. "authorisation": a decision made by the Minister giving the authorised party permission to carry out a specific activity during a determined period and under specific conditions.

and an authorisation for the building of the wind park, both to be procured in the pre-exploitation phase. The Decree describes the conditions and procedure for the granting of a licence or authorisation for offshore areas, which may occur according to two different types of procedure:

1. Procedure met inspraak, in which there is consultation of the public
2. Procedure zonder inspraak, in which there is no consultation of the public.

Applications for licensing or authorisation for offshore wind farm development is submitted under the "procedure met inspraak". The competent authority is the Ministry of Environment.

The application for licence/authorisation must be accompanied by an Environmental Impact Statement (EIS), which, amongst other things, will form the basis of an Environmental Impact Assessment (EIA). (It is important to note that EIA obligation is a general obligation applicable to every activity Belgian seas that is subject to a licence or authorisation, and not only to the activities enumerated in (Article 25) the Marine Environment Protection Law.)

The EIA Decree describes the procedure for conducting the Environmental Impact Statement (EIS), which must be submitted by the developer with his application for licence/authorisation. The Decree refers to the Environmental Impact Assessment Directive (1985) of the European Council and to the Convention on EIA in a Transboundary Context (Espoo Convention). It makes a distinction between the EIA preliminary to the granting of a licence or authorisation (chapter II) and the EIA of the licensed or authorised activity (chapter III). The EIA must be therefore conducted before the granting of the licence or authorisation, and also after the acquisition of the licence or authorisation. Thus, after the granting of a licence or authorisation, the activities at sea will be submitted to a permanent evaluation by monitoring programs and permanent examinations.

The EIS of the developer outlines the potential environmental impact of the project and provides a basis, amongst other things, for the formulation of an Environmental Impact Assessment (EIA) or Environmental Impact Evaluation (Milieu-effectenbeoordeling). The competent administrative body for the formulation of the EIA is the Management Unit of the North Sea Mathematical Models (MUMM).

The MUMM is a department of the Royal Belgian Institute of Natural Sciences and is responsible for marine environmental protection and resource assessment. The minister responsible for the marine environment is advised by MUMM on the decision of granting an environmental permit or not, but is not bound by this advice. A general overview, including a time schedule in French or in Dutch of the environmental procedure for offshore large-scale projects, can be downloaded from the MUMM web site www.mumm.ac.be/EN/Management/Sea-based/windmills.php .

Additional considerations to be factored into procedures

In addition to the environmental impact requirements associated with obtaining the licences and concessions, the Royal Decree on conditions and procedure for the granting of domain concessions also makes a general reference to the influence of wind farm activities on other important maritime activities such as shipping and fishery. It stipulates that the influence of the installation on other permitted activities in the sea area must be considered amongst the selection criteria used in the granting of a domain concession[63]. There is, however, no further specification for the siting of a wind park with respect to the protection of shipping and fishery activities from offshore wind farm activity. This is different to the regulations regarding installations built for the exploitation and exploration of mineral and other non-living resources on the continental shelf – Royal Decree of 16 May 1977 determining measures to protect the shipping industry, fishery at sea, the environment, and other important interests in the exploration and exploitation of the mineral and other non-living resources of the seabed and the underground (i.e. other than oil) in the territorial sea and on the continental shelf[64]. This difference is probably due to the fact that building zones for the exploitation of mineral and non-living resources are pre-established by law whereas, for offshore wind, the procedure for granting domain concessions determines that building zones must be proposed by the applicant.

Supplementary or additional to the above-mentioned regulations for the protection of maritime activities such as shipping and fishery, there exist separate national-level regulations for the protection of other important maritime activities such as shipping, fishery, and scientific research.

[63] Art. 3.2
[64] M.B. 21 July 1977

Shipping routes must be respected according to the Law of 24 November 1975 on the ratification and execution of the provisions of the Convention on the International Regulations for Preventing Collisions at Sea (COLREG), 1992, and its annexes.

Additionally, the Law of 10 October 1978 on the determination of the Belgian Fishery zone[65] amended by the EEZ law (22 April 1999) establishes a Belgian fishery zone within the boundaries of the EEZ. In this zone the Belgian jurisdiction and regulations on fishery apply. These regulations tend to conserve and to manage the fish stocks in the areas under Belgian jurisdiction.

Scientific research of the sea is addressed under the Programme for "Sustainable Management of the North Sea " of the Federal Office for Scientific, Technical and Cultural Affairs (OSTC) (see www.belspo.be).

In addition to the national environmental protection legislation a number of obligations ensuing directly from international-level treaties, must be respected due to Belgium's adherence (through ratification or otherwise) of such. In particular, under the Ramsar Convention on Wetlands (which came into force for Belgium on 4 July 1986), the sandbank area (7,768 ha) (51°10'N 002°44'E) from Oostende to the French border (known as the Kust Banken), has been designated as a Belgian Marine Wetland of International Importance (Ramsar site no. 326). As such, this area must be protected according to Ramsar stipulations. In addition, under the EC Habitats Directive[66] a Special Protection Area of 17,000 ha – comprising the area known as the Kust Banken – has been proposed.

4.1.3.3 The exploitation and decommissioning phases

After the granting of a licence or authorisation, the activities at sea will be submitted to a permanent evaluation by monitoring programs and examinations.

During the exploitation phase, regulatory and procedural requirements consist mainly in providing information to the competent authorities regarding the fulfilment of requirements related to the conditions under which the granting of licences, authorisations and concessions were agreed. This would concern in particular the on- and off- shore construction, and environmental requirements.

As is the case with the exploitation phase, the procedural requirements related to decommissioning concern primarily the fulfilment of agreed conditions under the granting of the original consents. In particular, demolition and removal procedures, and environmental impact and rehabilitation.

4.1.4 Economic conditions for offshore wind exploitation

Support for matters related to procedure or infrastructure

Although all renewables are given 'priority' access to the grid, access in practice is not guaranteed at the moment, as a consequence of limited grid capacity. The basic costs associated with grid connection are met by the developer. However, in the case of extra costs arising from the need to extend or reinforce the grid, there is no fixed regulation.

Support for investment

There are no investment subsidies applicable specifically to offshore wind exploitation. There are no other fiscal or non-fiscal forms of investment support at the Federal level

Support during operation

The Federal government has passed a Royal Decree fixing the pricing conditions for offshore wind. The decree sets out a guaranteed fixed minimum price to be accorded to green certificates for offshore wind electricity, wherein the grid operator is obliged to purchase the electricity at a minimum price of 0.09 €/kWh. This minimal fixed tariff is applicable for a period of 10 years from the time at which the electricity is first injected into the grid.

[65] M.B. 28 December 1978
[66] Council directive 92/43/EEC

4.2 Denmark

4.2.1 Delineation of Danish seas into zones

Baseline

The delineation of Danish seas is done using a baseline defined according to the regulation Bekendtgørelse om afgrænsning af Danmarks Søterritorium (Government order on the delimitation of Denmark's Territorial Sea) 1999:242. The baseline is the "virtual" line, which delimits the land area. It is determined by bilateral and multilateral delimitation agreements and implemented in Denmark through a Government order, which includes the specific baselines.

Territorial Sea

The territorial sea is defined under Lov om afgrænsning af søterrito-riet (Act on the Danish Territorial Sea) 1999:200). In principle the Danish sea territory is 12 nautical miles from the coast. The delineation of sea areas with neighbouring and opposite countries is determined by bilateral and multilateral delimitation agreements. The co-ordinates are defined in a Government order (1999:242) following up on the Act.

Continental shelf

The Lov om kontinentalsoklen (act on the continental shelf) 1979:182 defines the Danish continental shelf. The delineation of sea areas with neighbouring and opposite countries is determined by bilateral and multilateral delimitation agreements. The law has been modified a number of times since it was adopted. There is no updated law document.

Exclusive Economic (EEZ)

Denmark proclaimed an EEZ according to Lov om eksklusive økonomiske zoner (act on the Danish economic zone) 1996:411, and Bekendtgørelse om Danmarks Exclusive økonomiske Zone (Government Order on the Danish Economic Zone) 1996:584. The economic zone, in principle, covers the area extending up to 200 nautical miles from the baseline. Where this conflicts with other countries' exclusive economic zones, the zones are delimited by the middle line, which is a line where each point has an equal distance to the nearest point on the base lines from which the size of the Danish territorial sea and other states are calculated. The co-ordinates of Denmark's EEZ are published in the previously-mentioned Government order.

Coastal zone

The applicable regulation for the coastal zone is described in the publication "Eksisterende regulering af det danske kystområde (Existing regulation of the Danish Coastal Zone. Ministry of Environmental, National Planning Department, 1999)". The regulation of the coastal zone is rather complicated with a number of different regulations. An overview is produced in a publication (in Danish) on the existing regulation of the Danish Coastal Area[67].

4.2.2 Competent authorities for Danish sea zones

Territorial structure

The Kingdom of Denmark consists of three parts: Denmark, the Faeroe Islands and Greenland. The legal regulation for the Faeroe Islands and Greenland is not included in the following description, as they are not members of the European Union.

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[67] Integreret kystzoneforvaltning: Eksisterende regulering af det danske kystområde. Delrapport 2: Udført for Miljø- og Energiministeriet, Landsplanafdelingen af Helle Tegner Anker, Center for Samfundsvidenskabelig Miljøforskning v. Aarhus Universitet og Forskningscentret for Skov & Landskab. 1998.

Government structure

Denmark is a Constitutional monarchy. The Parliament has one chamber (Folketinget). Grundloven (The constitutional law) determines the rights of individuals and the powers of the King, Parliament, Government and Courts.

Administratively, Denmark is divided into 14 counties (amter) and 275 local authorities (kommuner), two of which (Copenhagen and Frederiksberg) are not included in the counties, but are dealing with both local and regional matters. Each of these counties/municipalities has a regional/local council (Amtsråd/kommunalbestyrelse). There is very little regional state administration. Most of the regional matters are decentralised to the counties (their elected bodies).

The municipalities and the county on the Island Bornholm will merge on the 1st of January 2003 and thereby create a new regional municipality.

Authority over sea zones

Legally, the Danish territorial sea is a special zone and in general is not covered by the on-land regulation. However, the on-land regulation is to a certain extent applicable to the coastal zone.

Different state authorities administrate the sovereignty. With respect to the production of electricity from installations situated in the territorial sea (in particular wind turbines) the Danish Energy Authority administrates the sovereignty. Furthermore, it is the Energy Authority that decides whether a specific project requires an Environmental Impact Assessment (In Danish abbreviated VVM – refer to section 4.2.3).

Competent authorities for sea zones for offshore wind development

In the Government, energy policy and energy administration is the responsibility of the Ministry for Economic and Business Affairs, to which the Danish Energy Authority belongs.

The main competent authority involved in the procedure for offshore wind developments is the Danish Energy Authority. The decisions of the Energy Authority can be brought to the Energy Board for Appeal, which is an independent appeal board under the Ministry for Economic and Business affairs.

A number of other authorities administer regulation concerning the sea territory, but according to the existing framework they are all linked through the Energy Authority. The Danish regulation is aiming at "one-stop shopping".

Due to the fact that the Energy Authority acts as the central link, and because the whole framework is now under reconsideration (see 4.2.3) by a working group within the Ministry for Economic and Business Affairs, the other authorities are not listed.

4.2.3 Legal and procedural requirements for offshore wind exploitation

Introduction

In describing the Danish procedure for offshore wind development, it should be noted that the Government has decided to reconsider the framework in order to create a more competitive system, based on tendering. The minister has set up a working group, which, in November 2002, will present an assessment on the option of implementing a competitive tendering system for offshore wind turbines.

Significant work has already been conducted in the Danish offshore wind energy sector. Over the last ten years a number of studies concerning the environmental impact assessment and siting of offshore wind turbines have been carried out – a number of these are published and can be found by a search on Nordic Energy Index (www.risoe.dk/nei).

Between 1992 and 1995 the Offshore Wind Turbine Committee of the former Ministry of Environment and Energy conducted a mapping project in order to identify possible locations for offshore wind farms in Danish waters. An assessment of the impact of offshore wind farms on coastal landscapes further

recommended that offshore wind farms be concentrated in relatively few areas, placed at a given distance from the coast.

The mapping project tended to take into account all known interests in Danish waters, such as nature preservation areas, main sailing routes and military areas etc. Moreover, the planning process took into consideration the need for limited water depths, relevant for the technology available at that time. The plan also aimed to concentrate offshore wind energy development in a few areas, while maximising the use of existing infrastructure and reducing as far as possible the impact on the coastal landscape. Based on an evaluation of the interests attached to the different areas in the Danish waters, five main areas for offshore wind farms were selected.

The principles put forward by the Committee were implemented (in 2000) through a Government order[68], which sets out the procedures for the Environmental Impact Assessment and conformity with the regulation on the Sea. The Government order was issued based on a new law on electricity supply[69]. It concerns projects undertaken within the Danish Exclusive Economic Zone (including the territorial sea) and applies to both new projects and to existing plants undergoing major changes. It is generally assumed that such projects will have a major impact on the environment and will therefore require an Environmental Impact Assessment (EIA) procedure (The Danish abbreviation for EIA, VVM, will be used in the following). The decision on whether a VVM procedure is required is however made by the Danish Energy Authority.

Thus, through the government order, the Danish Energy Authority is the junction for the application from a developer – since the agency is responsible for administrating the sovereignty with respect to the sea territory, and also because it acts as the co-ordinating body for the various public interests involved in offshore wind energy exploitation.

Two small offshore pilot-demonstration wind farms, each 5 MW, were built at Vindeby and Tunø by the utilities in 1991 and 1995 respectively.

The 40 MW pilot-project at Middelgrunden obtained planning permission in May 1999 and was approved by the Danish Energy Authority in December 1999. The project is situated 2 km outside the Copenhagen harbour in shallow water (3-5 m) and was put into operation at the beginning of 2001.

Planning permissions, Environmental Impact Assessment (EIA) and approvals have been obtained for two projects in Denmark's large-scale offshore wind-farm demonstration programme. In 2001, Elsam/Eltra was granted permission to develop a wind farm at Horns Rev at the West Coast of Jutland, while SEAS (on behalf of Energi-E2) was granted permission for a project at Rødsand, south of Seeland. Environmental Impact Assessments have been carried out for the projects.

Due to the special status of the demonstration programme an environmental measurement and monitoring programme, more comprehensive than the EIA, has been initiated to investigate the effects on the marine environment before, during and after the completion of the wind-farms.

Pre-exploitation phase

The conditions for future offshore farms have now been laid down in the new electricity bill, approved by the Parliament in May 1999 as a result of the reformation of the Danish electricity sector. According to the regulation, the right to exploit energy from water and wind within the territorial waters and the economic zone (up to 200 nautical miles) around Denmark belongs to the Danish Government.

The bill lays down the procedures required for the approval of electricity production from water and wind sources and for the pre-investigation for such activities within the national territorial waters and economic zone belonging to Denmark. Permissions are granted for a specific area, and where construction works are expected to have an environmental impact, an environmental assessment must be carried out.

According to the Danish electricity supply bill the establishment of offshore wind farms requires a permit as well as a license for the operation. The twofold approval process includes permission for

[68] Bekendtgørelse om vurdering af virkninger på miljøet (VVM) af el-produktionsanlæg på havet (Government order 2000:815 (28 August 2000))
[69] Lov om elforsyning, 1999:375 (2 June 1999)

preliminary surveys and later a final approval of projects – a building permit. Both of these permissions depend upon a process of public hearing in order to take account of the different interests. In relation to the latter, the applicant is called upon to do an EIA.

The final decision of the Energy Authority is published. The decision can be brought before the Energy Board of appeal through a complaint.

The framework for a forthcoming public tender and conditions for future offshore windfarms is going to be assessed. The objective is to ensure that the future offshore development is based on market conditions in an environmental sound and economically efficient way

The exploitation and decommissioning phase

During the exploitation phase, regulatory and procedural requirements consist mainly in providing information to the authority supervising the project (the supervision authorities are pointed out in the approval from the Energy Authority) regarding the fulfilment of requirements related to the conditions under which the original permission for the offshore development was agreed (such as further information that must be provided...). In this respect, developers are typically required to conduct monitoring activities and provide regular reports concerning offshore and onshore construction, and environmental impact.

As is the case with the exploitation phase, the procedural requirements related to decommissioning concern primarily the fulfilment of agreed conditions under the granting of the original consents, such as: demolition and removal procedures, environmental impact and rehabilitation, safety etc. In one of the approvals already given, these conditions are described as follows:

The developer has the obligation, on his own account, to remove the plant (or the remnants), including the cable connections, and re-establish the former condition in the area (except for the bases under the seabed level), and to this end an economic guarantee (approved by the Energy Authority) must be provided by the developer.

A summary of the legislatory aspects of relevance in offshore wind farm development, and the relevant competent authorities, is shown in Table 3 below.

Table 3: Legislatory aspects relating to offshore wind development in Denmark.

	Identification[70] of the regulatory act (in Danish)	Translation of the subject	Authority
1a	Lov om afgrænsning af søterritoriet Lov 1999:2000 (7th of April)	Act on the delimitation of the territorial sea	Ministry of foreign affairs. With respect to electricity production plants, the authority is delegated to the Energy Authority
1b	Bekendtgørelse om afgrænsning af Danmarks søterritorium BEK 1999:242 (21st of April)	Government order on the delimitation of the Danish Territorial Sea (co-ordinates)	Ministry of Foreign Affairs
2a	Lov om eksklusive økonomiske zoner Lov 1996:411 (22nd of May)	Act on exclusive economic zones	Ministry of foreign affairs With respect to electricity production plants, the authority is delegated to the Energy Authority
2b	Bekendtgørelse om Danmarks eksklusive økonomiske zone BEK 1996:584 (24th of June)	Government order on the delimitation of the Danish Exclusive Economic Zone (co-ordinates)	Ministry of Foreign Affairs
3	Lov om kontinentalsoklen Lov 1979:182 (1st of May)	Act on the continental shelf	Ministry of Environment/Ministry of Economic and Business affairs
4	Lov om beskyttelse af havmiljøet Lov 1993:476 (30th of June)	Act on protection of the maritime environment	Ministry of Environment Danish Forest and Nature Agency
5	Lov om naturbeskyttelse Lov 2002: 85 (4th of February)	Act on Protection of Nature	Ministry of Environment Danish Forest and Nature Agency
6	Lov om råstoffer Lov 1997:569 (30th of June)	Act on Raw Materials	Ministry of Environment Danish Forest and Nature Agency
7	Lov om miljøbeskyttelse Lov 2001:753 (25th of August)	Act on Environmental Protection	Ministry of Environment Danish Environmental Protection Agency
8	Lov om elforsyning Lov 2001:767 (28th of August)	Act on Electricity supply	Ministry of Economic and Business Affairs Danish Energy Authority
9	Bekendtgørelse om vurdering af virkninger på miljøet (VVM) af el-produktionsanlæg på havet BEK 2000:815 (28th of August)	Government order on the Assessment of Environmental Impact from electricity production plants on the Sea	Danish Energy Authority

[70] The identification is the most recently published act in its entirety. Any subsequent amendments are not part of the registration

	Identification[71] of the regulatory act (in Danish)	Translation of the subject	Authority
10	Bekendtgørelse om støj fra vindmøller BEK nr 1999:304 (14th. Of May)	Government order on noise from wind turbines (relevant in coastal areas)	Ministry of Environment Danish Environmental Protection Agency
11	Lov om fiskeri Lov 1999: 281 (12th of May)	Act on Fishery	Ministry of Food, Agriculture and Fisheries
12	Vejledning om udlægning af telekabler og visse rørledninger på søterritoriet Vejledning 2001:163 (17th of September)	Guidelines on cable laying on the Sea Territory	Danish Energy Authority (cables for electricity Production Plants)
13	Bekendtgørelse om afgrænsning og administration af internationale naturbeskyttelsesområder BEK 1998:782 (1st of January)	Government order on the delimitation and administration of international nature preservation areas	Danish Forest and Nature Agency
14	Lov om sikkerhed til søs Lov 2000: 554 (21st of June)	Security for sea transportation	Ministry of Economic and Business Affairs Danish Maritime Authority
15	Bekendtgørelse om beskyttelse af søkabler og undersøiske rørledninger BEK 1992:939 (27th of November) 1992	Protection zones for cables or pipelines (200 m)	Ministry of Economic and Business Affairs Danish Maritime Authority

4.2.4 Economic conditions for offshore wind exploitation

Support for matters related to procedure or infrastructure

Denmark currently has three major programmes for the funding of R&D projects relating to energy supply:

1. The Energy Research Programme administrated by the Danish Energy Authority
2. Public Service Obligation (PSO) programme administered by the transmission system operator, Eltra (West of the Great Belt)
3. Public Service Obligation (PSO) programme administered by the transmission system operator, Elkraft-System (East of the Great Belt)

The programmes have priorities for renewable energy. The Energy Research Programme has a budget of 40 million DKK (approx. 5.4 M€) for 2002, and the two PSO programmes have in total a budget of 100 million DKK (approx. 13.5 M€) in year 2002.

The costs of grid connection are split between the grid operator and the wind turbine owner according to the rules set out in a government order on grid connection and feed-in prices (Bekendtgoerelse 2001: 87 (16th of March) om nettilslutning af vindmøller og prisafregning for vindmølleproduceret elektricitet m.v.).

[71] The identification is the most recently published act in its entirety. Any subsequent amendments are not part of the registration

For offshore wind turbines located on sites specified in the former government's plan, "Havmøllehandlingsplan for danske farvande", the grid connection costs from an offshore grid junction point are paid by the grid operator. The internal grid of the wind farm is paid by the owner of the turbines. For offshore farms in other locations, the developer has to pay the connection costs to an onshore junction point. However, these rules are under consideration by the committee set up by the government, and will probably not be applicable in the future.

Support for investment (future)

Denmark's green electricity is currently in a state of transition – the Government has decided to reconsider the existing system of fixed tariffs, and create a more competitive system based on tendering. For this, a working group has been set up, which will present a proposal for a competitive tendering system for offshore wind turbines, in November 2002.

Support during operation (current)

The framework for the future support system for offshore windfarms is going to be implemented according to a public tender procedure.

4.3 Federal Republic of Germany

4.3.1 Delineation of German seas into zones

Baseline

All distances from the coasts for the delineation of the German coastal waters refer to the mean high tide line.

Territorial sea

On 25 July 1997 Germany ratified the Law of the Sea Convention (LOSC), and is therefore subject to the definition of the territorial sea as stated in the Convention. The delineation of sea areas with neighbouring countries is determined by bilateral and multilateral delineation agreements.

The territorial sea of the Federal republic of Germany extends up to 12 nautical miles (nm) from the baseline.

Continental shelf

The continental shelf area covers the seabed and sub-soil seaward of the territorial sea extending up to a maximum distance of 200 nm from the coast.

Exclusive Economic Zone

The Exclusive Economic Zone is defined as the maritime zone seaward of the 12 nm limit of the territorial sea, extending up to a maximum distance 200 nm from the coast, as measured from the mean high tide line, in accordance with part V of the LOSC. In the Federal Republic of Germany, the area of the EEZ is identical with its continental shelf area. The total area of the EEZ covers 28606 km² in the North Sea and 4513 km² in the Baltic Sea.

Coastal zone

Germany's coastal zone is defined as being at a distance of 12 nm from the mean high tide line.

Maps (legend in German) showing the delineation of German waters may be found at http://www.bmu.de/download/dateien/offshore01a.pdf (North Sea) and at http://www.bmu.de/download/dateien/offshore01b.pdf (Baltic Sea).

4.3.2 Competent authorities for German sea zones

Territorial structure

The Federal Republic of Germany consists of 16 Federal States (Baden-Württemberg, Bayern, Berlin, Brandenburg, Bremen, Hamburg, Hessen, Mecklenburg-Vorpommern, Niedersachsen, Nordrhein-Westfalen, Rheinland-Pfalz, Saarland, Sachsen, Sachsen-Anhalt, Schleswig-Holstein, Thüringen).

Government structure

The Government is a parliamentary democracy consisting of the parliament (Bundestag, directly elected representatives of the public) and the federal states representation (Bundesrat, representatives of the federal states) as the federal-level legislative body. The state parliaments fulfil certain tasks independent of the federal government, such as building, culture, education etc. The distinction of federal and state ('Länder') tasks creates both centralised and decentralised structures.

Authority over sea zones

In the zone extending up to a distance of 12 nm from the coast the states are responsible. From West to East, the coastal states are: Niedersachsen (Lower Saxony), Bremen, Hamburg, Schleswig-Holstein, Mecklenburg-Vorpommern. Activities in the exclusive economic zone (EEZ) fall mainly under federal authority.

Competent authorities for sea zones for offshore wind development

Landward of the EEZ, i.e. in the area of the territorial sea (up to the 12 nm limit), the German Länder (federal states) are responsible for the approval of installations. Activities in the exclusive economic zone (EEZ) are administered at the federal level by the Federal Maritime and Hydrographic Authority (BSH).

4.3.3 Legal and procedural requirements for offshore wind exploitation

4.3.3.1 Introduction

In general the procedure for establishing an offshore wind park within the territorial sea differs from that for parks located within the EEZ. However, the procedures may still be broken down in similar stages, namely:

- The pre-exploitation phase
- The exploitation phase
- The decommissioning phase

The general procedure is therefore described according to the three phases identified, indicating where relevant, the differences between the procedures for parks within the territorial sea compared to parks located outside the territorial sea, within the EEZ. Because the majority of legal and procedural requirements relate to the pre-exploitation phase, this phase is treated in greater detail. Wherever possible, reference is given to the relevant competent authority involved with each procedural phase.

The German government has published a strategy on the exploitation of offshore wind energy in the context of its national sustainability strategy. The ministries involved were: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (lead), Federal Ministry of Economics and Technology, Federal Ministry of Transport, Building and Housing, Federal Ministry of Consumer Protection, Food and Agriculture and Federal Ministry of Defence. The Federal Nature Conservation Act, which was revised parallel to the development of this strategy, contains – amongst other things- new regulations for marine protection in the EEZ. These regulations deal with the identification of protected areas, as well as the provisions for specially-suited areas for the establishment of wind power plants, and the licensing procedure with the Offshore Installation Ordinance.

4.3.3.2 Pre-exploitation phase

For installations in the 12 nm zone an application for permission must be submitted to the responsible body of the respective federal state. This permission covers wind turbines, as well as cables needed to conduct electricity from the wind park to onshore connection points. The competent authorities for permits in the 12 nm zone are those responsible for the "Imissionsschutzrechtliche Genehmigungen" (Imission Control Regulation permit), in accordance with the Bundesimmissionsschutzgesetz (Federal Imission Control Act).

Permission for the installation of rigid and floating structures in the exclusive economic zone has to be obtained from the Federal Maritime and Hydrographic Authority (BSH). As issuing body for permits, the BSH has to consult with the "Träger öffentlicher Belange" (institutions responsible for safeguarding public interests, such as nature associations, agencies, authorities etc.). In addition, the plans must be published and comments from the public (local residents and NGOs) must be heard in an application conference.

For planned wind parks in the EEZ, two permit applications must be submitted to the Federal Maritime and Hydrographic Authority – one for the wind park, and a separate one for submarine cables.

Completed applications are treated on a first-come-first-serve basis – that is, the application which is the first to obtain all the necessary permissions (genehmigungsfähig) is the one which gains priority over the site in question.

At the same time, the application is weighted for its quality and focus towards the objective, so as to avoid situations in which applicants 'block' locations without serious interest in developing the wind park in the near future. Wind parks in the EEZ must also receive permission for the installation of submarine cables in the 12 nm zone. This permission must also be obtained from the respective federal state.

The developer is required to pay a fee for the processing of his application by the competent authorities. Fees are calculated based on actual work carried out at the Federal Maritime and Hydrographic Authority. A down payment of 2000 € has to be paid upon application. A further 8000€ must be settled at the time of the application conference, and the rest upon approval. The cost of the permit is determined by the amount of work that the Federal Maritime and Hydrographic Authority and other bodies have to carry out in the process of examining the application. The hourly tariffs are 45 € for the medium level officers, for higher ranks, the tariff is 60€/hr.

The application, in general, contains the following items:

- A general description of the project
- A description of the location and the lay-out of the wind park, maps
- Time schedule
- Itineraries for the environmental impact assessment, considerations for the protection of the environment, risk analysis
- (Technical) description of the wind turbines
- Considerations on the effect and dangers on marine and aviation traffic, defence, fisheries, mining, tourism, visibility
- Environmental pre-assessment: marine mammals, fish, birds, benthos etc.
- Geological survey and considerations on stability for the foundations
- Wind climate and wave loading with considerations on failure of the installation, risk analysis
- Cable routing, shore connection, grid capacity
- Financing concept for removal of turbines

After examination of the submitted documents, a process involving application conferences and successive refinement of the information is started. During this process, the local coastal or island residents and their representatives, as well as associations of the fisheries, marine traffic, sailing, nature and environmental protection, are involved.

Environmental Impact Assessment

The EU Directive on Environmental Impact Assessment 97/11/EG, 85/337/EWG has been implemented into German national law as of 3 August 2001 with:

- Gesetz zur Umsetzung der UVP Änderungsrichtlinie, der IVU-Richtlinie und weiterer EU-Richtlinien zum Umweltschutz' (Act on the implementation of the directive to change the EIA, the IPPC directive and other EU directives aimed at environmental protection) (3 August 2001).

All installations and operations of technical buildings are covered within the scope of this law. The extent and scope of the EIA to be carried out varies according to the category of wind park, defined according to the following sizes: up to 3 turbines, between 3 and 6 turbines, between 6 and 19 turbines, and 20 or more turbines. For wind parks of more than 20 wind turbines, the law requires a full environmental impact assessment.

The Offshore Installations Ordinance states that the Federal Act on Environmental Impact Assessment will apply for offshore wind parks in the EEZ.

The EIA must cover direct and indirect impacts on humans, flora and fauna, ground water, climate, landscape, cultural, and other assets. The law also requires a public participation.

In the case of offshore wind parks, the authorities expect visualisations, bird counts, research fishing with stocktaking of fish and benthos, dredging of the seabed and assessment/count of species and geological structure, counts of sea mammals before, during, and after the installation of the wind park.

Protected Areas

The protected areas of the North and Baltic Sea are shown in maps (legend in German) available at http://www.bmu.de/download/dateien/offshore01a.pdf (North Sea) and at http://www.bmu.de/download/dateien/offshore01b.pdf (Baltic Sea).

4.3.3.3 The exploitation and decommissioning phase

With respect to the permit, the issuing body of the permission may require monitoring of the environmental impact parallel to the operation of the wind parks during the exploitation phase.

Details of the planning for the decommissioning phase and a bail for financing these operations may be required as a prerequisite to the permit.

A summary of the major national and international legislation of relevance in offshore wind development procedure in Germany is given in Table 4 below.

Table 4: Summary of applicable legislation for offshore wind exploitation in Germany

Legislation	Relevant administrative procedure	Competent authority
Seeaufgabengesetz Federal Act on Marine Traffic Affairs	Permit (safety of maritime traffic, danger to the environment)	Bundesamt für Seeschiffahrt und Hydrographie Federal Maritime and Hydrographic Authority
Seeanlagen-Verordnung of 23 Jan 1997, amended April 2002 (Main legislation relevant for application process for offshore wind parks) Offshore Installations Ordinance	Permit (safety of maritime installations, danger to the environment)	Bundesamt für Seeschiffahrt und Hydrographie Federal Maritime and Hydrographic Authority
Bundesnaturschutzgesetz of Aug 2001, amended April 2002 Federal Nature Conservation Act (valid within 12 nm-zone and partly extended to EEZ)	Permit (EIA)	Bundesamt für Seeschiffahrt und Hydrographie EEZ section (beyond 12-nm zone): Federal Maritime and Hydrographic Authority Within 12 nm-zone: Länder
Bundesimmissionsschutzgesetz Federal Immission Control Act (valid within 12 nm-zone)	Permit (EIA)	Within 12 nm-zone: Länder
Umweltverträglichkeits-prüfungsgesetz Federal Act on Environmental Impact Assessment (valid within 12 nm-zone and EEZ)	Permit (EIA)	Bundesamt für Seeschiffahrt und Hydrographie EEZ section : Federal Maritime and Hydrographic Authority Within 12 nm-zone: Länder
Bundesberggesetz Federal Mining Act	Permit for cables	Bundesamt für Seeschiffahrt und Hydrographie, Länderbaubehörden Federal Maritime and Hydrographic Authority, state authorities
United Nations Law of the Sea Convention	Delineation of territorial waters	
EU Flora-Fauna-Habitat Richlinie EU Flora/Fauna Habitat Directive 92/43/EWG	Outline of protection areas by national governments	Within 12 nm-zone: Länder Beyond 12 nm-zone, inside EEZ: Federal Government
EU Vogelschutzrichtlinie EU Bird Protection Directive 79/409/EWG	Outline of protection areas by national governments	Within 12 nm-zone: Länder Beyond 12 nm-zone, inside EEZ: Federal Government
EU UVP Richtlinie EU Directive on Environmental Impact Assessment 97/11/EG, 85/337/EWG	Integration of Environmental Impact Assessment procedures into national law	Within 12 nm-zone: Länder Beyond 12 nm-zone, inside EEZ: Federal Government
EU IVU Richtlinie EU IPPC Directive 96/61/EG	Integration of Integrated Pollution Prevention and Control procedures into national law	Within 12 nm-zone: Länder Beyond 12 nm-zone, inside EEZ: Federal Government

4.3.4 Economic conditions for offshore wind exploitation

Support for matters related to procedure or infrastructure

The developer is required to pay the costs related to grid connection and transmission. However, producers of offshore wind-generated electricity are guaranteed access to the grid since the grid operator is placed under obligation to do so. The grid operator is also obliged to reinforce the grid – if it is just, reasonable and necessary to do so – at his own cost.

Regulation of other conditions for connection – which may be required as a result of the fluctuating nature of wind-generated power – still have to be elaborated.

Support for investment

There are no Federal-level subsidy schemes specifically dedicated to investment in offshore wind projects. However, important subsidy programmes exist for research, development and demonstration (RD&D), and for monitoring. Research on the wind climate, sea currents, waves, properties of the ground etc. is subsidised under the Future Investment Programme. To enable this research, the Federal Ministry of Economics provides a total of 15.4 M€ funds for the installation of research platforms. In addition to this, the Federal Environment Ministry grants 4.2 M€ for biospheric research on these platforms.

Support during operation

The major incentive for offshore wind development is the feed-in tariff regime, which has been continued under the new policy:

- Erneuerbare-Energien-Gesetz (EEG) (Renewable Energy Act) (approved 29 March 2000, entered into force 1 April 2000)

Generally the tariffs for windparks are split according to the period of its operation. In general, with respect to wind installations, a higher tariff is valid within the first five years, after which the tariff is lowered. For *offshore* windparks the first tariff is paid for 9 years instead of five years, if the offshore installations are commissioned no later than 31 December 2006. The tariff is lowered after the initial 9-year period. Unlike the previous scheme, the feed-in tariffs are no longer to be paid by the utilities but by the grid operators.

Table 5: Fixed buy-back rates for offshore wind energy in Germany

Distance from baseline	Period of Tariff (years)	Tariff (€/kWh, 2002)
<3 nautical miles	5	0.090
	6-20	0.061
>3 nautical miles and EEZ	9	0.090
	10-20	0.061

Under the feed-in tariff regime, offshore installations are categorised according to their distance (in nautical miles (nm)) seawards from the baselines used to demarcate territorial waters. Two categories are defined: 1. those lying within a distance of 3 nm from the baseline and 2. those lying beyond 3nm. Installations can benefit from the fixed price guarantee for a period of up to 20 years, although different base tariffs are applicable to different periods. The initial (higher) tariff may be extended beyond the first time period depending on the system's yield compared to a reference system at the same location (for offshore installations: 9 years). Table 5 shows the tariffs paid under the Renewable Energy Sources Act as at January 2002. (As of 1 January 2002, the minimum compensation will be reduced by 1.5% annually for new installations commissioned after this date). The tariff is broken down according to the period for which it is applicable for an offshore installation, at a particular location (determined by the distance from the baseline).

4.4 France

4.4.1 Delineation of French seas into zones

Baseline

The delimitation of French waters is done using straight baselines and the lines enclosing bays – these are defined in the Decree of 19 October 1967 (defining the straight baselines and the lines enclosing bays used in determining the baselines from which the breadth of the territorial waters is measured). The baseline may sometimes be several kilometres from shore.

Interior waters

The interior waters are defined as the sea area between the shore and straight baselines.

Territorial Sea

The French territorial sea is defined according to the Law No. 71-1060 of 14 December 1971 regarding the delimitation of French territorial waters. It is defined as extending up to a limit of 12 nautical miles (nm) from the baselines. The delineation of French territorial sea with opposite and neighbouring countries is done through a series of bilateral and multilateral agreements.

Exclusive Economic Zone

France declared an exclusive economic zone (EEZ) under its Law 76-655 of 16 July 1976 relating to the Economic Zone off the coasts of the territory of the Republic. Article 1 of this law defines the French EEZ as extending up to 188 nautical miles from the outer limit of the territorial sea. France has also established a number of other EEZs for its overseas departments and territories.

It should be noted that although there is no EEZ delimitation in the Mediterranean Sea, France is to issue a law creating an "Ecological Protection Area" there (modifying Law 76-655, to allow protection of the environment), and this may have consequences for future offshore windpark development in the area. This law is now under consultation with neighbouring States.

Continental shelf

The French continental shelf is defined according to the Geneva Convention on the Continental Shelf of 29 April 1958. Through Law 68-1181 of 30 December 1968 on the exploration of the continental shelf and the exploitation of its natural resources, France further exercises its sovereign rights for the purposes of exploring the continental shelf adjacent to its territory and exploiting its natural resources.

4.4.2 Competent authorities for French sea zones

Territorial structure

France is comprised of Metropolitan France and Overseas Departments and Territory (DOM-TOM). From an administrative point of view, France has 36 000 municipalities, and is divided in 96 metropolitan departments, over 21 regions and one territorial collectivity with special status (Corsica).

The overseas departments and territories are islands, such as St-Pierre-et-Miquelon, Guadeloupe, Guyana, Reunion, The Marquises Isles, Tahiti, New Caledonia, etc.

Government structure

France is governed under the 1958 constitution, which provides for a president, directly elected for a five-year term. A Prime Minister and ministers are appointed by the president and are responsible to the national assembly, but they are subordinate to the president who presides over the council of

ministers. The bicameral parliament consists of the National Assembly and the Senate. Parliament is solely responsible for legislation regarding civil, fiscal, and penal law, electoral law, civil liberties, the budget, and amnesty and labour laws.

Authority over French sea zones

The Law on the delimitation of French territorial waters (Law 71-1060 of 14 December 1971) enacts the sovereignty of the French State over its territorial sea into the French legislation. Furthermore, in accordance with Law 86-826 of 11 July 1986 on Marine Scientific Research in the economic zone (relating to the Law 76-655 of 16 July 1976 on the French EEZ), French authorities exercise the competence recognised by the international law on protection and preservation of marine environment, on marine scientific research, on the construction and use of artificial islands, facilities works.

The state is the *only* authority in charge of the sea itself – no local authority can exercise competence over French seas, only deconcentrated authorities representing the "central state" (for instance "préfet maritime" or "préfet du département (hereafter referred to simply as the "préfet") may exercise, in the name of the state, competence over the French sea.

As regards use of the sea bed, an important area under French legislation is the "domaine public maritime" (marine public domain), which is the soil and subsoil of French territorial sea (but does not include the water column or sea surface). The marine public domain defines the borders of the State's property. Within the marine public domain two distinctive areas are identified:

1. The natural marine public domain, which consists of a.o., the bank and the shore of the sea, salted ponds naturally communicating with the sea, foreshores, the soil and subsoil of territorial sea (12 miles offshore, i.e. roughly 22 km offshore) etc.
2. The artificial marine public domain, which consists of harbours and their outbuildings, artificial shores etc.

The marine public domain is of interest to numerous operators exercising various activities, including its use for offshore wind energy development.

The major role in the administration of the public domain traditionally lies with the "préfet", who, as a representative of the State in Le Ministère de l'Equipement, des Transports, du Logement, du Tourisme et de la Mer (The Ministry of Equipment, Transport, Housing, Tourism and the Sea), is the authority regulating the use of the marine public domain. The préfet is therefore responsible for allowing use of the domain for private or public activities, and for overseeing the protection of its integrity by prosecuting any parties responsible for infringements to this domain.

Competent authorities for sea zones for offshore wind development

The main competent authorities involved in the procedure for offshore wind developments are:

- The state, in particular Le Ministère de l'Equipement, des Transports, du Logement, du Tourisme et de la Mer (The Ministry of Equipment, Transport, Housing, Tourism and the Sea) – represented by the préfet. The Ministry exercises the State's role as landowner of the seabed up to the 12 nm territorial sea limit. However, there currently exists no specific procedure for leasing areas of seabed for the location of offshore wind farms.
- Le préfet maritime (directly linked with the Prime Minister, through the "Secrétariat Général de la Mer"), who represents all ministers at sea – except for the domaine public maritime.

The following government bodies and organisations also play a role in the offshore wind development procedure:

- Ministère de l'Ecologie et du Développement Durable (Ministry of Environment and Sustainable Development)
- Ministère chargé de l'Industrie, Direction Générale de l'Energie et des Matières Premières (DGEMP) (Ministry responsible for Industry, Directorate-General for Energy and Raw Materials). The Ministry responsible for Industry determines and implements French policy for energy and supplies of mineral raw materials.

- Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME) (Agency for the Environment and Energy Resources), which is an establishment of the State with industrial and commercial character, active in various fields including the promotion and development of renewable energy sources. ADEME is one of the major actors in France in the field of wind energy, and the agency has a delegation in each region.

It should be noted that there is *de facto* an overlap in the competencies of the "Préfet Maritime", competent at sea from the shore (see decree 78-272), and the "Préfet (du département)" competent ashore (inside the limits of the department) and for the marine public domain (12 nm limit). For his area of responsibility, each one represents all ministers.

It should also be noted that outside territorial waters (in the EEZ), there is as yet no regulation defining how to apply the rights of France to regulate the building of structures such as windmills or cable laying etc. Consequently competencies in this area are not defined.

4.4.3 Legal and procedural requirements for offshore wind exploitation

4.4.3.1 Introduction

The administrative procedure may be broken down into the following stages:

- The pre-exploitation
- The exploitation phase
- The decommissioning phase

In France, the question of a specific legislation regarding wind energy is very new and there is no specific legislation for offshore wind exploitation. There is no lease procedure. Implementation of projects within the territorial sea generally follows the same process as for general building works, with additional requirements related to the use of the marine public domain and the generation of electricity. It should be noted that outside the territorial waters (i.e. in the EEZ), there is as yet no fixed regulation for offshore wind development. The following procedure therefore relates to the procedure for developments within the territorial sea.

4.4.3.2 The pre-exploitation phase

The majority of administrative requirements relate to the pre-exploitation phase, which generally involves the following stages [Ministère de l'Aménagement du territoire et de l'Environnement, 2002]:

- Concession procedure
- Building agreement and Environmental Impact Assessment
- Exploitation agreement

Although the procedures are basically independent, involving separate applications, success in certain procedures may be pre-requisite to undertaking other procedures in the process.

Concession Procedure

Use of the marine public domain generally requires a concession. This is the first step in any application pertaining to use of the soil/subsoil of the territorial sea, and must be acquired before any other permissions may be sought.

It is possible for the managing authority (the Ministry of Equipment, Transport, Housing, Tourism and the Sea; representative: "Préfet") to allow more or less private occupations of the marine public domain. The legal instrument of general law is the:

- Authorisation of temporary occupation (A.O.T.), Article L28 of the State Domain Code (Code du domaine de l'État).

Furthermore, when an installation requires a long period of occupation and is of general interest, a long-term occupational permit for the natural marine public domain is required. The legal basis is set out in:

- Decree on 79-518 of 29 June 1979 on concession of containment and use of outbuildings of marine public domain maintained in this domain, harbours excluded

According to this Decree, a "concession of containment and use of outbuildings of the marine public domain maintained in this domain, harbours excluded " is issued in the form of a contract. This legislation is not specific and not yet particularly adapted (modification under study) to offshore wind exploitation. Fundamentally, this legislation concerns primarily marinas and shipyards, but is equally applicable to offshore wind exploitation in the marine public domain.

The Decree of 1979 on containment concessions sets out the procedure for the allocation of concessions, which are concluded for a maximum of 30 years in accordance with technical specifications specified by the 1979 Decree. The Préfet is in charge of the instruction of the applications for concession, but the concession is granted by the Ministry of Equipment, Transport etc.

According to Article 5 of the 1979 Decree, a public inquiry is obligatory when the project for concession relates to a surface area greater than or equal to a specified threshold. The executory legislation, the Arrêté of 4 July 1980, sets this threshold at 2000m².

As regards consideration of an application for a concession, the opinion of the Minister of Environment and Sustainable Development is always obligatory. The "Commission nautique" must also be consulted when granting a concession (refer to Decree 86-606).

There is a "redevance" (fee) associated with each concession. This is fixed by Direction Générale des Impôts (Directorate-General for Taxation), however, there is no general rule concerning the amount of the fee charged.

Building agreement and Environmental Impact Assessment (EIA)

The building agreement for wind turbines is one of the main authorisations to be obtained. Because the development concerns energy production, the competent authority is the Préfet, representing the state in the department (articles R421-33 to R421-36 from the Building Code). Requests are examined by the Departmental Directorate for Equipment and the Préfet Maritime. On the basis of their advice, the Préfet decides whether or not the building agreement should be granted. The application for building permits must contain an impact study and be subject to a public inquiry. The application must also contain a section concerning the landscape.

Furthermore, an environmental impact study is required according to:

- The Law 76-629 of 10 July 1976 on protection of nature
- Decree n° 77-1141 of 12 October 1977 on impact studies

The Law 76-629 of 10 July 1976 on the protection of nature states that preliminary studies for the realisation of development plans or public or private works which, because of their dimensions or effects, can damage the natural environment, must contain an impact study evaluating the environmental consequences.

According to the Decree n° 77-1141 of 12 October 1977 on impact studies, an Environmental Impact Assessment (EIA) is obligatory for any wind park project, the cost of which exceeds or is equal to 12 Mill. FF (1.83 M€). This amount includes all taxes, including the cost of land acquisitions and all project phases (edification, electrical connection,...).

Exploitation agreement

The main legislation concerning exploitation procedures are:

- Law 2000-108 of 10 February 2000 concerning the modernisation and development of the public electricity service[72] (hereafter referred to as the "Electricity Law")
- Decree 2000-877 of 7 September 2000 on authorisations concerning the exploitation of the electricity-producing installations

According to Articles 6 to 9 of the Electricity Law, all new electricity-producing installations and adapted installations must benefit from an exploitation authorisation or be the subject of a declaration. Table 6 below shows the applicability of the authorisation/declaration according to the nature of the installation.

The competent authority for granting an authorisation or declaration is, *a priori*, the Ministry for Industry, who can delegate the authority to the "Préfet" or the "Préfet Maritime".

Table 6 Applicability of authorisation vs. declaration for offshore wind exploitation in France

Statutory system on exploitation	Authorisation	Declaration
New electricity-producing installation, or replacement of an existing installation	If installed electrical capacity superior to 4.5 MW	If installed electrical capacity inferior to 4.5 MW
Increase in initial installed production capacity for installations of initial capacity above 4.5 MW	If the increase is greater than 10%	If the increase is less than 10%
Increase in initial installed production capacity for installations of initial capacity below 4.5 MW	If the increase results in an installed capacity above 4.5 MW	If the increase results in an installed capacity still below 4.5 MW
Change of primary energy	Installed electrical capacity is above 4.5 MW, new authorisation	Installed electrical capacity below 4.5 MW, new declaration

The Decree 2000-877 establishes a system for the authorisation of the exploitation of electricity-producing installations. The criteria for granting the authorisation concern:

- safety and security of the public electricity grids, installations and associated equipment
- the nature of primary energy sources
- the location of the installation
- the energy efficiency
- the technical, economical and financial competence of the candidate or applicant
- the compatibility of the project with the principles and missions of the public service, namely with respect to the objectives of the pluriannual investments programme and the protection of the environment
- respect of social legislation in force.

With respect to site selection, there is no directly applicable legislation. However, sea areas used for other activities, such as shipping lanes, dredging areas, fisheries, conservation areas, cables and pipelines, must be taken into consideration. In addition, certain areas within French seas close to the shore may be covered by Schema De Mise en Valeur de la Mer (SMVM) (Schemes for opening up for development of the sea), established under the Law 83-8 of 7 January 1983 (Loi Deferre), Article 57. Their content and the process of their elaboration were specified in the Decree 86-1252 of 5 December 1986. SMVM are elaborated under the authority of the préfet and aim to define the purpose of the so-designated space and to ensure coherence between its different uses, in particular with respect to environmental protection and economic development. At present, for sea areas under management by the State, the elaboration of a SMVM juridically falls into the competencies of the State. To-date eleven

[72] Loi 2000-108 du 10 Février 2000 relatif à la modernisation et au développement du service public de l'électricité. (refer to http://www.industrie.gouv.fr/energie/electric/f1e_elec.htm)

(11) schemes have been launched. There are currently no SMVM specifically related to offshore wind energy development. However, SMVM must consider *all* activities in one area. Thus, it can be concluded that if offshore wind farms are to be built inside the area concerned by a SMVM, they must either have been planned in this SMVM, or this SMVM would have to be modified to allow such an activity. However, there are currently very few SMVM, and their extension at sea is limited.

As regards the criterion of protection of the environment, it should be noted that, in practice, the environmental impact study of the Building Agreement and EIA procedure generally accounts for this. Furthermore, for fulfilling the criterion of safety and security of the grid, the "projet de convention" (draft agreement or draft contract) for grid-connection given by the grid operator at the request of the producer (see subsequent sections) is sufficient. Generally, grid connection does not require any particular administrative authorisation on the part of the producer. It is the concerned grid operator who is responsible for carrying out the necessary works and the procurement of the corresponding authorisations.

4.4.3.3 The exploitation and decommissioning phases

During the exploitation phase, regulatory and procedural requirements consist mainly in providing information to the competent authorities (specific requirements can be defined in the concession agreement). As such, producers benefiting from the purchase obligation (feed-in tariff) (refer to later sections) must communicate to the "Préfet" an annual report specifically including the energy production of the installation for that (previous) year.

As regards decommissioning, there is no specific procedure or guarantee related to demolition and rehabilitation during the decommissioning phase, however, procedures can be defined in the concession agreement. The only administrative obligation for the holder of an authorisation for exploitation is to notify the Minister of Energy of the definitive cessation of activity of the concerned installation.

4.4.4 Economic conditions for offshore wind exploitation

Support for matters related to procedure or infrastructure

At present, there is no specific support related to procedure or infrastructure for offshore wind energy development. A working group, dedicated specifically to the problems of offshore exploitation, was established in February 2002, headed by the "Secrétariat Général de la Mer". However, the work of this group has not yet been completed, thus no specific measures are yet in place.

The Electricity Law guarantees access of renewable energy producers to the public transportation and distribution networks. The Decree 2001-366 of 26 April 2001[73] specifically provides that the costs of grid reinforcement (including those associated with the connection of new users) will be integrated into the general tariffs for grid use. These costs will not fall to electricity producers.

The Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME) provides both financial and technical support, and through its "helping decision" programme, may provide financial assistance for pre-feasibility studies. Furthermore, the DGEMP, in co-operation with ADEME, elaborates pluriannual programmes with the specific objective of facilitating the use of renewable energy.

Non Fiscal Support for investment

In 1996, the "Eole 2005" program was launched by the Ministry responsible for Industry, to promote and boost French industry in the field of wind energy by implementing between 250 and 500 MW by 2005. The program was based on a call for tender wherein candidates had to propose their selling price per kWh to Electricité de France (EDF). The results of "Eole 2005" to-date have been disappointing, with only 70 MW of wind energy implemented by end-2001. This is perhaps explained by the double assessment system involving the selection committee of "Eole 2005", and the building agreement authorities. This programme has now been abandoned and replaced by a new policy based on feed-in tariffs (for <12MW).

[73] Décret relatif aux lignes directes mentionnées à l'article 24 de la loi n° 2000-108 du 10 février 2000 relative à la modernisation et au développement du service public de l'électricité

Non Fiscal Support during operation

Under Article 10 of the Electricity Law of 10 February 2000, producers of electricity from renewable energy sources can benefit, in certain circumstances, from a purchase obligation or feed-in tariff. The tariffs and future feed-in tariffs for generated electricity are based on the avoided cost of the electricity-generation system.

In June 2001, the French Government proposed fixed buy-back rates for wind energy, including offshore wind energy. Buy-back rates are dependent on the median load factor (in hours) of the installation in relation to a given full load reference. The median is determined by taking the average of 3 out of 5 previous years – leaving out the years with the highest and lowest figures. The rates stipulated for installations <12 MW are indicated in Table 7 below (these relate to installations sited in continental waters, including offshore – different rates apply for installations sited in the waters of Corsica, overseas departments and departments in the territorial collectivity of Saint-Pierre-et-Miquelon). For installations not meeting the conditions of maximal capacity, the buy-back rates are not applicable, and there is no defined support system. However, it is expected that a tender system will be implemented for installations >12MW.

Table 7: Fixed buy-back rates for wind energy in France (for installations sited in continental waters) [Journal Officiel de la République Française 22 Juin 2001]

If at date of signature of purchase contract, cumulated capacity of installations contracted to benefit from fixed buy-back rate is:		Tariff 1st 5 years	Tariff next 10 years
<1500 MW	>1500 MW		
Full load reference (h)		(€/kWh)	(€/kWh)
2000 h and below	1900 h and below	0.0838	0.0838
2000 – 2600 h	1900 – 2400 h	0.0838	Linear interpolation
2600 h	2400 h	0.0838	0.0595
2600 – 3600 h	2400 – 3300 h	0.0838	Linear interpolation
3600 h and above	3300 h and above	0.0838	0.0305

Thus, each producer signs a contract of 15 years, in which he receives a higher price for energy produced during the first 5 years (of the order of 8 €c/kWh), after which he receives a lower price (between 3-8 €c/kWh) depending on the performance of the system compared to the initial 5-year period. Thus, depending on the site, the tariff will be of the range 5-8 €c/kWh on average for the 15-year period. A progressively decreasing tariff is subsequently applied according to the date of the contract, in order to account for decreasing costs as a result of technological progress and market development.

In order to benefit from this purchase obligation, the producer must obtain a certificate entitling him to a purchase obligation[74]. This certificate attests that the project fulfils all criteria necessary to benefit from this measure. For the majority of large installations, it is delivered on basis of proof that the project would otherwise not be feasible. The certificate is delivered by the Préfet representing the Ministry for Industry, according to instruction by the DRIRE (Direction Régionale de l'Industrie, de la Recherche et de l'Environnement).

[74] This condition is stipulated in the Decree 2001-410 of 10 May 2001, concerning the electricity purchasing conditions for producers benefiting from a purchase obligation ([74] Décret 2001-410 du 10 Mai 2001 relatif aux conditions d'achat de l'électricité produite par des producteurs bénéficiant de l'obligation d'achat).

4.5 Ireland

4.5.1 Delineation of Irish seas into zones

Baseline

Irish maritime zones are measured from a straight baseline, which is the low-water mark on the coast of the mainland or of any island, or on any low-tide elevation situated within a distance of 12 nautical miles from the mainland or an island.

Territorial sea

The Maritime Jurisdiction Acts 1959 to 1988 define the Irish territorial sea as the area of sea lying beyond the baseline to a distance of 12 nautical miles from the baseline.

Continental shelf

The continental shelf of Ireland is defined according to, a.o., the Continental Shelf Act 1968. There is no specific line delineating the Continental Shelf, however, designated areas are defined in Continental Shelf (Designated Areas) Order 1974, and Continental Shelf (Designated Areas) (No. 2) Order, l977, S.I. No. 22 of l977. In addition, there is delimitation of the Continental Shelf with the United Kingdom of Great Britain and Northern Ireland, according to bilateral delimitation agreements[75].

Exclusive fishing zone

The Republic of Ireland has not yet established an Exclusive Economic Zone (EEZ), however, it claims an exclusive fishing zone extending up to 200 nm from the baseline.

4.5.2 Competent authorities for Irish sea zones

Government structure

Ireland is a Republic, with a President elected for a 7-year term. The National Parliament, or Oireachtas, is the sole legislative authority of the State and comprises the President, Dáil Éireann (House of Representatives) and Seanad Éireann (The Senate).

Authority over sea zones and activities

The Irish territorial sea area falls under the sovereignty of the Government of Ireland. In addition, Ireland has sovereign rights over its claimed exclusive fishing zone.

Competent authorities for sea zones for offshore wind development

The Department of Communications, Marine and Natural Resources is the main body responsible for the management and development of Irish sea zones. In the particular case of offshore wind development, the Foreshore Administration section of the Department of Communications, Marine and Natural Resources is the body which deals with: Foreshore Legislation, Foreshore Leases and Licences and, insofar as marine regulatory issues and management of the property function are concerned, Offshore Electricity Generating Stations. (The foreshore is classed as the land and seabed between the high water of ordinary or medium tides (shown HWM on Ordnance Survey maps) and the 12-nautical mile limit).

[75] Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Republic of Ireland concerning the delimitation of areas of the continental shelf between the two countries, 7 November 1988, and Protocol Supplementary to the Agreement between the Government of Ireland and the Government of the United Kingdom concerning the Delimitation of Areas of the Continental Shelf between the two Countries 7 November 1988.

Other competent authorities relevant in offshore wind energy exploitation are:

- The Commission for Energy Regulation (CER)[76], which oversees the regulation of the electricity market and which is responsible for the licensing of electricity generation and supply and the authorisation of construction or reconstruction of new generating plant
- The relevant local planning authority.

4.5.3 Legal and procedural requirements for offshore wind exploitation

4.5.3.1 Introduction

The following sections describe the administrative and procedural requirements that must be fulfilled in each stage involved in the implementation and exploitation of an offshore wind park, namely in the:

- The pre-exploitation phase
- The exploitation phase
- The decommissioning phase

The following sections describe the process involved in each stage with respect to administrative and procedural requirements that must be fulfilled. Wherever possible, the relevant competent authority is given.

It should be noted that, to-date, the procedure for offshore wind energy exploitation in Ireland is only in a very early stage and not much experience has been gained within the existing system. For this reason, the procedure is described making reference to the procedure outlined in the document 'Offshore Electricity Generating Stations – Note for Intending Developers', provided by the Department of the Marine and Natural Resources (now the Department of Communications, Marine and Natural Resources), and the experience of Sure Partners (wholly owned subsidiary of Airtricity) in the Arklow Banks project, which will be the largest offshore wind development to occur in Irish waters and the world. It should be noted that, through the experience gained through the Arklow Banks project, certain proposals of the 'Note for Intending Developers' were found to be unachievable in practice, and as a result, the necessary changes will be carried over into the document at the earliest opportunity.

4.5.3.2 The pre-exploitation phase

The underlying legal framework governing the regulation of the electricity market in Ireland is:

- Electricity Regulation Act 1999

The Electricity Regulation Act, 1999 provides the regulatory framework for the phased introduction of competition in the generation and supply of electricity in Ireland, to be completed by 2005. In the case of renewable energy sourced electricity (RES-E), the entire market (generation and supply) is already liberalised. Any RES-E developer is therefore entitled to construct and operate subject to licensing requirements. The Act provided for the establishment of the Commission for Energy Regulation and gives it the necessary powers to licence and regulate the generation, distribution, transmission and supply of electricity.

The pre-exploitation phase therefore relates primarily to the acquisition of licences etc. for the use of the Irish Foreshore for the purpose of investigating the suitability of sites for the construction of an offshore windpark. This is a two-stage process, involving applications for:

- Foreshore Licence
- Foreshore Lease

Foreshore Legislation and the Foreshore Leases and Licences that are required for an offshore electricity generating station fall under the competence of the Foreshore Section of the Department of

[76] The Commission for Electricity Regulation was established by the Electricity Regulation Act 1999. Subsequently its name was changed to Commission for Energy Regulation when its regulatory functions were extended to include the gas market.

Communications, Marine and Natural Resources. The relevant legislation concerning the use of marine areas is:

- The Foreshore Act 1933

as amended by:

- The Foreshore (Amendment) Act, 1992 (No. 17)
- Fisheries and Foreshore (Amendment) Act, 1998 (No. 54) [section 5].

With respect to European requirements concerning environmental impact assessment, the relevant regulations are:

- European Communities (Environmental Impact Assessment) Regulations, 1989
- Foreshore (Environmental Impact Assessment) Regulations 1990
- European Communities (Environmental Impact Assessment)(Amendment) Regulations 1998
- European Communities (Environmental Impact Assessment) Regulations 1999

The Foreshore Act requires a lease or licence to be obtained from the Minister for the Marine and Natural Resources (now the Minister for Communications, Marine and Natural Resources), for the carrying out of works or placement of structures or material on, or for the occupation of or removal of material from, the State-owned foreshore – which represents the greater part of the foreshore.

Leases are granted under the Acts for the erection of long-term structures (e.g. piers, marinas, bridges, roads, car parks, electricity generating structures) and licences are granted for other works (e.g. laying of submarine pipelines and cables) and purposes (e.g. aquaculture). Leases and licences are granted subject to the payment of fees.

Foreshore Licence

A Foreshore Licence is required to assess the suitability of the site for the intended wind farm project. A Foreshore Licence is generally granted for four years, not normally subject to extension. Multiple applications for a Foreshore Licence may be accepted for the same area, with the first applicant having first rights to development.

Foreshore Licences are granted at a nominal rent of 5€/year, subject to a refundable deposit of €100,000 to be made on the day of acceptance of Licence conditions[77]. The deposit is refunded provided the conditions of the Licence are met and that a valid application for a Foreshore Lease is made within 12 months of the expiry of the Licence, unless it is proven that the site is unsuitable for electricity generation.

When a licence-holder is satisfied that the site is appropriate, then application may be made for a Foreshore Lease for the development. The granting of the Lease allows construction and operation of the development, subject to agreed terms and conditions.

The competent authority is the Department of Communications, Marine and Natural Resources.

In specific reference to the Arklow Banks project of Sure Partners/Airtricity, the initial step called for assessment of the various offshore sites available. The Arklow Banks was chosen as the most desirable. In accordance with the procedure outlined in the 'Offshore Electricity Generating Stations – Note for Intending Developers' document, Sure Partners applied for a Foreshore Licence. The Licence was granted, allowing four years for completion of the required investigations to determine the suitability of the bank for construction of the proposed windfarm. Site investigations were conducted on the bank to determine its suitability for the construction and accommodation of the proposed windfarm. Upon confirmation of the suitability, further environmental monitoring was started.

[77] A separate Foreshore licence is normally required for plotting the route of cable from a proposed wind farm to the national grid onshore. This is issued free and without further deposit, but the deposit held on the Licence for investigation is attached to this Licence as well.

Foreshore Lease

Application for a Foreshore Lease is contingent on the applicant having held a Foreshore Licence for investigation in good order, and on his making a valid Foreshore Lease application within 12 months of the Licence's expiry. A valid application must be accompanied by the following:

- Evidence of possession of the necessary authorisation/licence/other permissions from the Commission for Energy Regulation (CER) or other relevant authorities or evidence that these have been sought
- Permission for connection to the national grid or evidence that such permission has been sought
- Environmental Impact Statement
- Planning Permission for onshore based works (where applicable)

These are described in further detail below.

In addition, the application must have: a full Business Plan covering the construction period and the first five years of operation, and a Tax Clearance Certificate or other document showing good standing with the Revenue Commissioners (or equivalent for applicant companies outside the jurisdiction).

The Minister for Communications, Marine and Natural Resources applies commercial rents based on the nominal output of each turbine (€3800 p.a. on a rating of 1MW – subject to review every 5 years), or a percentage of gross revenue (2.5%) – whichever is the greater – paid as rental over the site sought.

The maximum Lease period is 99 years, subject to holding all valid authorisations etc.

In the case of the Arklow Banks project a Foreshore Lease application was made in June 2001. Accompanying documentation included:

- Environmental Impact Statement (EIS)
- Copies of applications to the CER for Licences to Construct and Generate
- Copy of Power Purchase Agreement
- Copy of application to National Grid for Connection of Phase 1
- Business Plan
- Tax Clearance Certificate

As regards the EIS, a complete EIS was conducted, and extensive consultation with local and national agencies and interest groups was undertaken, including with those agencies outlined in the 'Note for Intending Developers', such as: Duchas; Sea Fisheries Board (Bord Iascaigh Mhara (BIM)); Commissioner for Energy Regulation; Commissioners of Irish Lights; Irish Aviation Authority; Local Harbour Board; Local County Councils; Local Urban District Council; Local Chamber of Commerce; Birdwatch Ireland; Bord Gais Eireann.

Following the application and further communication with the Department of the (then) Marine and Natural Resources, the Foreshore Lease for the Arklow Banks was issued in January 2002. A copy of the Lease, which is a public document, may be downloaded from the Department's website www.marine.gov.ie

Permissions from the Commission for Energy Regulation (CER)

The Commission for Energy Regulation (CER) was established to oversee the regulation of the liberalised electricity and gas markets in Ireland. (Under the Electricity Regulation Act 1999 (No. 23 of 1999) the body established is the Commission for Electricity Regulation. However, this was subsequently changed to the Commission for Energy Regulation when its regulatory functions were extended to the gas market). Three permissions must be obtained from the CER before a Foreshore Lease can be granted:

- An authorisation to construct an electricity generating station
- A licence to generate electricity

- A licence to supply electricity, obtained from the CER (or other appropriate authority).

Information on the criteria and terms and conditions of these permissions are available at http://www.cer.ie/licence2.htm .

Connection to the National Grid

In accordance with the Electricity Act 1999, Sections 34, 35, 36, electricity generation facilities will require to be electrically connected to the Electricity Supply Board's (ESB) Transmission Network or the ESB Distribution Network. The procedure and terms and conditions for connection to the ESB network are outlined in the ESB document 'Process for Connection of a Power Station to ESB's Transmission System', available at: http://www.esb.ie/main/downloads/about_esb/esbinfo.doc .

Environmental Impact Statement

The European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999 (S.I. No 93 of 1999) transposed EU Directive 97/11/EC into Irish law. According to these regulations, the preparation of an Environmental Impact Statement (EIS) is obligatory for wind energy installations of more than 5 turbines or having output greater than 5MW. The purpose of the EIS is to provide the competent authority – the Minister for Communications Marine and Natural Resources – with information to enable a decision on a particular project, in full knowledge of its likely environmental impact. Details on the information to be included in the EIS is given in the document 'Offshore Electricity Generating Stations – Note for Intending Developers', provided by the Department of Communications, Marine and Natural Resources.

Planning Permission/Licences

Planning Permission is required for the land-based element of the offshore wind installation where cabling is above ground. This is subject to the Local Government Planning and Development Acts and Regulations.

4.5.3.3 The exploitation and decommissioning phases

It is a condition of any Foreshore Lease that construction commence within a stated period of the signing of the Lease, and that construction must be completed and generation started within an agreed period.

In addition, applicants for a Foreshore Lease are required to provide plans for the eventual decommissioning of the generating installation and the clearance of the site. A bond or similar agreement will be required in the lease negotiations to ensure suitable arrangements for decommissioning and site clearance, and will be subject to review every five years to ensure that it is adequate.

4.5.4 Economic conditions for offshore wind exploitation

Ongoing work in support related to procedure, infrastructure, and future economic supports

Offshore wind energy development is still in a relatively early stage in Ireland, and there still remain a number of major issues to be researched and resolved before a detailed policy framework can be published. These issues include:

- Assessment of the capacity of the electricity grid system to accept large volumes of wind-generated electricity. The Commission for Energy Regulation, with the Office for the Regulation of Electricity & Gas (OFREG) in Northern Ireland, has commissioned a study of the effects of increased levels of wind penetration on the electricity system of the island of Ireland. A preliminary version of the report can be accessed at the Commission's web address www.cer.ie (doc id. 02/89).
- A study of the costs associated with offshore wind developments under economic conditions in Ireland. On this matter, some work has already been carried out in a study done by Kirk, McClure, Morton, entitled "Assessment of Offshore Wind Resources in the Republic of Ireland and Northern Ireland".
- The connection cost of windfarms of such substantial capacity. This issue will have to be examined by Eirgrid and regulated by the Commission for Energy Regulation.
- There is a need to examine and evaluate the support mechanisms in place for offshore projects in other European countries.

Sustainable Energy Ireland has published a RD&D programme for renewable energy technologies. Relevant documentation, including application forms, can be accessed at www.irish-energy.ie (click *Research and Development*, click *Renewable R D & D*).

Support for investment

Support for wind power in Ireland is administered under a competitive tendering process (Alternative Energy Requirement (AER) schemes) operated by the Department of Communications, Marine and Natural resources. Competitions are announced in the national newspapers and the Official Journal of the European Communities (from 1996 to present, 5 competitions have been held). Applicants are invited to bid a price ("x" € cents/kWh) at which they will sell electricity from a new renewable-energy-based electricity generating facility. The successful applicants are those who bid the lowest prices up to an installed capacity decided by the Minister. The successful applicants are allowed to conclude a 15 year "power purchase agreement" with the ESB (Electricity Supply Board, the former virtual monopoly operator) obliging the ESB to purchase the entire output of new stations, for up to fifteen years, at the bid price. Successful applicants must be in a position to comply with the generally applicable rules of the CER (see "Permissions from the CER" above).

The next competition, AER VI, is expected to be announced publicly later this year (2002). It is expected to deliver the remainder of the current target (published September 1999) of an additional 500 MW of new generating capacity. The Department of Public Enterprise has undertaken to consult widely on appropriate support mechanisms e.g. competitive tendering, fixed feed in, regulated rates of return, tax incentives green certificates, carbon tax etc., before launching the next target.

In addition Sustainable Energy Ireland is (since July 2002) engaged in a public consultation process on a proposed R&D programme for renewable energy technologies. Details on this are not yet available.

4.6 The Netherlands

4.6.1 Delineation of Dutch seas into zones

Territorial sea

Under the Law on the determination of the borders of the territorial sea of the Netherlands of 9 January 1985[78], the delineation of the Dutch territorial with its neighbour and opposite countries is determined by bilateral and multilateral delimitation agreements.

Exclusive Economic Zone (EEZ)

The Act of 27 May 1999 on the exclusive economic zone of the Kingdom of the Netherlands establishes the EEZ of the Netherlands. The Decree on the borders of the Dutch Exclusive Economic Zone of 13 March 2000 determines the outer limits of the exclusive economic zone of the Netherlands and effects the entry into force of the Act from 28 April 2000 on[79]. In addition, a fishery zone has been established within the EEZ boundaries according to the Law of 8 June 1997. The surface area of the EEZ is 57,000 km².

Continental shelf

The surface area of the continental shelf coincides with that of the EEZ, i.e. 57,000 km².

4.6.2 Competent authorities for Dutch sea zones

Government structure

The Netherlands is a constitutional monarchy with a parliamentary system. The Dutch government comprises not only ministers and their state secretaries, but also the monarch. The Constitution sets out the division of powers between the monarch and other institutions of government. Ministers are accountable to Parliament for the Government's actions, but the monarch has no political responsibility and is therefore not accountable to Parliament.

The Netherlands forms a decentralised unitary state. There are three levels of government: central, provincial, and municipal. Central government is concerned with issues of national interest. Provinces and municipalities fall under local government. There are twelve provinces. Issues such as environmental management, spatial planning, and energy are the responsibility of provincial authorities. A fourth layer, independent of municipalities, is formed by the Water management boards.

Authority over sea zones

The Dutch continental shelf is divided into administrative zones.

- The coastline up to about 1 km on the seawards side of the baseline falls under the authority of the municipalities and provinces.
- Outside the 1 km line only state authority applies. This includes the following zones:
- The 3-mile zone (with regard to the mining legislation)
- The 12-mile zone delimiting the territorial sea. Most laws applicable on land are also applicable in the territorial sea (e.g. the Spatial Planning Act, the Environmental Management Act)
- Outside the 12 mile zone (EEZ).

[78] *Staatsblad* 21 March 1985
[79] *Staatsblad* 27 April 2000

Competent authorities for sea zones for offshore wind development

The main competent authorities involved in the procedure for offshore wind developments do not legally differ according to whether the offshore wind development occurs within the 12-mile zone ("near shore") or beyond the 12-mile zone (offshore). As there is limited experience in such developments, and no established, uniform procedure, the competent authorities for each case are referred to within the description of the procedural phases (following section).

4.6.3 Legal and procedural requirements for offshore wind exploitation

4.6.3.1 Introduction

The typical procedural phase in an offshore wind development may be broken down according to the following stages:

- The pre-exploitation
- The exploitation phase
- The decommissioning phase

However, the Netherlands makes an additional distinction between "near-shore" wind farms (NSW) (i.e. those located within the 12-mile zone) and "offshore" wind farms (i.e. those located beyond the 12-mile zone) [80], and this may have different implications for the procedural phases to be followed, in particular in the pre-exploitation phase. The pre-exploitation phase is therefore described separately for the two types of wind farms, by making reference to the experience achieved to-date in connection with the two types, from the point of view of the Government project (referred to as the "NSW" procedure), and from the point of view of the first private development in offshore wind, undertaken by E-connection (referred to as "offshore" procedure).

The experience with NSW is based on a (Demonstration) Near Shore Wind Farm (NSW) at a location off the coast of Egmond aan Zee, done on the initiative of Dutch national government. The initiative for this project was taken after a feasibility study carried out by Novem (the Dutch Agency for Energy and the Environment). The demonstration project must be considered as a one-off or non-recurrent project (from the point of view of the Dutch Government) – it is primarily intended for acquiring knowledge and experience for offshore wind farms further out in the sea. In fact, the Government has already decided to allow only one wind farm within the 12-mile zone (the NSW Demonstration). Other "near shore" farms are excluded for reasons of visual intrusion and birdlife protection.

In terms of "offshore", the experience used is that of the developer E-Connection, who, without awaiting the results and experience of the NSW, has obtained a licence for the erection of an offshore wind farm at a location called Q7, at 25 km from the coast.

The procedure for NSW differs from the E-Connection procedure since the Dutch Government decided to go through the heaviest administration procedure under the Dutch physical administration law. This was done voluntarily, as a result of a consultation with environmental NGOs. There was no legal necessity, since in principle, the NSW could have followed the same procedure as E-connection.

Since the NSW- initiative and the E-Connection (offshore) projects don't follow the same pre-exploitation procedure, the procedure relating to the pre-exploitation phase (see Sections below) is described separately for each project. On the other hand, there are certain national and international regulations that impact (now and in the future) the pre-exploitation procedure for all offshore wind projects, whether NSW or offshore. These regulations and procedures are therefore described, in a general way, in a separate subsequent section. The exploitation and decommissioning phases are then treated together in another sub-section.

[80] The border between these two areas roughly coincides with the 20-m depth line.

Because the majority of legal and procedural requirements relate to the pre-exploitation phase – this is treated in greater detail. Wherever possible, reference is given to the relevant competent authority involved with each legislative or procedural phase.

4.6.3.2 *The pre-exploitation phase – Near Shore Wind park (NSW) (within the 12-miles zone)*

The different steps in the pre-exploitation phase are listed hereafter in chronological order:

- Starting letter
- Location procedure and Environmental Impact Report
- Selection procedure
- Licence procedure
- Ground lease
- Agreement on the implementation of the NSW

Due to the fact that the NSW was the first (and probably the only one) of its kind, and was a Government-initiated demonstration project, the procedure described is intended primarily for reference purposes, and not as a representation of the standard procedure to be followed. Information and a map with the location of the NSW can be downloaded from the web site of the Ministry of Economic Affairs www.nearshorewindpark.ez.nl.

Starting letter

The procedure started with a letter (7 July 1998) from the Ministers of the Ministry of Economic Affairs (EZ) and the Ministry of Housing, Spatial Planning and the Environment (VROM) to the Lower Chamber motivating the need for and feasibility of a NSW Demonstration project.

The government decided that a procedure for determining the appropriate location for the NSW and the establishment of a selection of candidates should precede the normal licensing, by virtue of the following laws:

- Law on the Administration of Public Water Works (Wet beheer rijkswaterstaatswerken (Wbr), of 14 November 1996, on the determination of regulations regarding water works governed by the State)[81]
- Law of Environmental Administration (Wet milieubeheer (Wm)), of 16 June 1979 on the regulations of several general subjects in the domain of environmental hygiene[82]

Location procedure and Environmental Impact Report

For this step, reference was made to the following legislation:

- Spatial Planning Act (Wet op de Ruimtelijke Ordening), of 5 July 1962, on the determination of regulations regarding spatial planning[83], Art. 2a
- Second Electricity Structure Plan (Tweede Structuurschema Elektriciteitsvoorziening (SEV-2))
- Decree on the execution of the chapter Environmental Impact Report of the Environmental Management Law (Besluit MER 1994), of 4 July 1994[84], Art. 3

This Spatial Planning Act sets out the regulations for spatial planning. Article 2a describes the procedure for the establishment of the Key Spatial Planning Decisions (kspd) (planologische kernbeslissing (pkb)), which was used to fix the location of the NSW demonstration project. This kspd also contains a partial review of the Second Electricity Structure Plan (SEV-2), which is supported by the Decree on Environmental Impact Assessment (EIA), requiring a location EIA for the purposes of giving a view on the possible environmental impact of the installation at the location chosen.

[81] Staatsblad 23 December 1996
[82] Staatsblad 21 August 1979
[83] Staatsblad 7 August 1962
[84] Staatsblad 26 July 1994

Guidelines for this procedure are provided by the competent authority(ies). The date for the provision of guidelines was 25 March 1999.

The following competent authorities all have joint authority by virtue of a mandate of the Council of Ministers:

- Ministry of Economic Affairs (energy policy)
- Ministry of Agriculture Nature Management and Fisheries (landscape and nature policy)
- Ministry of Transport Public Works and Water (North Sea matters)
- Ministry of Management and Housing Spatial Planning and the Environment (Spatial Planning)

The location EIA and the partial review of the SEV-2 were deposited for inspection simultaneously and a public hearing was held during the period of inspection.

The date of the EIA and Draft- Key Planning Decision (kspd-Part 1) was February 2000.

Reactions on the draft-kspd were laid down in Part 2 of the kspd and sent to the chambers of parliament. The Dutch Cabinet took a position with respect to the partial review kspd/SEV-2 and decided to fix the location for the NSW Demonstration Project by means of the kspd (Part 3 – Government Final Decision) (27 March 2001). In part 3 the government also established a corridor for the electricity connection between the NSW and the Velsen high-voltage station.

The Lower House of the States-General approved of the choice for Egmond aan Zee as location for the NSW (Approval by the Lower House – 4 October 2001; Approval by the Upper House – 4 November 2001).

Part 4 of the kspd was open for public inspection from 23 January 2002.

Selection procedure

The administrative policy rules regarding the NSW were published (26 October 2001) in the Staatscourant (official gazette of the Dutch government)[85]. These policy rules describe the procedure and criteria applying to the selection of the party that will build and run the NSW.

According to the criteria, application for selection is possible only through an official application form (submission date: 11 January 2002. The application form must be accompanied by a project plan and budget. The project plan must also give a complete coverage of the compulsory part of the Monitoring and Evaluation Program (MEP). The function of the NSW-MEP is to register economic, technical, ecological and societal impact. An advisory committee NSW, advises the Minister of Economic Affairs on the participants of the selection procedure, applying the criteria listed in article 6 of the policy rules.

On the basis of these policy rules, four consortia have applied for participation in the selection procedure. A commission appointed by the Minister of Economic Affairs advised the Minister on the selection on March 21, 2002. The consortium NoordzeeWind, an alliance between Shell and the energy company Nuon, was regarded as most qualified.

Licence procedure

The selected builder is required to obtain a building licence and an environmental licence.

The requirement for a building licence falls under the scope of:

- Public Works and Water Management Act (Wet beheer rijkswaterstaatswerken (Wbr)) 1996

This law subjects every activity in the waters under Dutch jurisdiction to the obtaining of a licence. The competent authority is the Ministry of Transport, Public Works and Water Management (Minister van Verkeer & Waterstaat) - Director (senior-engineer) of the North Sea Direction ("Directie Noordzee").

[85] Policy rules from the Minister of Economic Affairs and the Secretary of State of Finance on the selection of the builder of the demonstration project near shore wind park of (Staatsblad 26 October 2001).

In the procurement of an environmental licence the following regulations apply:

- Decree on Installations and Licences (Inrichtingen- en Vergunningsbesluit Milieuhinder) of 5 January 1993[86] – concerning the Law of Environmental Administration on the execution of chapters 1 and 8 of the Environmental Administration law and chapter V of the law on Noise Nuisance
- General Administration Act (Algemene wet bestuursrecht), of 4 June 1992[87] - Section 3.5
- Decree on the execution of the chapter on the Environmental Impact Reporting (EIR) of the Law of Environmental Administration (Besluit MER 1994) of 4 July 1994[88] (EIR Decree)

The Decree on Installations and Licences sets out the conditions and stipulations for acquiring an environmental licence and lists (in Annex I) installations that can be classified having a potentially harmful effect on the environment. Offshore wind installations are classified under the definition of Category 20, Art. 20.1 of Annex 1 of the Decree (Installations for the transformation of wind energy into mechanical, electrical or thermal energy).

Section 3.5 of the General Administration Act (Algemene wet bestuursrecht) 1992 sets out an extended and strict preparation procedure that must be followed for the acquisition of the licence. This law is relevant and must be applied in the procurement of an Environmental Licence.

According to the 1994 EIR Decree, an Environmental Impact Assessment (EIA) and an Environmental Impact Report must be conducted for developments subject to an Environmental Licence, in order to describe the possible environmental impact of the development. The decree distinguishes 3 different kinds of EIA; the voluntary EIA; the obligatory EIA; and, the discretionary EIA.

In the case of the discretionary EIA, the competent authority must conclude whether, in view of the special circumstances under which the activity in question is to be undertaken, an environmental impact statement must be drawn up in preparation for the relevant decision. Offshore wind energy installations are listed in part D category 22.2 of the categories of installations that are subject to a discretionary EIA. They are described as: "the creation, change or extension of one or more interconnected installations for harnessing wind power for electricity generation, in cases where the activity relates to a total capacity of 10 megawatts (electrical) or more, or 10 wind turbines or more".

The Minister of Transport, Public Works and Water Management (Minister van Verkeer & Waterstaat), in accordance with the Minister of Housing, Spatial Planning and the Environment (VROM), is the competent body authorised to decide on the application for a licence[89]. Specifically, the authority has been delegated to the director (senior-engineer) of the North Sea Direction ("Directie Noordzee").

The terms of the licence and the EIR procedure can be consulted in the EIR guide, "Handleiding MER", from the Ministry of Housing, Spatial Planning and the Environment (VROM) (p. 368)

Ground lease

The seabed of the territorial sea is owned by the State of the Netherlands. As a result, the builder of the wind park must, subsequent to the selection and licensing procedures, obtain a ground lease (Erfpachtovereenkomst). This involves concluding, with the Ministry of Finance, a contract pertaining to the use of the ground, governed by private law.

[86] *Staatsblad* 29 January 1993
[87] *Staatsblad* 30 June 1992
[88] Staatsblad 26 July 1994
[89] Decree on Installations and Licences (5 January 1993) Art.3.3 para.1

Agreement on the implementation of the NSW

After selection, an agreement on the implementation of the NSW is made between the builder and Secretary of state of Finance and the Minister of Economic affairs.

4.6.3.3 *The pre-exploitation phase – "offshore" installations (outside the 12-miles zone)*

For installations located outside the 12-miles zone (EEZ), the Law on Environmental Management 1979 is not applicable, thus only the following law pertaining to the building licence is applicable:

- Public Works and Water Management Act (Wet beheer rijkswaterstaatswerken (Wbr)) 1996

The scope of this law has been extended from the 12- miles zone to the Dutch EEZ. From 6 December 2000 onwards the licensing procedure for the wind parks outside the 12-miles zone ("offshore") runs analogously with the licensing procedure for installations of the NSW project (see above).

Although the Law on Environmental Management 1996 is not applicable in the offshore zone, the above-mentioned law on the Public Water Works (Wbr) provides the possibility – and the competent authority (Minister of Transport, Public Works and Water Management) has engaged itself to do so – to take into account environmental aspects (EIR-obligation) before granting a building licence. At this moment the Ministry of Housing, Spatial Planning and the Environment (VROM) is preparing a modification of the 1994 EIR Decree stating that the EIR obligation can be linked to the building licence based on the Administration of Public Water Works Act (Wbr).

However, it should be noted that, up until now, the licensing procedure regulated by the Public Works and Water Management Act is mainly decisive for the installation of offshore wind parks (outside the 12-mile zone). In this procedure applicants are treated in accordance with the "first come, first served"-principle. The authorities therefore have no real impact in the choice of location. This situation will be changed by including a concession procedure, which is currently being developed by the Government. In the meantime, no applications for offshore wind farms will be taken into consideration.

With respect to the E-connection project, the Q7 wind farm has received (during the 1st quarter 2002) a license for a location 23 km offshore (outside 12 nm zone).

4.6.3.4 *The pre-exploitation phase – all offshore wind projects*

This section describes the *additional* procedures to be taken into account, for both NSW and offshore projects.

Physical connection to the grid (electricity cable)

With respect to the cable connection of the wind park to the grid, different regulations are applicable to the various sea zones through which the cable may run. The licences required for the cable connection are in accordance with the following laws:

- Spatial Planning Act of 5th July 1962[90]
- Public Works and Water Management Act of 14th November 1996[91]

Since the sea area extending from the coastline up to about 1 km on the seawards side of the baseline falls under the jurisdiction of the relevant municipality/province, the Spatial Planning Act applies to this area and a licence supplied by the local community, and the Water board, is required.

For sea areas outside the 1 km line, only state authority applies. Thus, the electricity cable between the wind park and high-voltage station on land is subject to a licence by virtue of the Public Works and Water Management Act. This law is applicable for the part of the route through the EEZ as well as in the territorial sea. In this licensing procedure the interest regarding the public water works as well as the environmental aspect can be considered by virtue of article 3 of the Act.

[90] Staatsblad 7th August 1962,
[91] Staatsblad 23rd December 1996.

With regard to the cables in the North Sea the Fifth Policy Document on Spatial Planning describes the objective to make it compulsory to combine new and renewed cables and pipelines in specified lanes. This objective may be included in the conditions stipulated in the granting of permits under the Public Works and Water Management Act.

Future policy and developments

In the Fifth Policy Document on Spatial Planning (by the Ministry of Housing, Spatial Planning and the Environment (VROM)), it is declared that a spatial planning policy for the North Sea will be pursued. The policy document outlines a number of functions of the North sea that must be taken into consideration in site location of a wind farm, together with a policy plan for the future.

With regard to offshore activities is stated that the government is promoting wind energy, both generally and offshore and that preferential areas for the generation of wind energy on the North Sea will be designated. Before the end of 2003 a concession procedure for the granting of licenses will be established. Until this concession procedure is established no applications for offshore wind farms will be considered.

One goal described in the document is the conservation of an unobstructed view of the sea from the coast. Permanent structures visible from the coast within the 12-mile zone will thus only receive permits in cases of significant public interest.

The policy document together with the maps designating the preferential areas can be consulted on the website of the Ministry of Housing, Spatial Planning and the environment www.vrom.nl.

It is also worth noting the ecological importance of the North Sea. The entire North Sea is part of the Dutch Ecological Main Structure (Ecologische Hoofdstructuur (EHS)) as described in the "Green Space Structure" (Structuurplan Groene Ruimte (SGR)) of the 5th Key Planning Decision on spatial Planning. The protective regulations ensuing from this are to be effective up to and beyond the 12-mile zone. Many ecological features pertain to the North Sea as a whole, while other ecological features are area-specific. The national government will work out the details regarding which areas must be afforded extra protection in this respect. Policy concerning the Wadden Sea region is aimed at the sustainable protection and development of the Wadden Sea as a nature area and preservation of its unique open landscape. This objective is to be detailed separately in a different key planning decision, namely the Key Planning Decision on the Third Policy Document on the Wadden Sea.

4.6.3.5 The exploitation and decommissioning phase – all offshore wind projects

Thus far, there is no experience related to these phases of the process. At the very least some monitoring and reporting activities (on the part of the developer to the competent authority) would be expected, regarding the fulfilment of requirements relating to the conditions of the building and environmental licences. These demands are included in the specifications of the Measuring and Evaluation Program (MEP) for the NSW and probably will also be demanded for the Q7 wind farm.

With respect to decommissioning and rehabilitation arrangements, the developer is required to submit to the authorities, a security for the full amount of decommissioning costs as determined by the authorities. This amount is non-negotiable.

4.6.4 Economic conditions for offshore wind exploitation

As a result of the liberalisation process, energy policy in the Netherlands has moved away from a system of subsidies to one comprised of fiscal- and market- based instruments. Most instruments are fiscal in nature, and generally apply to all RES (except waste incineration). The Electricity Law[92] (2 July 1998) incorporates a separate status for electricity generated from renewable energy sources (RES-E) wherein support is granted to RES-E as a whole, i.e. without differentiation between the various renewable energy sources[93]. The renewable sources are electricity produced by wind, solar, small-scale hydropower, or plants in which biomass is thermally processed to yield electricity without any supplementary firing or admixture of synthetic material (article 73 of the Electricity law 1998).

The law requires producers and suppliers of energy to promote effective and environmentally friendly use and production of electricity (chapter 5 "Sustainable Energy Supply"- Art. 68). Furthermore, there is (taking into account specific transitional conditions) an obligation on the part of the licence holder to accept electricity produced by sustainable energy sources (a.o. wind energy) (Art. 69) for a remuneration as determined by the Minister in accordance with the parameter of article 70.

Support for matters related to procedure or infrastructure

With respect to development of offshore wind energy specifically, the Dutch national government has taken an active role by reserving a budget of 27.2 M€ under the CO_2 reduction programme for the realisation of the 100 MW near-shore wind (NSW) demonstration project. The NSW demonstration project, located off the coast of Egmond aan Zee, is meant as a one-off or non-recurrent project, and the only wind farm that will be built in the near shore area. It is primarily intended for acquiring knowledge and experience for offshore wind farms further out in the sea.

Except for Government-run programmes grid connection for offshore installations is not guaranteed, and all grid costs are met by the developer. In addition, the developer undertakes a supply contract for a given capacity, and in breach of contract is subject to a fine.

In the 5e Nota Ruimtelijke Ordening (Spatial Planning Policy Plan) preferred areas are indicated. The demands imposed on wind energy will be less severe in these areas. However, this policy plan is disputed and might be changed (also due to the recent change of government).

Non-fiscal Support for investment

A maximum subsidy of approx. 27.2 M€ (60.000.000 NLG) is available from the Government for the realisation of a 100 MW near-shore wind (NSW) demonstration project. The subsidy allocation shall be integrated in the selection procedure. Also the Q7 wind farm might receive a grant to carry out a Measuring Program.

Fiscal Support during operation

Two main incentives exist for producers of green electricity in the Netherlands: a fixed minimum payment per production unit, and green certificates.

The payment made to green electricity producers on the basis of units of green electricity produced represents a recirculation of a portion of funds collected through the energy tax (REB) scheme. The payment amounted to 1.92 €c/kWh in 2000 and 1.94 €c/kWh in 2001.

The green certificates system operates in conjunction with the system of tax exemption of RES-E, through which a significant voluntary market for green electricity has been created. Under the Dutch energy taxation scheme, households, as well as small & medium enterprises (SMEs), normally pay

[92] Law on the rules regarding the production, the transport and the supply of electricity of 2 July 1998 (*Staatsblad* 16 July 1998)

[93] The renewable sources are electricity produced by wind, solar, small-scale hydropower, or plants in which biomass is thermally processed to yield electricity without any supplementary firing or admixture of synthetic material (article 73 of the Electricity law 1998).

energy tax on the consumption of electricity (and natural gas). However, since 1998, RES-E consumption is exempt from energy tax (REB), thereby providing an incentive for SMEs and households to buy green electricity. The tax amounts to roughly 5.78 €c/kWh for consumers using up to 10,000 kWh/year [Ecofys, 2001].

The tax exemption system is regulated using a system of tradable green certificates. Dutch producers of renewable electricity receive a certificate for each pre-defined unit of electricity produced. These certificates are needed by consumers seeking REB exemption for RES-E consumption, and may be traded independent of the physical electricity supply. Thus, the green electricity producer can receive for his electricity production, a value additional to simple grey electricity, through green certificates. The benefit received from green certificates is typically 2.3-2.8 €c/kWh. Certificates may be issued in units of 1, 10, 100 or 1000 MWh, and each certificate is valid only up to 12 months after its date of issue.

Certificates originating from green electricity produced outside the Netherlands can also be used provided that there is a specification of the origin of source, that the RES-E has not been subsidised in the country of origin, and that the importer holds a similar quantity of import capacity for the physical import of electricity. That is, the import of certificates is linked to the physical import of electricity and its production is required to confer with the Dutch Electricity Act 1998.

However, it should be noted that although the Dutch system currently operates on a voluntary basis, the Ministry of Environment and the Dutch Second Chamber have called for the implementation of minimum obligations, proposed at 3% of total electricity consumption.

Thus, overall, with the combination of support received from production subsidy and green certificates, green electricity received a premium in 2001 of around 4.5 €c/kWh above market price.

4.7 Sweden

4.7.1 Delineation of Swedish seas into zones

Baseline

The baseline used in the delimitation of Swedish sea zones is defined according to Förordning om beräkning av Sveriges Territorial sea (Proclamation on the Measuring of the Territorial Waters of Sweden) 1966:375. Straight baselines are used – the baseline extends between the baseline points on the low-water line along the coast (set out in the Act 1966:375).

Territorial sea

The Swedish territorial sea is defined according to Lag om Sveriges Sjöterritorium (Act concerning the territorial waters of Sweden) 1966:374. In principle the Swedish Sea territory is 12 nautical miles (nm) from the coast. The delineation of territorial sea areas with neighbouring countries has been determined by bilateral and multilateral delimitation agreements. The co-ordinates are set out in the Act.

Continental Shelf

The Swedish continental shelf is defined in accordance with the Geneva Convention on the Continental Shelf (29 April 1958). The delimitation of the Continental shelf under Swedish law is set out in Lag om kontinentalsocklen (Act on the Continental Shelf) 1966:314, and Kontinentalsockelförordningen (Proclamation concerning the Application of the Act on the Continental Shelf) 1966:315. The delineation of the Continental shelf with neighbouring and opposite countries is determined through bilateral and multilateral agreements.

Exclusive Economic Zone

Sweden claimed an Exclusive Economic Zone (EEZ) according to Lag om Sveriges ekonomiska zon (The Swedish Exclusive Economic Zone Act, promulgated 3 December 1992) 1992:1140. The EEZ is delimited by the "middle line", which is a line each point of which is situated at an equal distance from the nearest points on the base lines from which the breadth of Sweden's and other State's territorial sea of Sweden is measured. The points demarcating Sweden's EEZ are given in Ordinance on Sweden's Exclusive Economic Zone, issued on 3 December 1992.

4.7.2 Competent authorities for Swedish sea zones

Territorial structure

The Kingdom of Sweden is a unity. There are no territories with special status.

Government structure

Sweden is a Constitutional monarchy. The Parliament has one chamber (Riksdagen). Four constitutional laws determine the rights of individuals and the powers of the King, Parliament and Government.

Sweden has 18 counties (län), two regions and one municipality dealing with the regional questions - each of these has both a regional parliament (landsting) and a regional state administration (county administration board, länsstyrelsen).

The County Administration Board (länsstyrelsen) is a state agency operating under general directives issued by Parliament and the Government. The board is completely independent to take decisions within its own framework.

Furthermore, Sweden has 289 municipalities (kommuner), which also have their locally elected representatives (kommunfullmäktige, kommunstyrelse).

Authority over sea zones

Legally, the Swedish territorial sea (limited by a 12 nm line etc.) is treated like the on-shore areas. The territorial sea areas are allocated to the relevant neighbouring local authorities (kommuner, län) and the planning and environmental laws are in force[94] without any modification.

However, use of sea areas (with the exception of a private property zone, which, in general, is 300 m from the coast) requires an application to the National Judicial Board for Public Lands and Funds for legal right to use the area.

The municipalities have a planning monopoly, which means that they decide on the use of land and the territorial sea, based on their planning (which has to comply with the national planning).

The state authority concerned with the national planning interests consists of both the national planning authority (Boverket) and the regional state authorities (länsstyrelsen). The tasks and competencies are defined in the so-called "Hushållningsförordningen"[95].

According to the planning laws the municipalities draw up comprehensive plans. The municipalities have been asked, in these plans, to identify suitable land and sea areas for wind turbines. The regional state authority is responsible for providing the national and regional focus for the municipalities' comprehensive planning. In general, the regional state authority represents and co-ordinates the state's interests in the planning process.

The national Planning Authority has, through a Government decision, been assigned with working out the general conditions for the siting of larger offshore wind farms.

Competent authorities for sea zones for offshore wind development

The main competent authorities involved in the procedure for offshore wind developments are:

- Ministry of Industry, Employment and Communications (Näringsdepartementet), which is responsible for the energy policy
- The National Board of Housing, Building and Planning (Boverket), the central agency of the Swedish government for planning, urban development, building and housing
- The Swedish Energy Agency (Energimyndigheten)
- National Judicial Board for Public Lands and Funds, which represents the public interests in decisions on use of water areas, particularly inside the territorial Sea.
- The regional state authority (Länsstyrelsen) for the region in question
- The environmental Court, set up according to the Environmental Code
- The municipality

4.7.3 Legal and procedural requirements for offshore wind exploitation

4.7.3.1 Introduction

There is no dedicated legal basis regarding offshore wind energy generation in Sweden and the planning procedures, aimed at pointing out relevant sites for the location of wind turbines, have not yet been carried out in all relevant municipalities. This does not prevent a municipality – where relevant – from working out the necessary detailed planning for an offshore wind farm.

The administrative and procedural requirements in the implementation and exploitation of an offshore wind park are therefore broken down into three phases, namely:

- The pre-exploitation phase
- The exploitation phase

[94] The principal law is the Act on planning and building (Plan- och Bygglagen) 1987-01-08
[95] Proclamation concerning the economizing on land and water areas (Förordning om hushållning med mark- och vattenområden m.m.) 1998:896.

- The decommissioning phase

The legal framework, particularly for the pre-exploitation phase, may differ depending on the location of project. If the project is located inside the territorial sea (within 12 nm) the legal framework is the same as that onshore. If it is outside the 12 nm zone another legal framework applies. A distinction is therefore made between the two legal frameworks involved in the pre-exploitation phase – this is dealt with below.

4.7.3.2 The pre-exploitation phase - sites within the territorial sea

The main legislation pertaining to offshore wind energy development in the territorial sea is:

- Planning and Building Act (Plan- och Bygglagen, PBL, 1987:10)
- Environmental code (Miljöbalken, MB, 1998:808)
- Act on Electricity (Ellagen 1997:857)

These regulations require various permits to be sought from different authorities.

The Act on Planning and Building (Plan och Bygglagen) requires the developer to obtain a building permit, which must be obtained from the municipality (Byggnadsnämnden). When considering the permit application, if the municipality finds that the (on-shore) project has a major impact on its surroundings it can, as part of the application, require an Environmental Impact Statement (Miljö Konsekvens Beskrivning (MKB) – hereafter, the Swedish abbreviation, MKB, is used) aimed at an Environmental Impact Assessment.

According to the Environmental code (Miljöbalken) projects on the sea always require special permission. For a proposed project of output less than 1MW, this permission must be obtained from the environmental court on water activities. However, where the proposed project has an output of 1 MW or more, the permission must be obtained from the regional state authorities (Länsstyrelsen). For farms comprising three or more wind turbines and having a total output of more than 10 MW the government is the competent authority concerning permit application (refer to Table 9). In the latter two cases, it is in generally assumed that there is a major environmental impact – thus a MKB (Environmental Impact Statement) must be provided. (Thus, the procedure of early consulting – to determine the necessity or otherwise of a MKB – is not formally necessary, but is recommended)

The developer is responsible for providing the Environmental Impact Statement (MKB) and must bear the associated costs. He is also responsible for carrying out hearings with the parties prescribed by the Environmental code (refer to chapter 6, paragraph 5 (Utökad Samråd) of the Environmental Code). The detailed content of the MKB must be negotiated with the authority considering the application relating to the environmental code. In general, however, the requirements are standard. One of the main problems in the Swedish system is the co-ordination between the two main laws – the Planning and Building Act, and the Environmental code. Details on the responsibilities and stipulations for the MKB, according to the two regulations, are given in

Table 8.

The Act on Electricity requires that a concession for access to the grid be obtained from the Swedish Energy Agency. The Act also requires an environmental impact assessment (MKB) to be included in the application for a line concession, in accordance with the Environmental code. Thus, an application for a permit according to the Environmental code must be simultaneously requested from the Environmental Court. Chapters 9, 11 and 17 of the Environmental code outline the aspects relating to government examination of the MKB.

Where a site is not considered private or public property (i.e. the site is located at a distance greater than 300m from the coast), State permission is required in order to obtain use of a site for development. In this instance, an application must be made to the National Judicial Board for Public Lands and Funds for the disposal of the area.

Table 8: Responsibilities relating to the MKB (EIS) in Sweden, according to the Environmental Protection Act and the Planning and Building Act (for sites in the territorial sea) (translation from a similar figure in the Boverket handbook [Boverket, 2001])

Responsibilities concerning the MKB, Environmental Impact Statement		
	Environmental Protection Act	Detailed plan according to the Planning and Building Act
Who shall provide the MKB (Environmental Impact Statement	The project developer	The municipality in principle can decide if the MKB is necessary, but it is always required on the sea
Who is financing the MKB	The project developer	The municipality/the project developer
Are there formalised (law-regulated) requirements for the MKB?	Yes detailed requirements	Yes, generally formulated. The MKB shall make an impact assessment possible
Shall alternatives to the proposed site and to the proposed project be considered?	Yes	–
Is it regulated when and with whom the project plans shall be consulted?	Yes	At the time for the public hearing of the detailed plan
Who shall carry out consulting process?	The project developer	The municipality
Who is documenting the results of the consulting process	The project developer	The municipality

4.7.3.3 The pre-exploitation phase - sites outside the territorial sea

The procedure applicable to offshore wind exploitation in the EEZ is done according to:

- Swedish Exclusive Economic Zone Act (Lag om Sveriges ekonomiska zon 1992:1140)
- Act on the Continental Shelf (Lag om kontinentalsocklen)

According to the Swedish EEZ Act, Government permission must be obtained for construction projects (with a commercial purpose) located within the Swedish EEZ. The evaluation of the project for which permission is sought is based, a.o., on paragraphs from the Environmental code (Miljöbalken) referred to in the EEZ Act. Certain chapters of the code, such as, chapters 2-4, chapter 6 and chapter 7, are emphasised in the common guidelines [Boverket, 2001] issued by the planning and environmental authorities. Accordingly, a statement on EIA must be included in the application. The Department of Environment (Miljödepartementet) is (through a government decision) the authority designated to administrate this part of the law. Applications must be sent to the department.

According to paragraph 3 in the Act on the Continental Shelf (Lag om kontoinentalsocklen) government permission is required for exploration relating to the establishment of construction projects, such as wind installations (geotechnical measurements, drilling etc). This is administrated by Ministry of Industry, Employment and Communications (Näringsdepartementet).

Concessions for access to the grid, according to the Act on electricity (Ellagen), are administered by the Swedish Energy Agency (Energiadministrationen).

Also of importance is the Espoo convention, which requires that potentially affected countries be involved in the Environmental Impact Assessment process, which includes formal submission of the EIA for the project to neighbouring states on whom the project has an impact[96].

For a site in the EEZ, the cables will pass through the territorial waters and probably also land areas. The associated environmental aspects must be evaluated by an environmental court according to the Environmental Act (Miljöbalken). Applications are sent to the Court.

For cables passing through privately-owned land or sea territory, the rules in the Utilities Easement Act (Ledningsrätslagen) apply.

4.7.3.4 The exploitation phase and decommissioning phases

During the exploitation phase, regulatory and procedural requirements consist mainly in providing information to the competent authorities regarding the fulfilment of requirements related to the conditions under which the various permissions were granted. As such, developers are typically required to conduct monitoring activities and provide regular reports concerning offshore construction, onshore construction, environmental impact etc.

Similarly, the procedural requirements related to decommissioning concern primarily the fulfilment of agreed conditions under the granting of the original permissions (including possible special conditions specified by the Environmental Court), such as demolition and removal procedures, environmental impact and rehabilitation etc.

[96] 1991 års Espoo(Esbo) konventionen om miljökonsekvensbeskrivningar i ett gränsöverskridande sammanhang (i kraft 1997, ratificerad av Sverige 1992, SÖ 1992:1).

4.7.3.5 *Summary*

Table 9 summarises the various procedural stages and competent authorities involved in offshore wind projects of various capacities, located within the territorial sea or the EEZ. In addition, a list of the major national legislation of relevance in offshore wind development is given in Box 2 below.

Table 9: Administrative procedures and competent authorities for offshore wind projects in the Swedish territorial sea and EEZ

	Project < 1MW output	1 MW < Project < 10MW	Project >10 MW
Inside the territorial sea (12 nautical miles)	Application for use of the area concerned – submitted to National Judicial Board for Public Lands and Funds Application to the municipality (Planning and Building Act) Application to the environmental court according to the Environmental code	Application for use of the area concerned – National Judicial Board for Public Lands and Funds Application to the municipality (Planning and Building Act) Application to the regional state authority (Länsstyrelsen) according to the Environmental code Application to the Ministry of Industry, Employment and Communications (Näringsdepartementet) for the examination of foundations etc.	Application for use of the area concerned - National Judicial Board for Public Lands and Funds Application to the municipality (Planning and Building Act) Application to the environmental court according to the Environmental code Application to the Ministry of Industry, Employment and Communications (Näringsdepartementet) for the examination of foundations etc., Application to the Swedish Energy Agency for a concession for access to the grid
Inside the Swedish Economic Zone (but outside 12 Nautical Miles)	Power Plants require government permission, through the Ministry of Environment. The evaluation of the project is based, a.o., on paragraphs in the environmental code (Miljöbalken). Government permission is required for any exploration relating to construction projects, such as wind installations (geotechnical measurements, drilling etc). Application to the Ministry of Industry, Employment and Communications (Näringsdepartementet) Application to the Swedish Energy Agency for a concession on access to the grid according to the Act on electricity. Special rules for the cables passing sea and land territory Espookomnventions requires formal submission to neighbouring states		

Box 2: Summary of national legislation relevant to the regulatory and administrative stages for offshore wind farm development in Sweden (in Swedish)

1. Plan- och Bygglagen, PBL, 1987:10 (Act on planning and building) – requires a.o. the municipalities to work out comprehensive plans
2. Lag om tekniska egenskapskrav på byggnadsverk, m.m., BVL, 1994:847 (Act on technical requirements for construction works)
3. Fördning om tekniske egenskabskrav på byggnadsbverk m.m., BVF, 1994: 1215
4. Miljøbalken, MB, 1998:808 (Environmental code) – this law aims at gathering all environmental regulation in one law. It replaced 16 special laws relating to various environmental issues, such as nature conservation, natural resources, chemicals, water, environmental protection etc.)
5. Lag om införande av Miljöbalken 1998:811 (Act on the implementation of the Environmental code)
6. Förordning (1998:896) om hushållning med mark- och vattenområden m.m. – describes the division of labour/authority concerning use of land and water areas between the different authorities
7. Lag om Sveriges Sjöterritorium 1966:376 (Act on the Swedish Territorial Waters)
8. Lag om Sveriges ekonomiska zon 1992:1140 (Act on the Swedish Exclusive Economic Zone)
9. Lag om kontinentalsocklen 1966:314 (Act on the continental shelf) – regulates access to make drillings and other examinations for the foundations and the cables
10. Ellagen 1997:857 (The Electricity Act)
11. Fiskelag 1993:787 (The Fishery Act)
12. Ledningsrättslag 1973:1144 (The Utilities Easement Act)

4.7.4 Economic conditions for offshore wind exploitation

Wind energy competes on the same market as conventional electricity producers, although the final price accorded to wind electricity is concluded with a system of economic support accorded under Public Service Obligations (PSOs).

Support for matters related to procedure or infrastructure

The Government has recently announced a special economic support structure for wind energy, which includes offshore wind (the other targeted wind energy is mountain-based wind energy). It involves a total of €32 million and is available for a 5-year period. Details on eligibility requirements will be presented in autumn 2002. There is also a general wind energy R&D programme, running up to end-2004, with an annual budget of €3 million.

Non Fiscal Support for investment

There are currently three types of subsidies available for wind installations. The first is an environmental bonus, which for the past two years has been equivalent to the electricity tax for households. In 2000 and 2001, the environmental bonus was 0.017 €/kWh and 0.0195 €/kWh respectively. In 2002 the bonus will remain at the 2001 figure, even though the electricity tax is expected to increase. The second subsidy programme applies to plants with a minimum installed

capacity of 200 kW. The maximum subsidy is now 10% of total investment, and the programme runs from Jul. 1997 to Dec. 2002. Finally, for installations of <1.5MW (unlikely for offshore wind farms), there is a support scheme equivalent to 0.98 € c/kWh. All subsidy schemes are anticipated to remain active until the start of the green certificates system (anticipated for 1 January 2003) at which point they will be replaced.

Non-Fiscal Support during operation

Sweden intends implement green certificates system with quota obligation, on 1 January 2003. The quota obligation is on the end-users/consumers. However, for consumers that do not actively choose to acquire the certificates on their own, the supplier must acquire the certificates for them. The system includes a decreasing price guarantee (floor) level to be applicable for the first 5 years of the green certificates system. In addition to the price floor, there is an upper ceiling of 200 SEK/certificate (21 €/certificate or 2.1 €c/kWh). The proposed quota obligation and price guarantees are shown in the following table (SOU 2001:77).

Table 10: Proposed quota obligations and price guarantees under the new Swedish green certificates system

Year	Quota (share of electricity to come from RES (%))	Environmental bonus	Price guarantee (floor) (per certif. or MWh)	
		öre/ kWh	öre/ kWh	€c/kWh
2003	6.7	18	6	0.633
2004	7.7	16	5	0.527
2005	9.7	14	4	0.422
2006	11.7	12	3	0.316
2007	13.1	9	2	0.211
2008	14.2	7	0	0
2009	14.9	5	0	0
2010	15.6	0	0	0

4.8 United Kingdom

4.8.1 Delineation of British seas into zones

Baseline

British maritime zones are measured from a straight baseline, which is the low-water line along the coast, including the coast of all islands comprised in the United Kingdom territories.

Territorial sea

The Territorial Sea Act 1987 defines the British territorial sea. The United Kingdom territorial sea extends 12 nautical miles (nm) from the baseline.

Continental shelf

The continental shelf of the United Kingdom is defined according to, a.o., the Continental Shelf Act 1964. The delineation of sea areas with neighbouring and opposite countries is determined through bilateral and multilateral delimitation agreements. The United Kingdom has delimitation agreements with Norway, the Netherlands, Denmark, Germany, France (and French islands), Ireland, and Belgium.

Exclusive Economic Zone

The United Kingdom ratified the United Nations Law of the Sea Convention on 25 July 1997. In accordance with Part V of the LOSC Agreement, the Exclusive Economic Zone (EEZ) of the U.K. extends up to 200 nm from the baseline.

4.8.2 Competent authorities for British sea zones

Territorial structure

The United Kingdom consists of Great Britain (England, Scotland, Wales) and Northern Ireland. The Isle of Man and the Channel Islands are autonomous and have their own legislation. British government guarantees defence and matters relating to international treaties.

Government structure

The Government is a constitutional monarchy. The UK Parliament consists of the Queen, the House of Lords and the House of Commons. All three combine to carry out the work of Parliament. The UK has a centralised government. However, since 1997, the British Government established devolved governments based on directly elected parliaments or assemblies in Scotland [97] and Wales[98].

The Scottish Parliament has law-making powers, including defined and limited financial powers to vary revenue. The Parliament and the Executive have responsibility for most aspects of domestic, economic and social policy, whilst the United Kingdom Parliament retains control of foreign affairs, defence and national security, macro-economic and fiscal matters, employment and social security.

Wales, through its National Assembly, also has its own decision-making powers, but has less autonomy than the Scottish Parliament. The National Assembly has the power to develop and implement policies in a number of areas of local importance to Wales, and decides on its priorities and allocates the funds made available to Wales from the Treasury. However, the National Assembly does not have the tax varying powers as does the Scottish parliament, and it cannot pass primary legislation. Instead, its powers allow it to pass secondary legislation in the form of statutory instruments. As is the case with

[97] The Scottish parliament opened on July 1, 1999
[98] The Welsh Assembly opened on May 26, 1999

Scotland, the UK Parliament retains responsibility for overall foreign affairs, defence and national security, economic policy etc.

Devolved government was re-established in Northern Ireland in December 1999 under the terms of the Good Friday Agreement.

Authority over sea zones

The Crown Estate, as main landowner of the territorial seabed, is the primary authoritative body concerning sea areas, from whom permission (via leasing/licensing) must be sought for the use of its sea property. The Crown Estate's Commissioners, under the provisions of the Crown Estate act 1961, manage the Estate. Some competencies also lie with the Planning authority, whose competence to grant a planning permission extends to the mean low water line[99].

The Crown Estate owns around 55% of the foreshore (between mean high and mean low water) and approximately half of the beds of estuarial areas and tidal rivers in the United Kingdom. In England, Wales and Northern Ireland the Crown Estate owns about 2720 kilometres of foreshore out of a total of 5120 kilometres. It also owns the seabed out to the 12-mile territorial limit, including the rights to explore and exploit the natural resources of the UK Continental Shelf, excluding oil, gas and coal. The Crown Estate does not own the water column, oil, gas and coal, or govern public rights such as navigation and fishery over tidal waters.

The Crown Estate grants leases or licences on its estate. The largest leaseholders are local authorities, ports and harbours and conservation bodies such as English Nature, National Trust and the Royal Society for the Protection of Birds. Some 570 kilometres (21%) foreshore is leased specifically for conservation purposes and it is intended to extend this in consultation with English Nature.

The activities licensed by the Commissioners of the Crown Estate are the extraction of marine sand and gravel, the laying of oil and gas pipelines, electricity and telecommunications cables and the construction of maritime networks.

Competent authorities for sea zones for offshore wind development

The main competent authorities involved in the procedure for offshore wind developments are:

- The Crown Estate
- The Department of Trade and Industry (DTI)
- The Department for the Environment, Food and Rural Affairs (DEFRA)
- The Department for Transport (DfT)
- The National Assembly for Wales (NAW)
- Scottish Executive (SE) (for Scotland)

The Crown Estate's role is that of landowner of the seabed up to the 12 nautical mile territorial limit, and plays an important role by leasing areas of seabed for the location of offshore wind farms. As "landowner", the Crown Estate is the body that grants the lease or licence allowing the siting of an offshore wind energy project. However, it does not have regulatory responsibility, and will only grant a lease when the developer has obtained all the necessary statutory consents from the responsible Government Departments. Developers must therefore apply through the consenting authorities to gain the consents necessary before work on the new sites may begin.

The Department of Trade and Industry (DTI) is the lead government authority in the consenting procedure by virtue of its Offshore Renewables Consents Unit (ORCU), which has the co-ordinating role for offshore wind farm applications in the territorial waters around England and Wales. Furthermore, the alliance of DEFRA's Marine Environment Branch and DfT's Ports Division into a Marine Consents and Environment Unit (MCEU) serves as a central facility for the receipt of applications for consents and for administrative co-ordination for relevant marine works (under the Food Environment Protection Act (FEPA), Coast Protection Act (CPA), Telecommunications Act, and other legislation). The MCEU will perform these functions for Wales as well as England.

[99] Town and Country Planning Act 1990 (TCPA)

For offshore windfarm proposals in territorial waters adjacent to Scotland, the Scottish Executive's Consents and Emergency Planning Unit (CEPU) is the lead department and has the co-ordinating role.

4.8.3 Legal and procedural requirements for offshore wind exploitation

4.8.3.1 Introduction

Since the Crown Estate owns the total area of the territorial waters of the United Kingdom, the project developer for an offshore wind farm must follow the granting for lease procedure of the Crown Estate, which is conditional to the developer obtaining all the necessary licenses or consents from the consenting authorities. The administrative procedure may be broken down as follows:

- The pre-exploitation
- The exploitation phase
- The decommissioning phase

The following sections describe the process involved in each stage with respect to administrative and procedural requirements that must be fulfilled - wherever possible, the relevant competent authority is given. The majority of administrative requirements relate to the pre-exploitation phase – this is therefore treated in greater detail.

4.8.3.2 The pre-exploitation phase

The pre-exploitation phase essentially involves the following stages:

- Agreement for Lease
- Consents procedure
- Environmental Impact Assessment and Environmental Statement
- Consultation
- Determination

Agreement for lease procedure

Based on the procedure for the first round of offshore wind farms, the Crown Estate Agreement for Lease procedure involves 3 stages: pre-qualification, site allocation, and the granting of the Agreement for Lease. The developer must fulfil the pre-qualification[100] and site location requirements of the Crown Estate, upon which he is offered a site allocation.

Potential developers must evaluate and propose sites for approval for potential lease by the Crown Estate. Aside from the technical and economic requirements, in identifying sites, potential developers must consider a number of factors relating to the environment and other seabed activities (including proximity to shipping lanes, dredging areas, fisheries, conservation areas, cables and pipelines). In general, areas of high nature conservation value are to be avoided, as well as those where existing seabed activities and uses are potentially incompatible with offshore windfarm development. Details of international and EU legislation impacting site selection is given in the DTI document 'Draft Guidance Notes Offshore Wind farm Consents Process' [DTI, 2001] (hereafter referred to as the DTI draft guidance notes).

Once the potential developer's application is deemed satisfactory, the Crown Estate grants an Agreement for Lease, which gives the applicant the option, for a given period[101], to obtain all necessary consents to be granted a Crown Estate Lease for an offshore windfarm site (in accordance with the Crown Estate Procedures relating to that site). A detailed explanation of the conditions and procedure involved in the Crown Estate Agreement for Lease and Terms of Lease for the first round of offshore wind farms are available from the websites of the Crown Estate, and the British Wind Energy

[100] In the first round of allocated sites pre-qualification required (in order of priority): financial standing, offshore development expertise, wind turbine expertise
[101] In the first round the Agreement for Lease was granted for 3 years

Association: http://www.crownestate.co.uk/estates/marine/windfarms.shtml, and http://www.britishwindenergy.co.uk).

Consents procedure

The consents required by a developer for an offshore development are not fixed in all cases, since some consents are site-dependent. However, certain consents are likely to be required for all offshore projects. These relate to Electricity Act 1989 (EA) – Section 36; Food and Environment Protection Act 1985 (FEPA) – Section 5; and Coast Protection Act 1949 (CPA) – Section 34. These are described in further detail in the DTI Draft Guidance Notes [DTI, 2001], together with other, additional consents that may be required. Details of the direct competent authorities associated with each regulatory procedure are also included in the document.

There are currently two consents' routes available in England and Wales for developers to proceed. These are described separately below.

1. Electricity Act/FEPA/CPA and other possible consents

The main consents/licences required under this route are:

- Electricity Act 1989 – Section 36
- Food and Environment protection Act 1985 – Section 5
- Coast Protection Act 1949 – Section 34

Other consents may be required according to the nature of the site and onshore development proposals:

- Town and Country Planning Act 1990 – Section 57 or 90 (e.g. For onshore substations)
- Town and Country Planning Act (Scotland) 1997 (for onshore substations in Scotland)
- Electricity Act 1989 – Section 37 (for onshore overhead lines)
- Water Resources Act 1991 – Section 109 (if erecting structures in a water course)

An Environmental Impact Assessment (EIA) is likely to be needed for all applications under the Electricity Act (EA) as described in the Electricity Works (Environmental Impact Assessment) (England and Wales) regulations 2000 (SI 2000/1927) (EIA Regulations).

For proposals in territorial waters adjacent to Scotland, an EIA will be required to comply with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000.

2. Transport and Works Act (TWA)/FEPA and other possible consent;

It should be noted that as the Transport and Works Act does not apply in Scotland – this route is therefore not available for proposals sited in territorial waters adjacent to Scotland.

Where developers choose to proceed by way of an Order under the TWA, the following main consents apply:

- Transport and Works Act 1992 (TWA) – Section 3
- Food and Environmental Protection Act 1985 (FEPA) - Section 5

In addition to authorising offshore works, an order may also authorise ancillary onshore works. However, the making of an order does not automatically confer planning permission for any development provided for in the order. The developer must therefore seek planning permission, either through a simultaneous request for deemed planning permission, when applying for the order, or through a separate request to the local planning authority (LPA). Thus, as in the case of the previous procedure, additional consents are likely to be required for onshore aspects, namely:

- Town and Country Planning Act 1990 – Section 57 or 90 (e.g. for onshore substations)

All applications regarding TWA are processed by the TWA Processing Unit of the Office of the Deputy Prime Minister (ODPM). Details and principles regarding planning policy can be consulted at

www.planning.odpm.gov.uk, and a guide to TWA procedures is available at: www.planning.odpm.gov.uk/twa92/index.htm.

An EIA is also likely to be required. However, if required, the developer may apply to the Secretary of State or the National Assembly for Wales (NAW) for a decision on whether an EIA is required (a 'Screening Decision') or request an opinion on the scope of the EIA (a 'Scoping Opinion'). Consultations with environmental agencies are conducted before either a decision or opinion is given.

It should be noted that there is currently a proposal for the consents procedure to be conducted using a single administrative focal point – the DTI. In this respect, the Offshore Renewables Consents Unit (ORCU) of the DTI would act as the co-ordinating body for all competent authorities implied in the Consents process. The DTI process would incorporate Consents Route 1 and also a close involvement in Consents Route 2 (although applications will continue to be processed by the TWA Unit as an interim measure) because DTI would be the competent authority for all applications in English waters. Further details regarding the role of the ORCU and DTI in the Consents process are provided in the DTI Draft Guidance Notes [DTI, 2001]. Although developers would not be obliged to use this route, it is expected that this facility would be the primary recourse for developers due to greater simplicity. However, regardless of the route pursued by the developer, the consents and licences required (described in the pre-application phase) remain unchanged.

Environmental Impact Assessment (EIA) and Environmental Statement

Both consents routes are likely to imply the need for an EIA, since all offshore applications fall within the scope of the following legislation:

- Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 (SI 2000/1927) or the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000

Other legislation implying consideration of environmental aspects (whether through the EIA or otherwise):

- CPA (to satisfy the Harbour Works (EIA) Regulations 1999 where a proposed scheme is located wholly or partly within a port or harbour)
- TWA Order through the 2000 Rules (SI 2000/2190) (EIA partly applies)
- FEPA (EIA Directive does not yet apply but, as allowed under the provisions under the FEPA, the equivalent of a formal Environmental Statement (ES) is required by the licensing authority)

The Centre for Environment, Fisheries and Aquaculture Science (CEFAS, an Agency of the Department for Environment, Food and Rural Affairs -DEFRA) has published a Guidance Note for Offshore Windfarms for Environmental Impact Assessment relating to FEPA and CPA. This note can be downloaded from the CEFAS web site: www.cefas.co.uk/publications/Windfarm-guidance.pdf.

Other types of environmental assessments may also be required, now or in the near future, depending on the nature of the project – these are, namely, Appropriate Assessments and Strategic Environmental Assessment (SEA) (refer to chapter on EU legislation – some specific details pertaining to the UK are given in the DTI Draft Guidance Notes [DTI, 2001]). The Environmental Statement is to include any information pertaining to an Appropriate Assessment. The SEA came into force on 21 July 2001, and has to be implemented by 21 July 2004 in UK legislation.

Consultation Stage

At the same time the developer submits his applications to the DTI he must prepare a public notice and advertise the proposal in one or more local newspaper(s) (for 2 successive weeks); Fishing News, the London Gazette, and in one or more national newspapers – allowing 28 days from the date of the latest publication for comments to the DTI. Simultaneously, he must arrange for the Environmental Statement (ES) and consultation letters to be lodged with a minimum of two local authorities closest to the area in question for at least 6 weeks. During this period the DTI will also write to its statutory and non-statutory consultees for comments on the developer's proposal.

For proposals which will fall to be determined by the Scottish Ministers, the developer must prepare a public notice and advertise the proposal in one or more local newspaper(s) (for 2 successive weeks), Fishing News, the Edinburgh Gazette and in one or more national newspapers – allowing 28 days from the date of the latest publication for comments to the Scottish Ministers.

Determinations Stage

Based on the responses received during the consultation period the DTI, in conjunction with DEFRA and DfT, will consider whether additional information is required from the developer and/or possible modifications to project proposals are required, before making recommendations to ministers as required on individual applications. The DTI will not make a decision in the absence of a decision on any other consents required. On the basis that project proposals are acceptable, DTI, DEFRA (or NAW) and DfT will grant consents to successful applicants.

In Scotland, the CEPU will consider their response along with the FEPA consenting authority (Scottish Executive's Rural Affairs Department) and the CPA consenting authority (Scottish Executive's Development Department) before asking the Scottish Ministers to make a determination.

A summary of the pre-exploitation phase, incorporating the two possible routes and the relevant legislation, is given in the following table.

Table 11: Summary of pre-exploitation phase for UK offshore wind development

Agreement For Lease from the Crown Estate	
Consents Route 1	Consents Route 2 (Not available in Scotland)
Offshore developments	
Electricity Act (1989) - Section 36 Food and Environment Protection Act (1985) – Section 5 Coast Protection Act (1949) - Section 34	Order under the Transport and Works Act (1992) Food and Environment Protection Act (1985) - Section 5
Onshore works	
Town and Country Planning Act (1990) - Section 57 or 90 Town and Country Planning (Scotland) Act 1997 Electricity Act (1989) - Section 37 Water Resources Act (1991) - Section 109	Town and Country Planning Act (1990) - Section 57 or 90
Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 '(SI 2000/1927 *(embracing the other EIA and ES requirements)* Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (SSI 2000/320)	Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2000 (SI 2000/2190)
Environmental Impact Assessment and Environmental Impact Statement (Appropriate Assessment and/or Strategic Assessment)	
Consultation	
Determination	

4.8.3.3 The exploitation and decommissioning phases

During the exploitation phase, regulatory and procedural requirements consist mainly in providing information to the competent authorities regarding the fulfilment of requirements related to the conditions under which the granting of consents were agreed. In this respect, developers are typically required to conduct monitoring activities and provide regular reports concerning offshore construction, onshore construction, and environmental impact.

Similarly, the procedural requirements related to decommissioning concern primarily the fulfilment of agreed conditions under the granting of the original consents, such as demolition and removal procedures, environmental impact and rehabilitation, and safety.

4.8.4 Economic conditions for offshore wind exploitation

4.8.4.1 Support for matters related to procedure or infrastructure

The DTI has created an Offshore Renewables Consents Unit (ORCU) intended to act as a 'one-stop shop', co-ordinating all administrative activities related to consents and other procedural requirements. Furthermore, the DTI is developing a guidance document to assist offshore wind farm developers through the consenting procedure: site selection stage, obtaining all required consents, and finally, obtaining a lease from the Crown estate. In Scotland, a similar streamlined 'one stop shop' administrative procedure is currently being developed by the Consents and Emergency Planning Unit

(CEPU) to deal with offshore proposals sited in territorial waters adjacent to Scotland. The CEPU also intends to publish a guidance document.

Furthermore, a Marine Consents and Environment Unit (MCEU) has been created (through the alliance of DEFRA's Marine Environment Branch and DfT's Ports Division) so as to provide a central facility for the receipt of applications for consents and for administrative co-ordination for relevant marine works (under the FEPA, CPA Telecommunications Act, and other legislation). The MCEU will perform these functions for Wales as well as England.

These institutions should assist greatly in simplifying and streamlining the procedural requirements for offshore wind farm development.

As part of a programme of work to consider the prospects for future offshore development inside and beyond territorial waters, the DTI is involved in a number of studies examining various critical aspects, including; implications for the UK's electricity network, financing for renewables energy projects, regulatory issues, strategic environment assessment and the marine consents framework. The results of all these various strands of work will feed into a public consultation on the future for offshore development in the autumn of 2002.

4.8.4.2 Support for investment

Non-fiscal

Offshore wind will benefit from an extensive programme of capital grants worth at least £74 million (115 M€) between 2001 and 2004. This funding will support a number of early commercial demonstration projects and will assist firms with the capital costs of plant construction. Each applicant will be eligible to receive a maximum of £10 million (€16 million), or 40% of eligible costs per project. The closing date for the first round of applications is 1 July 2002. Further details of the scheme, and application details, can be found on the DTI website at http://www.dti.gov.uk/renew/eoi.htm (guidance notes available at: http://www.dti.gov.uk/renew/guidance.pdf).

The capital grants programme is itself part of a wider package of Government support for renewables worth more than £260 million over the 2001 – 2004 period. Capital grants are also available to stimulate early deployment of energy crops, while offshore wind developers may also be able to benefit from an expanded R&D programme worth £55.5 million (€89 million).

4.8.4.3 Support during operation

Non-fiscal

Offshore wind will also benefit from the major policy instrument designed to bring forward renewable energy technologies. The new Renewables Obligation, which came into force on 1 April 2002, was implemented by an Order under the Utilities Act 2000 and requires licensed electricity suppliers in Great Britain to supply a specified proportion of their electricity from renewable sources. The Renewables (Scotland) Obligation will apply in Scotland. This also came into force on 1 April 2002. The Government's target is that, by 2010, 10% of electricity sales by licensed suppliers will come from renewable sources that are eligible for the Obligation.

Individual suppliers are responsible for demonstrating their compliance to Ofgem (Office of Gas & Electricity Markets). This evidence will take the form of Renewables Obligation Certificates (ROCs) which are issued by Ofgem to accredited renewables generators. The certificates are fully tradable. If suppliers are unable to fulfil their Obligation requirements with ROCs, they can choose to pay a "buy-out" price, which will then be recycled back to suppliers in proportion to the extent of their compliance. Currently, the buy-out is set at £0.03 /kWh (€0.047 /kWh).

The Obligation is a long-term measure – for 25 years – and is designed to accelerate the uptake of renewable electricity in Great Britain. The previous policy instrument, the Non-Fossil Fuel Obligation (NFFO) was highly successful in creating a fledgling renewables industry. It was recognised, however, that a new approach was needed to deal with the challenges of a liberalised electricity market.

Fiscal

The Climate Change Levy aims to reduce CO_2 emissions by encouraging non-domestic consumers to be more aware of energy efficiency issues. Introduced on 1 April 2001, it is a tax payable by all non-domestic energy users across the United Kingdom. Electricity from renewables is exempt from this payment, currently set at 4.3 pence/kWh (6.7 €/kWh).

The aim of the Climate Change Levy is to reduce CO_2 emissions by encouraging non-domestic electricity users to become more energy-efficient.

PART 3 - Enabling offshore wind developments

5 Best practice offshore wind policy

Offshore wind energy policy is, in most countries, still in an early stage of development. In these cases, a pre-mature coherence between all implied policy areas has been reached, often resulting in a complicated network of procedures, acting as a disincentive to project developers. The previous chapters have given an extensive overview of International, European and national offshore wind policy. Table 12 gives an overview of the basic characteristics of national offshore wind policies as regards the major regulatory procedures, and existing economic frameworks.

A comparison of national policies indicates missing or potentially weak elements in some national frameworks and aspects on which to identify 'best practices'. The identified best practices are shown in Box 3 below:

Box 3 Best practices in offshore wind energy policy

- *'One stop shop' procedure*
- *Transparency in financial burden for project developer*
- *Anti-speculation clauses*
- *Enhanced communication and public involvement*
- *Burden sharing for grid connection*
- *Allowances for innovation in technology*
- *Securing pioneering risks*
- *Risk hedging schemes*
- *Monitoring requirements*
- *Decommissioning and rehabilitation guarantees*

'One stop shop' procedure

In all countries investigated, the pre-exploitation (pre-construction) procedure necessitates input from at least 7 different administrations – whether this be only in a consultative or advisory capacity or in a more extended capacity, such as being a direct awarding body, for instance in the granting of a permit, domain concession or lease. At present, the UK has put into place (Scotland in preparation stages) a 'one stop shop' procedure to ease the procedural difficulties for project developers. Denmark is also aiming for a one-stop procedure. Furthermore, the UK and Ireland are preparing a handbook for developers. In most countries, maps showing different zones fit (or unfit) for offshore exploitation i.e. "exploitable or permissible zones" are available.

Table 12: Overview of basic characteristics of offshore wind policy in the EU member states (situation August 2002)

	BE	DK	FR	DE
Procedures				
Fixed procedure	yes	under review	not clear	yes
One-stop shopping	no	probable	no	no
Pre-selected sites	no	yes (by previous Govt.-but under review by new Govt.)	no	Provisions for specially-suited areas for establishing offshore wind installations
Economics : costs				
		under transition		
Lease fee	none	*under review*	fixed by Tax authority (no known rule)	no
Priority grid access	yes	*under review*	yes	yes
Grid connection costs	none	Devloper pays up to onshore junction pt. (for sites in ex-govt's plan, all costs paid by grid operator)	new users-no grid connection cost for electricity producer	Developer pays grid connection & transmission, but grid operator obliged to reinforce grid, if required, at his own cost
Decommissioning fund	yes (depends on distance from coast 20-25 k€ (experience to-date))	uncertain	possible pre-requisite	possible pre-requisite
Economics : incentives				
Direct subsidy	no	(not likely)		no
Tender	no	(likely)	yes (>12 MW)	no
Green certificates	min. price guarantee for certificates (9 €c/kWh)	(postponed indefinitely)	no	no
Feed-in tariff	no	(likely to be replaced - current tarrif for new turbines is 6.1€c/kWh for first 25,000h)	yes (<12MW) (~8 €c/kWh 1st 5 yrs; ~3-8 €c/kWh next 10 yrs)	yes (<3nm: 9€c/kWh yrs 0-5, 6.1€c/kWh yrs 6-20; >3nm&EEZ: 9€c/kWh yrs 0-9; 6.1€c/kWh yrs 10-20)
Preferential tax scheme	no	yes (offshore wind exempt from CO_2 & SO_2 taxes; Middelgrunden co-operative don't pay taxes on earnings)	no	no

	IRL	SW	NL	UK
Procedures				
Fixed procedure	yes	yes	*under review*	yes
One-stop shopping	no		uncertain	yes
Pre-selected sites	no (but certain areas prohibited)	no	uncertain	no
Economics : costs				
	to be reviewed after conclusion of current tendering scheme			
Lease fee	commercial rents (3800€/MW/yr or 2.5% gross revenue, whichever higher)	annual fee of approx. 150 €/year and per wind turbine	*under review*	commercial rents (2% gross revenue)
Priority grid access	predetermined capacity	guaranteed access for <1.5MW	grid connection not guaranteed	no
Grid connection costs	integrated into bid price for tender	paid by developer	paid by developer	paid by developer
Decommissioning fund	yes (case by case-bond agreed as part of lease negotiations - reviewed every 5 yrs)	yes-conditions & funds related to decommissioning agreed (case by case) at granting environmental permit (no advance payment required)	yes (developer to provide security for (non-negotiable) sum, determined by authorities)	yes (fund or bond - case by case basis - established as a condition to granting Lease)
Economics : incentives				
Direct subsidy	no	yes (<2003) (environmental bonus = 0.0195 €/kWh; For <200kW investment subsidy max. 15%; For <1.5MW, support of 0.98 € c/kWh)	yes (CO_2 reduction programme (19.2 M€ accorded to 48 wind projects Senter, 2002)).	yes (for demonstration projects). Max. £10 Mill (15.6M€) per project)
Tender	yes (15-yr power purchase agreement)	no	no	no
Green certificates	no	yes (> 2003)	yes (typically 2.3-2.8 €c/kWh)	yes (buy-out price of £30/MWh or 47€/MWh)
Feed-in tariff	No	no	no	no
Preferential tax scheme	no	no	yes (RES-E consumption exempt from energy tax (REB), portion of funds collected through REB recirculated to RES-E producers (1.94 €c/kWh in 2001))	yes (exemption from climate change levy - currently 4.3p/kWh (6.7€c/kWh)

Transparency in financial burden for project developer

The method applied by each member state for obtaining revenue may vary between different countries, and it may even arise that several methods exist in a single country. Some methods in existence are:

- royalties
- lease fees
- administrative handling costs
- cost charged for research required by the administrative services
- costs related to increased availability of emergency teams

In most countries, project developers do not have complete insight to these future costs at the outset of the investment. It is recommended that national governments clarify and justify these costs to potential project developers.

Anti-speculation clauses

Concession legislation should prevent early offshore wind developments being hindered or prevented by speculative concessions. This can be achieved by imposing deadlines – accompanied with penalties or loss of the concession – for follow-up action, for instance by requiring that the developer start building activities within a limited period of time after the required permissions have been granted.

Enhanced communication and public involvement

Public acceptance is highly project dependent, and is largely influenced by cultural and societal attitudes. Generally speaking, near shore wind energy has received moderate to strong public support in the few coastal areas where it has been applied or planned, and where surveys have been conducted.

A complete coverage of the horizon is generally considered as unacceptable; a very limited coverage of the range of vision is generally considered as very acceptable. A pragmatic rule has to be applied to find an acceptable equilibrium between the two extremes.

A particular case of interest for EU experiences is the Belgian one. With a short coast of 65 km, almost completely developed as tourist areas, Belgium may be considered as a particular case of a potentially vulnerable area, susceptible to negative public opinion. As part of the EIA procedure, a survey was done by the WES (West Flemish Economic Study Office) (contracted by the MUMM (Management Unit of the North Sea Mathematical Models, Belgium)) on the public perception of wind energy and near shore wind farms in Belgium. The results (depicted in Figure 3) show that 78.3% of the public display an attitude ranging from neutral to very positive. A significant difference in attitudes is seen to occur between the various categories: residents, commercial entrepreneurs and tourists. Residents were observed to have higher resistance, with more than 30% having a negative attitude towards near-shore wind developments.

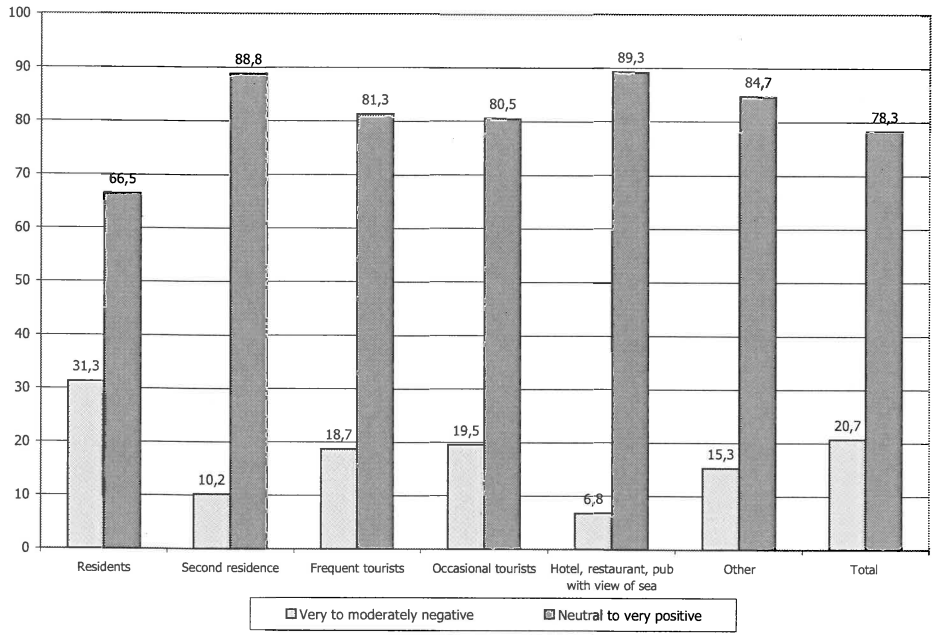

Figure 3: Results of survey performed in Belgium by WES on the public perception of near shore wind farms at 6 km from the shore

The MUMM has advised the imposition of a limit of 20% of the total horizon to be cumulatively covered by built structures, referenced from any arbitrary observation point from the coast (including neighbouring countries). In addition, to avoid the possibility of one project occupying the maximum allowable space, it is proposed to limit the occupation of a single project to a maximum of $1/9^{th}$ of the total horizon [MUMM, 2002]. This rule gives consideration to the negative reaction observed for 30% of coastal residents and for the minorities in other categories (see Figure 3), without completely blocking the development of near shore projects, for which a strong overall public support nonetheless exists.

It should be mentioned that the potential share of visible near-shore wind parks, in front of coastal tourist areas, will be small compared to the overall potential. Nonetheless, considering the relatively positive attitude observed in existing or planned projects, near shore windfarms in tourist areas should not be excluded de facto but investigated case by case, and limitative rules as described above can be used to limit the visual impact in an equitable manner based on local circumstances, available coastal zones, and their functions.

Public attitude is, to an important extent, determined by the level of public involvement in the project procedure and development. One can basically distinguish 3 extents of public involvement relevant to wind energy projects:

- Informing the public about developments
- Involving the public in decisions on developments
- Involving the public in the financial structure of developments

A strong involvement is often perceived as disadvantageous because public participation could slow down the decision-making process or may even expand the scope of possible conflicts. Nonetheless, a communication process, managed by an independent government-appointed party, has been demonstrated to be the most effective. This approach minimises the risk that one concerned interest group will monopolise the public debate and facilitates a more rational, multi-stakeholder decision process.

The 'Middelgrunden' project in Copenhagen can be considered as a primary reference case of public participation in offshore wind projects. This is described in the box below.

Box 4: Middelgrunden case study

Case study "Middelgrunden" [Soerensen, 2001]

In Denmark approximately 150 000 families are involved (through co-operatives) in wind energy projects, motivated by environmental concerns and/or the possibility of receiving some financial benefit. These co-operatives have played a crucial role in the development of wind energy in Denmark. Opinion surveys show that at least 70% of the Danish population are in favour of wind energy, and only 5% against.

In the particular case of Middelgrunden, the project consists of 20 x 2MW BONUS turbines, 50% of them owned by the Middelgrunden wind turbine co-operative. The co-operative consists of 8500 members based primarily in the local region, in the vicinity of the wind park. Each member typically has an investment of 2 850 €, corresponding to a production of 5000 kWh/year.

Through dialogue with various interest groups, the Copenhagen Environment and Energy Office and the Middelgrunden wind turbine co-operation of 8500 members has generated widespread social acceptance of the wind farm. Locally based commitment, and co-operation between the co-operative, the local utility, and the municipality of Copenhagen, has been a significant pre-condition for the successful development of the project. In addition, it is worth noting that the application of the Espoo Convention (Convention on Environmental Impact Assessment in a Transboundary Context) – requiring a.o. consultation with the relevant Swedish authorities – was central to the final approval of the project. This approach has given the project credibility with politicians, the press, and the general public.

Burden sharing for grid connection

Although most countries have no adapted rules, it can be argued that the grid connection to major offshore wind sites should be financed partially or completely by the grid operator, to the extent that it can be considered as an enhancement of the overall supply system and not solely a measure that is of benefit to the producer.

In a few countries co-financing or full financing of grid connection by the grid operator is available.

An optimised approach for second generation larger scale developments at European level is highly recommended (see 0).

Allowances for innovation in technology

In some countries, project developers are obliged to specify the commercial choice for turbines in the application for lease or domain concession. Given the relatively long lead times between concession demand and actual building activities, some allowance should be made to enable integration of the most recent technology, given that unit size is increasing at a fast pace. Legislation should allow for technology innovation.

Securing pioneering risks

Financial regulations for first generation technologies should secure investments to cover for pioneering risks. In so doing, investments are assured a guaranteed ROI for the first generation of projects. Both fixed feed-in tariffs and green certificates, implemented in a secured environment, have been shown to attract the required investments when combined with civil power purchase contracts for typically 15 to 20 years. For first generation technology, located at sites exposed to harsh wind and wave climate, these prices could be as much as 8 – 9 € cents/kWh. For less exposed sites, a typical value is 5 € cents/kWh.

Risk Hedging Schemes

Financing of offshore wind parks is impossible without full insurance coverage.

Commercial insurances applicable to offshore wind projects are:

- Construction All Risks (CAR): insurance for risks during the construction phase – for material damage to the physical construction and wind turbines, as well as for liability to third parties, including losses as a consequence of construction delays due to the above-mentioned covered risks ('Advanced loss of profit 'ALOP')
- All Risks of Machinery Breakdown : insurance for material damage to the wind park, including the coverage of income loss due to damage to the installation caused by the above-mentioned covered material damage (Loss of profit due to Business Interruption)
- Liability insurances: extra-contractual liability, liability for accidental environmental damage, etc.

Most project developers confront significant barriers with respect to obtaining insurances, due in large part to a lack of references or other appropriate bases for risk assessment. Risks can be both 'internal risks' (i.e. cable failure, blade breakage, etc.) and 'external risks' (lightning, wind gusts, or shipping accidents).

One sector that may be considered to have similar types of risks is the offshore oil and gas exploitation sector. Companies have set up their own risk hedging funds ('self insurance' techniques) and, as such, insure the risks of exploitation internally. Although the risks for offshore wind energy are similar, being a new sector, it does not have a similar "retention capacity"- that is, it is less capable of carrying such risks for the time being.

On a purely private basis the pooling of insurance companies for the purpose of creating risk hedging schemes is difficult due to the high establishment costs involved and a lack of EU harmonisation. For the first 'wave' of developments, the public sector could play an important role by initiating risk hedging schemes in association with insurance companies – as is currently done for mature sectors such as shipping and air-traffic.

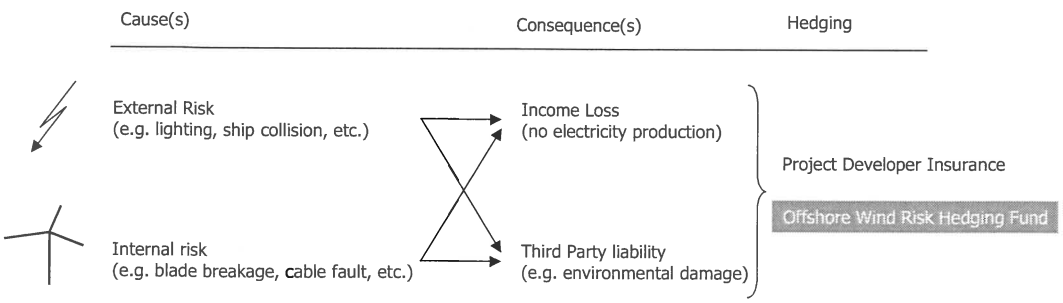

Figure 4: Offshore Wind Risk Hedging Fund

Monitoring requirements

Extensive monitoring of all aspects is recommended. Furthermore, English summaries of the results would greatly enhance European information exchange.

Decommissioning and rehabilitation guarantees

Financial guarantees have to be foreseen for the demolition stage as well as for the restoration of the site.

The following paragraphs aim to indicate policy requirements (both new policy and strengthening of existing policy) on international, European and international levels. Due to the length of implementation time, and in view of the speed of project developments, the initiatives proposed require immediate action.

6 New policy requirements

6.1 Standards in Environmental Impact Assessment

Wind energy developers should take a pro-active role in minimising potentially significant environmental impact – both by supporting research to rationalise and get insight into effects and by developing methods to control, reduce or avoid impacts.

Scientific evidence is clearly lacking for many aspects related to environmental impact. In many cases the information available is not sufficient to enable authorities to clearly distinguish and compare between those factors which justify the blocking of projects, and other factors where the impact can be positive, or turned positive by implementation of precautionary measures. Technological solutions have been developed for many of the identifiable potential impacts, however these have associated costs.

Although scientific evidence on the local environmental effects is limited, the environmental and socio-economic impact of offshore wind energy is far better than conventional energy production considering its absence of polluting emissions, its renewable nature and its contribution to the reduction of the energy dependence of the EU.

Experiences from extensive monitoring of the first offshore wind farms should be optimally used for assessing the impact of offshore windfarms, and for giving a firm scientific basis for future assessment of projects.

In adhering to the precautionary principle, governments can (and tend to) impose many, sometimes severe, environmental and safety guarantees on areas for offshore wind development. Governments have the option to approve first generation projects, awaiting further scientific evidence, and – as part of the precautionary principle – impose measures defining the course to be taken in implementing the proposed project, such as support in research and monitoring activities (refer to Box 5).

The following recommendations can be made in this respect:

- Establishment of an EU-wide scientific monitoring 'council', to ensure thorough exchange of experiences and results from monitoring activities, impact assessment (including the associated costs for both assessment and monitoring), and the outcome of mitigating measures.
- Incorporation of results for the development of appropriate policy for impact assessment, monitoring procedures and development of mitigating measures.
- Availability of executive summaries in English in (public) national monitoring reports so as to facilitate EU-wide dissemination of results.

Box 5: Application of the precautionary principle

The EC Communication (COM (2000)1) [EC, 2000] entitled 'Communication of the Commission on the precautionary principle' states that:

"When action without awaiting further scientific information seems to be the appropriate response to the risk in application of the precautionary principle, a decision still has to be taken as to the nature of this action. Besides the adoption of legal instruments subject to review by the courts, there are a whole raft of measures for decision-makers to choose from (funding of a research programme, informing the public as to the adverse effects of a product or procedure, etc.)..."

6.2 EU offshore electric grid

There is a complete absence of electrical transmission infrastructure in the North Sea or anywhere in the North Atlantic. The situation is similar to that experienced in the natural gas sector at the time of the discovery of commercial quantities of the resource in the North Sea, before the construction of pipelines to EU consumption centres.

Evidently, the size of the offshore windfarms will increase progressively with time as more experience is gained in the field. In autumn 2002, 160 MW has been put into operation in the North Sea of the Danish Coast. Permission has been granted to construct a 520 MW offshore windfarm in Ireland, where construction is expected to start in 2003. Offshore wind energy exploitation is clearly moving beyond embedded generation towards large-scale power generation.

Onshore grids are inadequate for large-scale transmission and distribution of renewably generated electricity from the North Sea. Grid infrastructure will need to be adapted accordingly. Rational offshore wind deployment requires an adapted and optimised grid infrastructure.

In any large scale offshore wind scenario, the cable may be carrying more electricity than can be absorbed by regional coastal markets, and therefore multi-market access via high consumption areas is unavoidable in such a scenario.

A European optimised grid infrastructure is therefore recommended. A first proposal for an offshore wind electrical infrastructure is the 'Sea Electric Superhighway' [O'Connor, 2001]. The proposed infrastructure comprises an estimated length of 11 000 km, at an estimated cost of 10 billion €.

The added value clearly goes beyond the offshore wind energy sector itself, when one considers that large consumption areas such as London, Rotterdam, Bremen, Esbjerg, would be electrically interconnected.

An indicative scheme is presented in Figure 5.

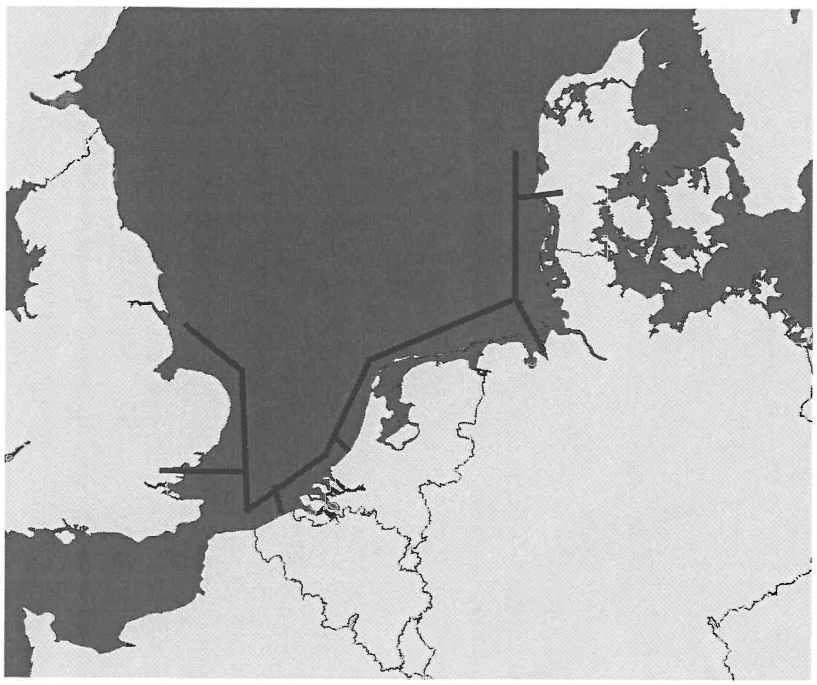

Figure 5: First stage 'Seas Electric Superhighway'; the numbers indicate envisaged and/or realised offshore windfarms corresponding to Figure 1 and Table 1.

It is worth noting that, while gas infrastructure is built only for a few decades, that is, as long as the reserves are expected to last, the infrastructure for offshore wind – a renewable and thus inexhaustible resource – may be rationalised to serve for as long as there is interest in its exploitation.

6.3 Research, Development and Demonstration

6.3.1 Introduction

The final objective of offshore wind developments is to contribute to a secured energy supply for the EU, at low environmental impact and at acceptable costs. Strong public commitment is needed to make the step from current first generation technology to dedicated and commercially proven technology.

The European Commission has supported wind energy demonstration projects since 1983. Focus in the public programmes has shifted from small size turbines to multi-MW turbines and first demonstration offshore wind farms as indicated in Table 13. A complete list of offshore wind demonstration projects co-financed by the European Commission is added in Annex 1.

Table 13: European Commission demonstration programmes for wind energy, and offshore wind evolution [Kotronaros, 2001]

Programme and period	Main Topics	Budget allocated to wind energy (M€)
DEMO 1983 – 1989	Development of small size prototypes First offshore projects and MW-turbines	45,8
THERMIE 1990 - 1994	The first wind farms Development of large size prototypes	34,2
IVth Framework Programme	Wind farms and offshore projects, addressing grid connection, non-conventional siting, environmental and cost reduction issues	31,3
Vth Framework Programme	Large offshore wind installations Multi-MW wind turbines	32,1

Very large-scale implementation of wind power offshore will not be possible without parallel continuous research, development and demonstration supporting efforts. Research needs can be identified for the short-, mid- and long terms. The International Energy Agency (IEA) has published a paper in 2001 in which the long-term research and development needs for wind energy for the time frame 2000 – 2020 have been discussed [IEA, 2001]. In the paper, the reasons for continuing research were linked to the goal of achieving a substantial coverage of the world's energy demand by wind power. This would require serious efforts for achieving: improved technology of turbines and windfarms, grid connection and grid control, increased social acceptability, and enhanced economics of wind power in a liberalised market. In addition to the long-term needs there is a need for short to mid-term research, primarily in the interest of utilities, and manufacturing industries, and to some extent, in the interest of society. EWEA experts were involved in the preparatory work of the IEA and are supportive of the recommendations.

The IEA paper identifies four main reasons for increasing efforts related to offshore wind R&D work:

- Increase the value of wind power and reduce uncertainties
- Continue cost reductions
- Enable large-scale use
- Minimise environmental impacts

Specific research needs for offshore wind energy will now be briefly discussed with respect to these four categories. This list of the research topics does not seek to be fully exhaustive.

6.3.2 Increase the value and reduce the uncertainties of offshore generated wind electricity

Forecasting power performance

The value of offshore wind power will increase if reliable predictions of the power output can be made for different time scales, for instance for 6 to 48 hours in advance. For this purpose, the currently available prediction models need to be significantly improved to enable them to be used effectively for offshore-generated wind power.

Development of storage techniques

Effective methods of electricity storage, integrated into windpower installations, ensure a more predictable power output and could enhance the value of the produced electricity. Different storage techniques for various time scales need to be further developed.

Reduce the uncertainty in output estimations

R&D efforts to improve methods for wind regime determination at locations far offshore and at sufficiently high altitudes (~ 100 m) need to be done in order to reduce the uncertainty in energy output estimations. Furthermore, the know-how on wind turbine wake effects offshore needs to be improved, so as to enhance the accuracy of output estimations. Some work on these issues has already been conducted in the frame of the EC-supported project ENDOW, and efforts should be made to ensure efficient use of the results [ENDOW, 2001].

6.3.3 Continue cost reductions

Improved site assessment offshore

R&D efforts are needed to improve the understanding of the environmental conditions specific to offshore areas, in particular as concerns extreme winds and waves. Better estimation and assessment methods for environmental conditions will enable manufacturers to design site-specific offshore wind power systems to produce energy in a more cost-effective and reliable way. Development of cost-effective wind measurement techniques for high altitude at sea is needed.

Better models for aerodynamics, aeroelasticity and load calculations

In view of the large size of offshore machines and their potential stability problems, better methods are needed for predicting 3D aerodynamic behaviour and aeroelastic stability so as to allow accurate load calculation. These improved aeroelastic models and load-calculation methods for large rotating structures are essential for the development of optimised machines for offshore application.

New intelligent structures and materials

R&D efforts are needed to design cheap and effective structural solutions adapted to offshore transportation, installation and operation requirements. Operation in the marine environment – and care for the environment regarding disposal of used materials - require further research into appropriate materials for use.

More adequate and efficient electrical conversion systems

R&D is needed to further develop direct driven generators in order to reduce their weight and cost. Furthermore combined solutions need to be found for offshore electricity generation and transmission systems that can also achieve adaptable power factors and high power quality.

New concepts

In the short term R&D efforts will mainly focus on developing modified onshore designs. In the long term, and in view of far offshore, dedicated integrated designs need to be developed, incorporating solutions for support structure, cheap transportation to the site, and easy installation and access for O&M.

Development of condition monitoring techniques for components such as blade bearings and generation could reduce O&M costs.

In view of the high impact of support structures on the cost, novel concepts (e.g. floating structures) need to be developed.

Dedicated offshore wind power systems require an integrated design approach and very high reliability in all phases of deployment.

6.3.4 Enable large scale use

Because the contribution from offshore wind energy is expected to be significant on the local and national levels, special demands will be put on the transmission grid.

Combined technologies for generation (a.o. power control of wind farms) and transport of large amounts of electricity will have to incorporate innovations in automatic load flow controls, adaptive loads and demand side management. Extensive use of high-capacity power devices in national networks for HVDC links will also be required.

6.3.5 Minimise environmental impacts and risk

Public attitudes towards wind energy and the influence of visual impact have to be incorporated in the process of deployment of windfarms near the shores. Understanding of noise generation mechanisms and transportation of noise over large distances is essential. Challenges offshore are related to the acoustically hard water surface.

Potential negative effects of offshore wind power installations on the marine environment need to be carefully investigated in order to enable the design of environmentally friendly siting, installation and O&M methods.

Moreover, specific safety issues must be further investigated – in particular, how to cope with catastrophic risks such as lightning strikes, and collisions with drifting ships.

6.3.6 Other issues

In addition, synergies with other uses could be investigated:

- Artificial reefs and fauna
- Offshore fish and shell fish farming
- Wave energy production

6.4 Harmonised procedures for areas beyond national jurisdiction of coastal states[102]

6.4.1 Introduction

Offshore wind energy exploitation beyond national jurisdiction, in a legal sense, means exploitation either beyond the exclusive economic zone (EEZ) or beyond the continental shelf (CS) of a coastal state or beyond its territorial sea, in the case where the coastal state has not yet proclaimed an exclusive economic zone or has no continental shelf. In such cases, the exploitation takes place on the high seas.

The United Nations Law of the Sea Convention 1982 (LOSC) accords to all states the same freedoms of the high seas. These freedoms comprise freedom of navigation, freedom of overflight, freedom to lay submarine cables and pipelines, freedom to construct artificial islands and other installations, freedom of scientific research and freedom of fishing (article 87, LOSC). Since there is freedom to construct installations on the high seas, having due regard to the other freedoms of the high seas, no coastal state is empowered to regulate the construction of those installations, e.g. offshore windfarms. There are however two practical obstacles. Firstly, in most cases, the high seas would not be suitable for the installation of offshore windfarms due to the sea depth, and taking into account that most coastal

[102] Based on Maes (1997) and Personnel communications with Prof. Dr. F. Maes, Ghent University

states have a territorial sea and a CS and/or an EEZ. Secondly, electricity from offshore wind installations would have to be transmitted to land trough the CS or/and EEZ of a coastal state. In any case a coastal state or several coastal states would be involved indirectly in the construction of offshore windfarms on the high seas. It is therefore more important to concentrate on the CS and EEZ regimes.

Exploitation of wind energy beyond national jurisdiction of coastal states cannot be considered as an exploitation of minerals of the Area. The Area is the sea-bed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction (article 1, 1 (1), LOSC) for which the LOSC has established a separate regime (part XI, LOSC). This regime, however, covers only the exploitation of minerals, called "resources" and meaning "all solid, liquid or gaseous mineral resources in situ in the Area at or beneath the sea-bed, including polymetallic nodules" (article 133, LOSC). Offshore wind energy is not covered in the scope of these Area provisions.

6.4.2 Offshore wind exploitation on the continental shelf and in the exclusive economic zone of a coastal state

Since exploitation of the CS focuses primarily on exploitation of non-living natural resources of the sea-bed and subsoil of the shelf (article 77, LOSC), offshore wind energy cannot be considered as exploitation of the CS itself. Nevertheless, wind energy installations would be fixed to the seabed or subsoil of the CS, occupying some parts of the CS, although not involving actual exploitation of continental shelf resources. According to art. 80 of the LOSC, by reference to article 60 of the LOSC, such wind energy installations on the CS fall within the exclusive competence and the exclusive jurisdiction of the coastal state. Article 80 is related to the CS and introduces a regime comparable with the one for installations and structures in the EEZ. Article 80 does not relate solely to installations and structures intended for the exploitation of the CS, but deals with any structure or installation situated on the CS, for whatever purpose. The LOSC does not link article 80 to article 77, although article 80 is part of the CS regime (Part VI, LOSC). Furthermore article 60 LOSC concerning the EEZ, refers to article 56 on the rights, jurisdiction and duties of coastal states in the EEZ. One of those rights is the sovereign right and jurisdiction of a coastal state to establish and use inter alia installations and structures for the production of energy from currents and wind, which is regarded as an economic exploitation of the EEZ (article 56, LOSC). It can therefore be concluded that the rights of a coastal state to regulate installations and structures for offshore wind exploitation do not differ if those installations and structures are situated on its CS or in its EEZ.

6.4.3 Offshore wind exploitation on the continental shelf and in the exclusive economic zone and the rights of third states

In the case where a coastal state has not proclaimed an EEZ but is entitled to a CS, the waters above the CS have to be considered as high seas (art. 78, LOSC). The LOSC accords to all states the same freedoms of the high seas. These freedoms comprise freedom of navigation, freedom of overflight, freedom to lay submarine cables and pipelines, freedom to construct artificial islands and other installations, freedom of scientific research and freedom of fishing (article 87, LOSC). The latter freedom is subject to section 2 on the conservation and management of the living resources of the high seas. The former freedoms, with the exception of the freedoms of navigation and overflight, are subject to the rights of coastal states on their CS. In the CS and EEZ there is a special regime to conduct marine scientific research in the sense that there is no absolute freedom for third states to conduct scientific research. For this research the consent of the coastal states is required (article 246, LOSC). Although a coastal state cannot impede the laying of cables and pipelines on its CS by third states, this freedom for third states is a limited freedom. In all cases the delineation of the course of pipelines is subject to the consent of the coastal states. This is not the case with cables (art. 79, 3, LOSC). If cables and pipelines enter the territory or territorial sea of the coastal state, or are used for the exploitation of the CS, or if cables are used e.g. for wind energy installations on the CS or in the EEZ, they will fall under the jurisdiction of the coastal state. Under these circumstances, the coastal state is empowered to determine the conditions. These conditions are not specified and can relate to the laying of cables itself, or the materials used (see art. 79, 4, LOSC). Finally the coastal state may subject the laying of cables and pipelines i.a. to reasonable measures for the exploitation of the CS (art. 79, 2, LOSC), of which offshore wind exploitation is one example. Simply stated, the latter is the principle of first come first served.

Due to the sui generis nature of the EEZ, and the obligation of the coastal state to protect and preserve the marine environment (art. 56, 1, b (iii)), the freedom of other states to fish in the EEZ depends on the conservation and utilisation measures taken by the coastal state (determination of allowable catch, promoting optimum utilisation, regulation of the exploitation of marine mammals) (arts. 61, 62 and 65,

LOSC) and also takes into account a positive discrimination in favour of fishing fleets of land-locked states and geographically disadvantaged states (art. 69 and 70, LOSC). Furthermore, states that have concluded fishery agreements will have to respect those agreements. In this case, wind installations may not result in an infringement of states' fishing rights, as granted under those agreements.

Concerning shipping and overflight, third states are empowered to full rights to navigate in the EEZ and to flight over the EEZ. These two activities cannot be restricted by the coastal state. However they can be subjected to the rights and duties of the coastal state to protect the marine environment (see Part XII, LOSC). The latter will relate mainly to the implementation of international obligations by coastal states or where vessels do not comply with internationally agreed standards, rules, recommended practices and procedure (see also article 58, 3, LOSC). The majority of these international rules, standards etc. towards shipping have been accepted within the International Maritime Organisation (IMO).

For the exploitation of offshore wind energy on the CS or in the EEZ, there is one exploitation limitation for coastal states. Due to the freedom of shipping and for the sake of safety of shipping, international shipping routes have been either accepted by the IMO or indicated on charts by coastal states. If vessels, for safety purposes, have no other option but to navigate in those shipping routes, these shipping routes are excluded as sites for offshore wind energy (for shipping routes see the nautical charts and the Ships' Routing Manual of the IMO). Furthermore offshore wind exploitation is not allowed in cases where wind energy installations would interfere with the use of recognised sea-lanes needed to navigate through the EEZ of the coastal state.

6.4.4 Offshore wind exploitation on the continental shelf and in the exclusive economic zone and the duties of coastal states

The coastal state shall give due notice of offshore wind installations, as a warning to others of their presence at sea (art. 60, 3, LOSC). Due notice must also be given with respect to their related safety zones. The coastal state can establish reasonable safety zones around the wind installations to ensure the safety of navigation and the safety of those installations. The zone may not exceed 500 meters around the wind energy installation, unless a larger safety zone is allowed by generally accepted international standards or recommended by the IMO (see article 60, 5, LOSC). To-date, there are no such larger safety zones accepted for windmills.

Once the offshore wind energy production has ceased, the installations must be removed from the seabed (art. 60, 3, LOSC). Article 60 LOSC allows for partial removal as far as the safety of navigation and of fishing is ensured. However, to ensure safety of navigation the IMO is empowered by article 60 to establish generally accepted standards in relation to removal requirements.

Furthermore, other international organisations – either universal (London Convention (LC)) or regional (e.g. OSPAR 1992, Helsinki 1992) – have approved rules related to the removal of installations at sea after they have been abandoned. The London Convention (LC) regulates "dumping at sea", and abandoned wind energy installations are considered as "dumping" for the purpose of the 1996 Protocol to the LC. Dumping of such installations is prohibited, wherever this dumping takes place at sea (article 1 (4)(1), 2 & 4, article (1), 1 and Annex 1, LC) – whether by deliberate disposal or dumping of the installations from vessels, or by the abandonment or toppling off of the installation on-site for its deliberate disposal. The same prohibition applies on a regional level, for example in the North-East Atlantic Ocean and in the Baltic Sea. The issue of toppling off and removal for the purpose of safety of navigation is regulated by IMO Resolution A.672(16) of 6 December 1989 "Guidelines and Standards for the Removal of Offshore Installations on the Continental Shelf and in the Exclusive Economic Zone". New installations, placed on the CS of EEZ after 1 January 1998, should be completely removed after use or abandonment. Installations placed before 1998, in a water depth of less than 75 metres and with a superstructure of more than 4,000 tons, must also be completely removed.

Figure 6: Indicative landforms and national jurisdiction; existing national claims indicated in grey [Based on World Conservation Union (IUCN) 2001]

PART 4 - Acknowledgements, References, Annexes

1 Acknowledgements

This work has been realised with major input and support from national experts, project developers and governmental departments in charge of offshore wind.

The chapters on national offshore wind policy have been reviewed by national experts listed in Table 14. The chapter on policy recommendation has been realised thanks to strong interaction with project developers and members of the EWEA task force on offshore wind (

Table 15).

Table 14: National governmental experts

Country	Institute	Name
Belgium	Ministerie Economische Zaken - Bestuur Energie Kabinet van Staatssecretaris voor Energie en Duurzame Ontwikkeling	Ioana Balasoiu Henri Autrique
Denmark	Danish Energy Agency (DEA)	Jürgen Lemming
France	Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME) (Centre de Valbonne) Secrétariat Général de la Mer	Pascal Berlu Christophe Le Visage
Germany	Federal Ministry for Environment, Nature Protection and Nuclear Safety	Cornelia Viertl
Ireland	Department of Communications, Marine and Natural Resources Department of Public Enterprise	Tom Burke Eugene Dillon
Sweden	Swedish Energy Agency	Susann Persson
The Netherlands	NOVEM	Ruud de Bruijne

Table 15: Contributing experts and members of EWEA task force Offshore Wind

Name	Affiliation
F. Van Hulle	3E
V. Mézille	3E
E. O'Connor	Airtricity
P. Walsh	Airtricity
B. Goossens	Aon Belgium
S. Krohn	Danish Wind Industry Association
C. Kjaer	Danish Wind Industry Association
R. Lilly	Department of Trade and Industry (DTI)
T. Draebye	DRAEBYE consulting and management
J. Beurskens	Energieonderzoek Centrum Nederland (ECN)
O. Stobbe	Ecofys, Germany
R. Vanderborght	Ecofys, The Netherlands
E. Van Zuylen	Ecofys, The Netherlands
A. Zervos	National Technical University of Athens
B. Macguire	Scottish Executive
L. Thompson	Scottish Executive
F. Maes	University of Ghent, Department of International Public Law
L. Deckers	Vlaamse Reguleringsinstantie voor de Elektriciteits- en Gasmarkt (VREG)

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Charts and Maps:

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- For charts see with designated habitat areas see www.mumm.ac.be/EN/Management/Atlas/habitatramsar.php
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6. Ministère de l'Aménagement du territoire et de l'Environnement (Direction des études économiques et de l'évaluation environnementale) and Ministère de l'Economie et des Finances et de l'Industrie (Direction Générale de l'Energie et des Matières Premières (DGEMP)) (2002*) Rapport du groupe de travail sur la rationalisation et la simplification des procédures applicables aux producteurs d'électricité à partir de sources d'énergie renouvelables* (3 April 2002). Available at www.ladocumentationfrancaise.fr/brp/notices/024000222.shtml
7. Journal Officiel de la République Française, n° 143 du 22/06/2001 page 9889 à 9891 *Arrêté du 8 juin 2001 fixant les conditions d'achat de l'électricité produite par les installations utilisant l'énergie mécanique du vent telles que visées à l'article 2 (2o) du décret no 2000-1196 du 6 décembre 2000.*

Available at: http://admi.net/jo/2001/09889.html (general web page of Journal Officiel de la République Française http://www.adminet.com/jo/#page)

8. www.quid.fr gives a geographical description of France
9. http://www.legifrance.gouv.fr/html/images/boite-haut.gif

3.5 Ireland

3.5.1 General references and publications

1. Commission for Energy Regulation. General website www.cer.ie
2. Department of Communications, Marine and Natural Resources (2001) *Offshore Electricity Generating Stations – Note for Intending Developers*, available at http://marine.gov.ie/files/WINDFARM.zip (General website www.marine.gov.ie)
3. Department of Communications, Marine and Natural Resources. Personal communications with Tom Burke, Coastal Zone Administration Division (1 July 2001).
4. Electricity Supply Board (ESB) (1998) *Process for Connection of a Power Station to ESB's Transmission System* www.esb.ie/main/about_esb/grid_process.jsp
5. Sustainable Energy Ireland (formerly Irish Energy Centre) *Wind Energy Fact Sheet – last updated 12 December 2001*, available at www.irish-energy.ie/abouten/downloads/wind_general.zip
6. Personal communication with Pamela Walsh (24 June 2002), Airtricity.

3.5.2 Other Sources of Information

Legislation:

- Department of Communications, Marine and Natural Resources Foreshore Acts, 1933 to 1998. Report by the Minister for the Marine and Natural Resources for the year ended 31st December 2001 (PN 11129). Available at: http://marine.gov.ie/files/Report%202001.pdf.pdf
- Electricity Regulation Act, 1999 www.cer.ie/legislation.htm#act

General Information:

- Department of Communications, Marine and Natural Resources, Renewable Energy Division. General website: www.dpe.ie/energy
- Electricity Supply Board (ESB), general website: http://www.esb.ie/main/home/index.jsp
- Information on the terms and conditions for connection to the ESB Transmission Network may be obtained from connections@ngrid.ie . Details of the terms and conditions for connection to the ESB Distribution Network are available from dsocommercial@mail.esb.ie .
- Information on the foreshore licences required is available at www.marine.gov.ie
- Sustainable Energy Ireland, general website: www.irish-energy.ie

3.6 The Netherlands

3.6.1 General references and publications

1. Ecofys n.v. (2001) *Electricity from Renewable Energy Sources in the Netherlands : Current Status and Prospects* (August 2001)
2. Ministry of Housing, Spatial Planning and the environment www.vrom.nl
3. Palmers, G., Shaw, S. 'Pricing Mechanisms for Offshore Wind Electricity in EU Member States' Paper presented at the occasion of the EWEA Special Topic Conference in Offshore Wind Energy. 10-12 December 2001, Brussels, Belgium.
4. www.waterland.net for information on activities related to the functional and economic use of various water resources in the Netherlands.

3.7 Sweden

3.7.1 General references and publications

1. Boverket med stöd av Energimyndigheten, Naturvårdsverket och Riksantikvarieämbetet (2001) *Handbok för lokalisering av vindkraftverk, remissmaterial* (Handbook on the siting of wind turbines), 2001-12-14 (Boverket)
2. Swedish Energy Agency *Elcertifikat – En reform för miljön och framtiden*, for information on the electricity certificates system and quota. Available at: http://www6.stem.se/web/aktuellt.nsf/FilAtkomst/folder.pdf/$FILE/folder.pdf?OpenElement
3. Personal Communication (e-mail) with Göran Dalén (13 August 2002), Airicole.
4. www.sverigedirekt.se (in Swedish, general information in English). Official internet portal for information on the Swedish public sector. Provides, amongst other things, access to databases on laws in force.

3.8 United Kingdom

3.8.1 General references and publications

1. Centre for Environment, Fisheries and Aquaculture Science (CEFAS) Guidance Note for Offshore Windfarms for Environmental Impact Assessment relating to FEPA and CPA, downloadable from the CEFAS web site at: www.cefas.co.uk/publications/Windfarm-guidance.pdf
2. Crown Estate website: www.crownestate.co.uk. For maps of proposed offshore wind farm locations see www.crownestate.co.uk/estates/marine/windfarms/wfmap.shtml
3. Department of Environment, Food and Rural Affairs (DEFRA), general website: www.defra.gov.uk
4. DEFRA (2000) Quality Status Report of the Marine and Coastal Areas of the Irish Sea and the Bristol Channel 2000 available on the DEFRA website http://www.defra.gov.uk/environment/marine/quality/index.htm
5. DTI (2000) An assessment of the environmental effects of offshore wind farms (ETSU W/35/00543/REP) www.dti.gov.uk/renewable
6. DTI (2000) Guidance on the Electricity works (Environmental Impact Assessment) (England and Wales) Regulations 2000. www.dti.gov.uk/energy/guidancenotes.pdf
7. DTI (2000) New and Renewable Energy: prospects for the 21st century 'The Renewables Obligation Preliminary Consultation'. DTI, October 2000. Available at www.dti.gov.uk/renew/ropc.pdf
8. DTI (2001) Draft Guidance Notes Offshore Wind farm Consents Process. DTI Offshore Renewables Consents Unit (Version October 2001)
9. DTI website www.dti.gov.uk . See also renewables section: www.dti.gov.uk/renewable and the energy section
10. DTI websites: www.dti.gov.uk/renew/eoi.htm for details of the Capital Grants scheme and application details, and www.dti.gov.uk/renew/guidance.pdf for guidance notes related to the Capital Grants scheme
11. English Nature. Government agency active in the conservation of wildlife and geology throughout England. General website: www.english-nature.org.uk
12. Office of the Deputy Prime Minister (ODPM) websites: www.planning.odpm.gov.uk provides details and principles regarding planning policy and www.planning.odpm.gov.uk/twa92/index.htm provides a guide to TWA procedures
13. www.crownestate.co.uk/estates/marine/windfarms.shtml (the Crown Estate) and www.britishwindenergy.co.uk (British Wind Energy Association) provide an explanation of the conditions and procedure involved in the Crown Estate Agreement for Lease and Terms of Lease for the first round of offshore wind farms
14. www.dtic.mil/whs/directives/corres/20051m_040201/united_kingdom1final.doc for details of the delineation of British maritime zones
15. www.parliament.uk. General website of UK Parliament.

3.8.2 Useful contacts and sources of information

- The DTI plays a central role in offshore windfarm development. The Offshore Renewables Consents Unit (ORCU) of DTI was established to play a co-ordinating role and act as a "one stop shop" under the proposed arrangements.

  Department of Trade and Industry
  Offshore Renewables Consents Unit
  1 Victoria Street, London, SW1H 0ET
  Tel. 020 7215 0114; Fax. 020 7215 2601

- In Scotland the consents process for offshore windfarm development is managed by the Consents and Emergency Planning Unit (CEPU). Further information can be obtained from:

  Lesley Thomson
  Scottish Executive, Consents and Emergency Planning Unit
  2nd Floor, Meridian Court, 5 Cadogan Street, Glasgow
  Email: lesley.thomson@scotland.gsi.gov.uk

4 Annexes

Annex 1: Offshore wind projects supported by the European Commission

Table 16: Offshore wind projects supported by the European Commission [Kotronaros, 2001]

Project Name	Aim	Characteristics
Vindeby – Loland, DK	Demo of technical and financial viability of full scale offshore project	4,95 MW (11 x 450 kW BONUS) Contract date : 1987 Start operation : 1991 Distance shore : 1,5 – 3 km Total cost : 76,2 MDkr EC Support : 875 k€
Lelywind, NL	Demo of offshore in NL and monopile foundations	2 MW (2 x 500 kW NEDWIND) Contract date : 1988 Start operation 1996 Total Cost : 3,7 M NLG EC Support : 1,26 M€ Distance shore : 1 km Water Depth : 11 m
Bockstigen, Gotland (SW)	Demo of techniques to reduce cost and special controller to avoid grid strengthening	2,5 MW (5 x 500 kW Wind World) Contract date : 1996 Start operation : 1998 Total Cost : 3,7 M€ EC support : 1,136 M€ Distance shore : 3 km Water depth : 5,5 – 6,4 m
Blyth, UK	WEC installation in severe wave foundations on rock	2 x 1,8 MW VESTAS Contract date : 1995 Start operation : 2000 Total Cost : 2,737 k€ EC Support : 958 k€ Distance shore : 1 km Water depth : 10 m

Scroby Sands	Definition of technical requirements for offshore wind farms on sand banks in tidal environment for large wind turbines	37,5 MW (25 x 1,5 MW) Contract date : 1997 Start operation : - Total Cost : 50,857 M€ EC Support : 1,444 M€ Distance from shore : 3 km Water depth : 2 to 8 m
Gotland (SW)	Large scale demo of offshore wind farm using MW turbines, innovative installation techniques and contracting methods to achieve a production cost of 0,044€/kWh	42 MW (21 x 2MW NEG-MICON) Total Cost : 55 M€ EC Support : 5 M€
Nhoyle (North Wales, UK)	Large scale demo of offshore wind farm using MW turbines, wind turbine and foundation commissioning in port, installed in one piece	30 MW (12 x 2,5 MW BONUS) Total Cost : 50 M€ EC Support : 2,153 M€ Distance from shore : 10 km Water depth : 15 m
Other offshore related projects	- Development of a 5 MW wind turbine of ENERCON for offshore use - - Development of optimal cost effective mono-pile foundation for deep water - A concerted action on offshore wind energy - Legal and public acceptance	

Annex 2: Claimed Exclusive Economic Zone (EEZ) Areas of some European Union (EU) Member States

Table 17 Claimed EEZ areas of some EU Member States
(Data Source: The Global Maritime Boundaries Database (GMBD) Data Provider: Vlaams Instituut voor de Zee vzw (VLIZ) (Flanders Marine Institute) - World Resources Institute)

Country	EEZ Area (2000) (km^2)
Denmark	80419
France	706443
Germany	37438
Sweden	73166
United Kingdom	942500

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