

**ASSESSMENT OF THE EFFECTS OF  
NOISE AND VIBRATION FROM  
OFFSHORE WIND FARMS ON MARINE  
WILDLIFE**

**APPENDIX D**

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Description of the Projects and Studies Database for Phase 3 of the Assessment of the Effects of  
Noise and Vibration from Offshore Wind Farms on Marine Wildlife

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## **2 PROJECTS AND RELEVANT STUDIES DATABASE**

### **2.1 Introduction**

The purpose of this database is to create an inventory of planned and ongoing projects and studies that are directly relevant, or complementary, to the assessment of the effects of offshore wind farms on marine wildlife. The projects that are detailed in this database are offshore wind farm sites under consideration, under development and commissioned. The studies include planned, underway and ongoing studies that are significant to offshore wind farm development.

### **2.2 About the database**

This database has been created using Microsoft Access 97. It has been produced exclusively for the report entitled ‘Assessment of the Effects of Noise and Vibration from Offshore Wind Farms on Marine Wildlife’. The database is based on two main tables, Projects and Studies. Tables 1.1 and 1.2 show the fields used for each table. Access to the data in the tables is done via a number of different forms. The forms that are found in this database are designed so that the navigation around the database is as easy as possible. There are a series of transparent buttons that are located under text which will open new forms within the database. For example, to open up the project details form you must click on the words ‘Project details’. An indication to the destination of the link is also given as roll over text.

Table 1.1 Fields found in the Projects table

Field name	Description.
Site Name	Name of site e.g. Blyth.
Location	Specific location including country.
Installation date	Date of initial work.
Completion date	Date of completion of work. Note: this may not be the same time as the commission date.
Developer	The developer for that particular site.
Cost	Cost of site in £.
Size in MW	Total capacity of the site in MW.
No. of Wind turbines	The total number of turbines present at that site.
Area covered	The area covered by the turbines. If the turbines are in a straight-line configuration then the length of the arrangement is used.
Manufacturer	The manufacturer of the wind turbines which are present at the site.
Model of turbines	The model of the turbines that are present at the site. If a number of different models are used then they should all be entered into the field by using a ; to separate them.
Base configuration	This field contains a drop down box containing a number of different configurations for base constructions. If the construction method to be used at that specified site is not listed in the box then ‘other’ should be selected.
Nominal power	The individual power rating of each turbine in MW.

Axis type	The axis type used for the turbines present at the site.
Number of blades	The number of blades found on each turbine at the site.
Rotor diameter	The diameter of the rotor blades used on the turbines present at the site.
Hub height	The height of the hub above sea level.
Regulation	The method in which the turbine is regulated.
Rotor speed	The speed required for power generation. Some generators now work at multiple speeds and this should be entered into the field accordingly.
Substrate type	The substrate present at the base of the turbines.
Bathymetry	The water depth found at the turbine.
Mean wave height	The average wave height found at the site.
Other oceanographic conditions	Any conditions that are considered important by the developers, manufacturers and others.
Other information	If there is any other relevant information about this site then this should be included in this section.
ID	This assigns each project with a unique value for identification purposes.

Table 1.2 Fields found in the Studies table

Field name	General description.
Study title	The title of the study.
Author(s)	The authors involved in the study.
Status	The status of the project.
Publication date	The expected publication date.
Institution	The institutions where the majority of the work would be undertaken.
Further details on the study	Any other relevant information about the study.
Cost	The expected cost of the study.
Site related to	This related the study to any of the projects found in the database.
ID	This assigns each study with a unique value for identification purposes.

## **2.3 Basic layout**

When opening the database a main form will open (figure 1). From here it is possible to navigate around the database. Four choices are available:

### **2.3.1 Project details**

This section is entirely for project details. The different options available within this section include; data entry, viewing of data, searching for data and a map of projects. Further details of the fields available within the Project forms are given in table 1.1.

### **2.3.2 Study details**

This section identifies studies that were located by the CMACS team during the production of the report. The forms available beyond this section enable the user to undertake data entry and to view existing data via a number of search paths. The fields that are present within this section are detailed in table 1.2.

### **2.3.3 Produce a report**

This section enables the user to produce a report of the data that has been entered into the database. A print preview of the report is produced, which can then be printed. The reports are updated each time they are accessed.

### **2.3.4 Further details**

This is a small section that enables the user to insert the details of manufacturers and developers. The details that are required include: Name, address, Web address (as a hyperlink) and phone/fax numbers. These details are then referenced through the Project forms.

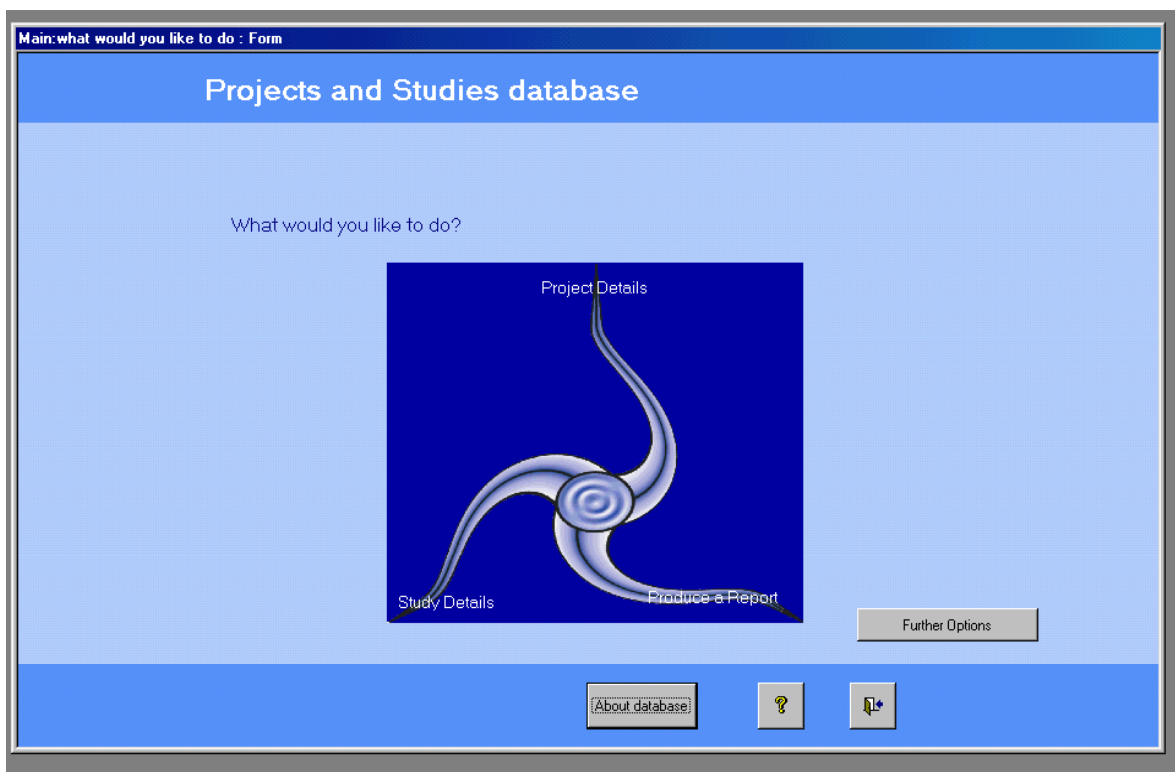


Figure 1. Screen print of the opening form of the database. The four choices that are available can be seen: Project details, Study details, produce a report and further options.

## **2.4 Detailed layout**

As described in the previous section, the opening form gives four routes through the database. The further options section does not open up any new forms so it is not considered in this section.

A detailed database plan can be found in appendix 1. From this diagram it can be seen that the projects and studies sections have three stages. An input stage, search stage and a view stage. The input stages for these two sections are similar in operation. When the input details button is pressed in the options form a new form is opened up as a data entry form. This means the information entered in this page will be stored in the corresponding underlying table. From this page it is not possible to view previous data entries except those which have been added in the same session.

To view previous data entries there are several search methods available. They include:

#### **2.4.1 Drop down boxes**

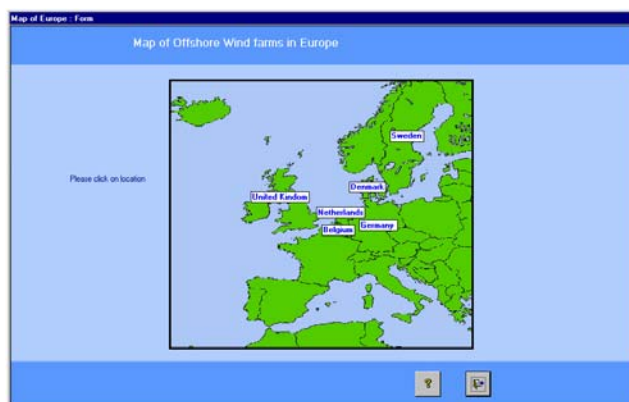
These will list all the entries that are present in the corresponding table. The boxes are separated into different fields e.g. Project name, developer, year etc.

#### **2.4.2 Word searches**

This method is used as a quick search method. It has a number of different fields that you can search. Note. Correct spelling is important as a mis-spelt word will yield no results.

#### **2.4.3 Map search**

A map of Europe (figure 2) has been produced which acts as a visual search method for project results. It shows the location of planned, under construction and commissioned wind farm projects. A small picture of a wind turbine indicates the location of the wind farm. The status of the wind farm is depicted by the colour of the background around the turbine. Yellow means the site is planned, blue means the site is under construction, green means the site is commissioned and red means that the site is now decommissioned see table 2)



2a







2b

Figure 2. Screen shots of the map section in the database. 2a shows the main map of Europe. 2b shows the resulting form after clicking on the United Kingdom in 2a. Note the green wind turbine over Blyth indicating that the site has been commissioned.

Once the chosen data entry has been selected the results are shown via a form which is similar to the data entry form. From here the data can be edited. Please note that any changes are permanent.

Table 2. Status of the projects depicted by the background colour.

	
Planned	Under construction
	
Commissioned	De-commissioned

## **2.5 Production of a report**

This section of the database is accessed by selecting the ‘produce a report’ button on the opening page. It may be required that some pages will have to be closed in order to view the main page, this is done by pressing the exit button at the bottom of each form. The form that is open gives the user two types of reports to choose from:

### **2.5.1 Projects report**

This will detail all of the projects that are entered in the database. It will detail all the fields as described in table 1.1. Each report will take up one page. Gaps in the information received will appear as blank spaces in the report.

### **2.5.2 Studies report**

This report lists the studies encountered during the production of the main report entitled ‘Assessment of the Effects of Noise and Vibration from Offshore Wind Farms on Marine Wildlife’.

Note: each time a report is accessed it will update any new entries.

## **2.6 Help files**

There are detailed help files for the operation of the database located at the bottom of the screen. When accessed, the database will bring up a list of topics. To return to the database simply click on the exit button at the bottom of the screen.

## **2.7 Other features**

There are a number of other features that can be found when navigating the database. They include:

### **2.7.1 Links to developers**

When inserting or viewing project details there is a button that brings up the details of the developer that was used. There are two ways of inserting the developers details. The easiest way is to insert them directly into the form from the input form. The second way is to return to the opening page and go to further details. After all the details are entered and the form is closed, the developer will now appear in the drop down box.

### **2.7.2 Links to manufacturers**

This is similar to the links to developers.

### **2.7.3 Diagrams of configurations**

Diagrams of the most popular configurations used in offshore wind farm construction are included in this database.

## **2.8 Technical details**

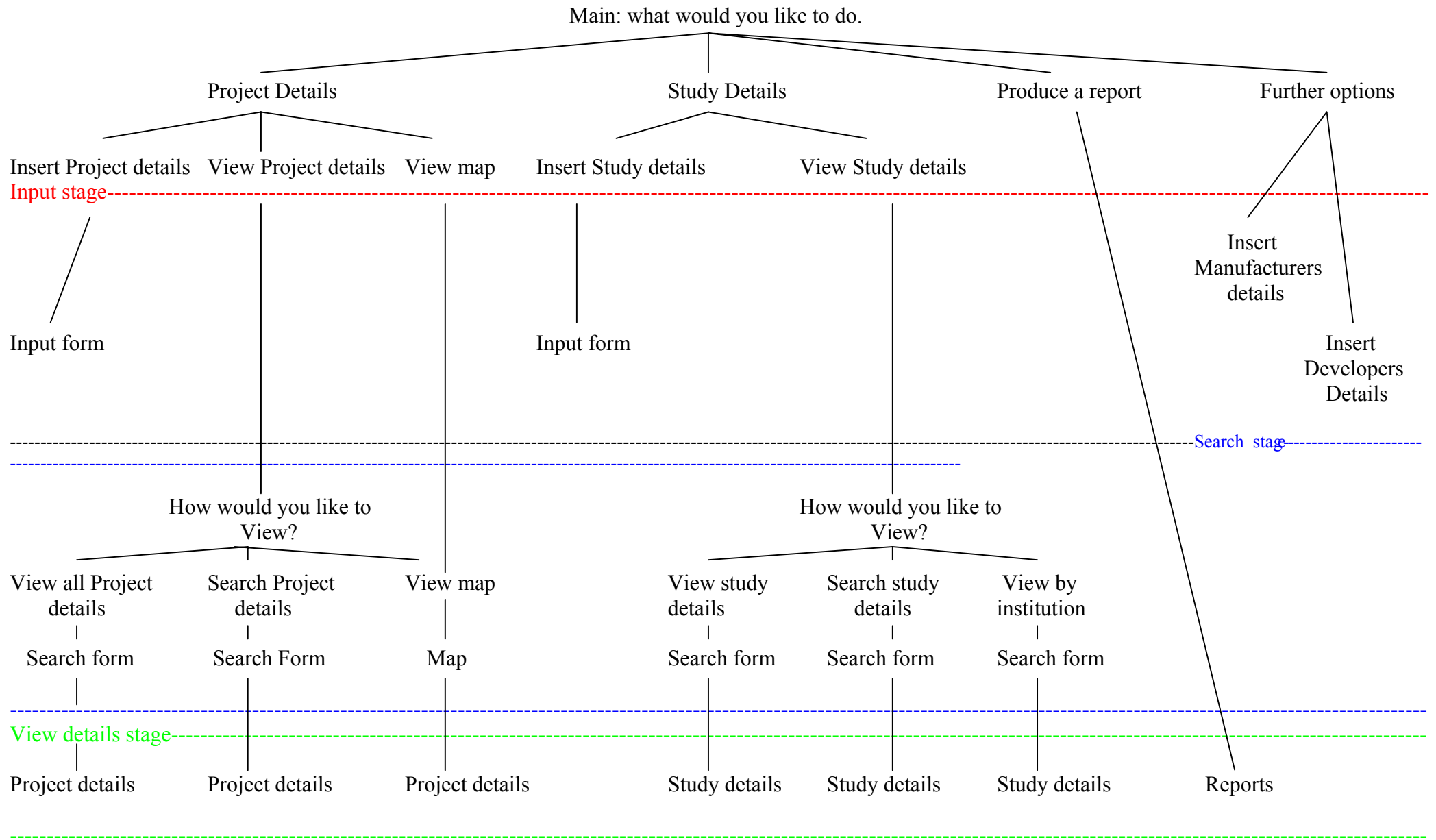
The final database is saved as a MDE file. This removes all editable source code and compacts the end product database. The visual basic code used in the database cannot be viewed or edited allowing for a greater level of security. The main advantage of creating the database as a MDE file is that the overall size of the file is reduced. This results in a reduction of memory usage which will improve the overall performance.



**2.9 Appendix 1.**

Map of database.





**2.10 Appendix 2. Hard Copy print out in alphabetical order of projects and relevant studies**

# List of Projects

## Blekinge

Status: Planned  
Location: Sweden  
Installation date: 2000  
Completion date: 2000  
Developer: Vindkompaniet  
Cost:  
Size in MW: 10  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## Blekinge 2

Status: Planned  
Location: Sweden  
Installation date: 2003  
Completion date: 2003  
Developer: Vattenfall  
Cost:  
Size in MW: 300  
No of Wind turbines: 100  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power: 3MW  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## Blyth

Status:	Commissioned
Location:	Blyth, Northumberland, UK
Installation date:	July 2000
Completion date:	11 Dec 2000
Developer:	Blyth Offshore Wind Limited
Cost:	£4m
Size in MW:	4
No of Wind turbines:	2
Area covered:	
Manufacturer:	VESTAS
Model of turbines:	V66
Base construction:	Piled
Nominal power:	2 x 2MW
Axis type:	Vertical
Number of blades:	3
Rotor diameter:	66m
Hub height:	58m
Regulation:	Pitch/OptispeedTM
Rotor speed:	21.3 rpm
Substrate type:	Rock bed
Bathymetry:	8m
Mean wave height:	11m
Other Oceanographic conditions:	The minimum water depth is 6m, the tidal range is 5m and waves of up to 8m are expected at the site

Other information:

## Bockstigen

Status:	Commissioned
Location:	Bockstigen, Valar, Baltic Sea, Sweden
Installation date:	1998
Completion date:	1998
Developer:	Vindkompaniet
Cost:	
Size in MW:	2.75
No of Wind turbines:	5
Area covered:	300 m separating
Manufacturer:	Wind World
Model of turbines:	Wind World 550 kW
Base construction:	Piled
Nominal power:	500 kW
Axis type:	Vertical
Number of blades:	3
Rotor diameter:	37m
Hub height:	
Regulation:	
Rotor speed:	
Substrate type:	Mudstone and
Bathymetry:	7m
Mean wave height:	
Other Oceanographic conditions:	

Other information:



## Dronten

Status: Commissioned  
Location: Dronten, IJsselmeer, Netherlands  
Installation date: 1996  
Completion date: 1996  
Developer:  
Cost:  
Size in MW: 11.4  
No of Wind turbines: 19  
Area covered:  
Manufacturer: Nordtank  
Model of turbines: Nordtank 600 kW  
Base construction:  
Nominal power: 600 kW  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions: Located just outside a dyke in fresh water.

Other information:

## Gedser

Status: Planned  
Location: Denmark  
Installation date: 2006  
Completion date: 2006  
Developer: ELKRAFT

Cost:  
Size in MW: 150

No of Wind turbines:

Area covered:

Manufacturer:

Model of turbines:

Base construction:

Nominal power:

Axis type: Vertical

Number of blades: 3

Rotor diameter:

Hub height:

Regulation:

Rotor speed:

Substrate type:

Bathymetry:

Mean wave height:

Other Oceanographic  
conditions:

Other information: Demonstration project.

## Gotland

Status: Planned  
Location: Sweden  
Installation date: Planned  
Completion date: Planned  
Developer: Vindkompaniet  
Cost:  
Size in MW: 35  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## Helgoland

Status: Planned  
Location: Germany  
Installation date: 2004  
Completion date: N/A  
Developer: Winkra-Energie of Schobüll/Hannover  
Cost: £0.5 b (first phase)  
Size in MW: 1200  
No of Wind turbines: 100  
Area covered: 200 sq km

Manufacturer:

Model of turbines:

Base construction:

Nominal power: 4-5MW

Axis type: Vertical

Number of blades: 3

Rotor diameter:

Hub height:

Regulation:

Rotor speed:

Substrate type:

Bathymetry:

Mean wave height:

Other Oceanographic conditions:

Other information:

## Horns Rev

Status: Planned  
Location: Denmark  
Installation date: 2001  
Completion date: 2001  
Developer: ELSAM Produktion  
Cost:  
Size in MW: 120-150  
No of Wind turbines:  
Area covered:  
  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:  
  
Other information: Demonstration project.

## Laeso

Status: Planned  
Location: Denmark  
Installation date: 2003  
Completion date: 2003  
Developer: ELSAM Produktion  
Cost:  
Size in MW: 120-150  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:  
  
Other information: Demonstration project.

## Laholm

Status: Planned  
Location: Halland, Sweden  
Installation date: 2002  
Completion date: 2002  
Developer: Renewable Energy  
Cost:  
Size in MW: 50  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## Lely Project

Status:	Commissioned
Location:	Medemblik, IJsselmeer, Netherlands
Installation date:	1994
Completion date:	1994
Developer:	
Cost:	
Size in MW:	2
No of Wind turbines:	4
Area covered:	
Manufacturer:	NedWind
Model of turbines:	NedWind 40-500 kW
Base construction:	Piled
Nominal power:	500 kW
Axis type:	Vertical
Number of blades:	3
Rotor diameter:	
Hub height:	
Regulation:	
Rotor speed:	
Substrate type:	Sandy Soil
Bathymetry:	
Mean wave height:	
Other Oceanographic conditions:	Fresh water. Mean wind speed at Hub is 7.7 m/s
Other information:	Corrosion life time of 50 years.



## Middelgrunden

Status:	Built
Location:	Middelgrunden, Copenhagen, Denmark.
Installation date:	Nov-Dec 2000
Completion date:	
Developer:	SEAS Wind Energy Centre
Cost:	
Size in MW:	40
No of Wind turbines:	20
Area covered:	183m Between
Manufacturer:	Bonus Energy A/S
Model of turbines:	Bonus 2MW
Base construction:	Gravity
Nominal power:	2000 kW
Axis type:	Vertical
Number of blades:	3
Rotor diameter:	76m
Hub height:	64m
Regulation:	Active stall power
Rotor speed:	17/11 rpm
Substrate type:	Limestone covered
Bathymetry:	5-10m
Mean wave height:	
Other Oceanographic conditions:	Top layer of polluted material.
Other information:	Base is specially designed to act as an ice breaker, reducing ice-loads.

## Nogersund

Status:	Decommissioned
Location:	Nogersund, Baltic, Sweden
Installation date:	1990
Completion date:	1990
Developer:	
Cost:	
Size in MW:	0.22
No of Wind turbines:	1
Area covered:	N/A
Manufacturer:	Wind World
Model of turbines:	Wind World 220
Base construction:	Other
Nominal power:	220 kW
Axis type:	Vertical
Number of blades:	3
Rotor diameter:	
Hub height:	35m
Regulation:	
Rotor speed:	
Substrate type:	Solid rock
Bathymetry:	
Mean wave height:	
Other Oceanographic conditions:	
Other information:	Tripod foundation on solid rock. Was a pilot scheme. Abandoned in 98.

## Omo

Status: Planned  
Location: Denmark  
Installation date: 2004  
Completion date: 2004  
Developer: ELKRAFT  
Cost:  
Size in MW: 150  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:  
  
Other information: Demonstration project.

## Orestad

Status: Planned  
Location: Oresund, Sweden  
Installation date: 2000  
Completion date: 2001  
Developer: Eurowind  
Cost:  
Size in MW: 72  
No of Wind turbines: 48  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power: 1.5MW  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## Rodsand

Status: Planned  
Location: Denmark  
Installation date: 2002  
Completion date: 2002  
Developer: SEAS Wind Energy Centre  
Cost:  
Size in MW: 150  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:  
  
Other information: Demonstration project.

## Rostock

Status: Planned  
Location: Germany  
Installation date: 2000  
Completion date: 2000  
Developer: Neptun Techno-Product  
Cost:  
Size in MW: 50  
No of Wind turbines: 20  
Area covered:  
Manufacturer: Nordex A/S  
Model of turbines: 2.5MW  
Base construction:  
Nominal power: 2.5MW  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:  
  
Other information: Similar to Middelgrunden

## Scroby Sands

Status:	Planned
Location:	Scroby, Norfolk
Installation date:	N/A
Completion date:	N/A
Developer:	PowerGen plc
Cost:	£35 Million
Size in MW:	37.5
No of Wind turbines:	25
Area covered:	
Manufacturer:	VESTAS
Model of turbines:	N/A
Base construction:	
Nominal power:	1.5 MW
Axis type:	Vertical
Number of blades:	3
Rotor diameter:	
Hub height:	63
Regulation:	
Rotor speed:	
Substrate type:	
Bathymetry:	
Mean wave height:	
Other Oceanographic conditions:	

Other information: This project did not secure a contract in the forth order of the NFFO. However developers remain hopeful that they will have better luck in NFFO5.

## Skabbrevet

Status: Planned  
Location: Landskrona, Sweden  
Installation date: 2000  
Completion date: 2000  
Developer: Renewable Energy  
Cost:  
Size in MW: 50  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:



## SKY2000

Status: Planned  
Location: Baltic Sea,Bay of Lübeck at Dahme and Grümitz, Germany  
Installation date: 2002  
Completion date: 2002  
Developer: SHOW-GmbH  
Cost:  
Size in MW: 100  
No of Wind turbines: 64  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry: 20m  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## South Coast

Status: Planned  
Location: Skane, Sweden  
Installation date: 2002  
Completion date: 2002  
Developer: Eurowind  
Cost:  
Size in MW: 1000  
No of Wind turbines:  
Area covered:  
Manufacturer: Enercon  
Model of turbines:  
Base construction:  
Nominal power: 5MW  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry: 30m  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## Tuno Knob

Status: Commissioned  
Location: Baltic Sea, Denmark  
Installation date: 1995  
Completion date: 1995  
Developer:  
Cost:  
Size in MW: 5  
No of Wind turbines: 10  
Area covered:  
Manufacturer: Vestas Wind Systems A/S  
Model of turbines: V39-500 kW  
Base construction:  
Nominal power: 500 kW  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type: Sandy soil  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions: Mean wind speed at hub is 7.5 m/s

Other information:

## Utgrunden

Status: Planned  
Location: South-east Sweden  
Installation date: 2000  
Completion date: 2000  
Developer: Vindkompaniet  
Cost:  
Size in MW: 10  
No of Wind turbines: 7  
Area covered:  
Manufacturer: Tacke  
Model of turbines:  
Base construction:  
Nominal power: 1.4MW  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## Vindeby

Status:	Commissioned
Location:	Denmark, NW of Lolland
Installation date:	1991
Completion date:	1991
Developer:	ELKRAFT
Cost:	6.4 million
Size in MW:	5
No of Wind turbines:	11
Area covered:	
Manufacturer:	Bonus Energy A/S
Model of turbines:	Bonus 450 kW
Base construction:	Other
Nominal power:	450 kW
Axis type:	Vertical
Number of blades:	3
Rotor diameter:	35m
Hub height:	37.5
Regulation:	Stall regulated
Rotor speed:	35 rpm
Substrate type:	Sandy soil
Bathymetry:	2.1m
Mean wave height:	
Other Oceanographic conditions:	Depth varies from 2.1 to 5.1m. Mean wind speed at hub is 7.5 m/s
Other information:	Distance from the shore is 1.5 to 3 Km. First Offshore wind farm.

## Ystad

Status: Planned  
Location: Skane, Sweden  
Installation date: 2001  
Completion date: 2001  
Developer: Vindkompaniet  
Cost:  
Size in MW: 10  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:

## Ystad 2

Status: Planned  
Location: Skane, Sweden  
Installation date: 2002  
Completion date: 2002  
Developer: Renewable Energy  
Cost:  
Size in MW: 50  
No of Wind turbines:  
Area covered:  
Manufacturer:  
Model of turbines:  
Base construction:  
Nominal power:  
Axis type: Vertical  
Number of blades: 3  
Rotor diameter:  
Hub height:  
Regulation:  
Rotor speed:  
Substrate type:  
Bathymetry:  
Mean wave height:  
Other Oceanographic conditions:

Other information:

End of Report

## Studies

Study title: Breaking Wave Loads on Offshore Wind Turbines

Author(s): Andrew Henderson

Publication date: N/A

Institution: T U Delft

Further details on study:

To investigate the probability and consequences of wave breaking, with an initial literature survey followed by the development of code to compare the most promising proposed models with each other and with linear and stream function methods.

Cost: N/A

Study title: Investigation of the Suitability of Floating Structures for Wind Turbines

Author(s): Andrew Henderson

Publication date: N/A

Institution: T U Delft

Further details on study:

The objective of this study is to review the floating structures currently used in the offshore industry and evaluate them for their suitability for mounting wind turbines.

Cost: N/A

Study title: Effects of noise on cetaceans

Author(s): Dr Paul Thompson

Publication date:

Institution: University of Aberdeen

Further details on study:

Geographical Locations: Moray Firth, Faroe-Shetland Channel.

Cost: N/A



Study title: A study into the effects of noise and vibration from marine dredging on fish.

Author(s): CEFAS and DERA.

Publication date: N/A

Institution:

Further details on study:

Cost: N/A

Study title: Ph.D. Intergrated Design of Support Structures for Offshore Wind Turbines

Author(s): N/A

Publication date: N/A

Institution: Delft University of Technology.

Further details on study:

Cost: N/A

Study title: Underwater Bio-Sonar Systems and Bioacoustics

Author(s): Marine Conservation Society.

Publication date: July 23rd

Institution: Loughborough University

Further details on study:

Symposium at Loughborough University to review the present state of this continually evolving subject, with reports on new developments and future trends. Themes include problems and mitigation of shipstrike on cetaceans, enviromental assasments.

Cost: N/A

Study title: Image-based Processing for Biosonar Target Recognition

Author(s): Altes, R

Publication date: N/A

Institution: CHIRP Corporation

Further details on study:

Theoretical understanding and working models of detection, estimation, classification and tracking in animal sonar systems.

Cost: \$90,000

Study title: Development of a Miniature Acoustic Recording Tag to Assess Marine Wildlife Response to Sound

Author(s): Burgess, William

Publication date: N/A

Institution: Greenridge Sciences Inc

Further details on study:

This research aims to develop electronic tags to measure these data while attached directly to individual animals, particularly protected species such as large baleen whales

Cost: \$109,943

Study title: New Directions in the Study of Low-Frequency Sound in Baleen Whales

Author(s): Clark, Christopher W

Publication date: N/A

Institution: Laboratory of Ornithology Performing, Cornell University

Further details on study:

is To understand the potential impact of man-made underwater sound on marine mammals. The secondary objectives are to understand the functions of the sounds made by marine mammals, and in particular the low-frequency sounds of whales.

Cost: \$58,496

Study title: New Directions in the Study of Low-Frequency Sound in Baleen Whales

Author(s): Croll, Donald A

Publication date: N/A

Institution: Institute of Marine Sciences, University of California, Santa Cruz

Further details on study:

To determine the relationship between blue and fin whale vocal behavior and feeding.

Cost: \$98,000

Study title: A Study of the Relationships Between Anthropogenic Sounds, Whale Sounds, and Behavior and Physiology of Free-Swimming Whales .

Author(s): Goodyear, Jeffrey

Publication date: N/A

Institution: Zoology, University of British Columbia

Further details on study:

To study the relationship of anthropogenic sounds to specific aspects of whale behavior and physiology .Furthermore, how low frequency sounds might negatively affect these parameters and habitat-use patterns.

Cost: \$14,335

Study title: Concussive Effects' of Low Frequency Sound Exposure

Author(s): McIntosh, Tracy

Publication date: N/A

Institution: University of Pennsylvania

Further details on study:

To evaluate the threshold for concussive and histopathological damage to the CNS following low frequency sound exposure.

Cost: \$27,593

Study title: Marine Mammal Monitoring on Navy Undersea Acoustic Ranges

Author(s): Moretti, Dave

Publication date: N/A

Institution: Naval Undersea Warfare Center

Further details on study:

Data will be used to make environmental impact assessments for range activities producing underwater sound. If successful, this prototype effort will be duplicated at other Navy test ranges to facilitate compliance with guidelines on environmental noise.

Cost: N/A

Study title: Low Frequency Odontocete Hearing

Author(s): Nachtigall, Paul

Publication date: N/A

Institution: University of Hawaii, Coconut Island Marine Lab,

Further details on study:

To examine the effects of loud sound on odontocete hearing. Generally loud sounds, similar to those at a rock concert for humans, cause a transitory reduction in the ability to hear called a temporary threshold shift.

Cost: \$223,430

Study title: Low-Frequency Sound Production by Mysticetes: An Integrated Approach (Phase 1: Anatomy)

Author(s): Reidenberg/ Laitman

Publication date: N/A

Institution: Mt. Sinai Medical School New York, NY

Further details on study:

Examine the intrinsic anatomy and positional relationships of nasolaryngeal structures in order to determine where and how low frequency sounds are produced by mysticetes.

Cost: \$20000

Study title: Low frequency marine mammal hearing thresholds in response to acoustic pressure and particle velocity

Author(s): Ridgway, Sam H/Finneran James

Publication date: N/A

Institution: Navy Marine Mammal Program, San Diego CA

Further details on study:

To determine the relative contributions of acoustic pressure and particle velocity to the low-frequency, underwater hearing abilities of the bottlenose dolphin white whale and California sea lion.

Cost: \$115,000

Study title: Marine Mammal Acoustic Safety Criteria

Author(s): Ridgway, Sam H

Publication date: N/A

Institution: SSC -San Diego

Further details on study:

To determine the physiological impact of naval acoustic operations on marine mammals. To relate acoustic energy to acoustic overload thresholds for marine mammals

Cost: \$300000

Study title: Measurement of Lung Vibration from Low Frequency Underwater Sound in an Animal Model and Divers Using NIV AMS

Author(s): Rogers, Peter H

Publication date: N/A

Institution: Georgia Institute of Technology

Further details on study:

Our objective is to contribute to the determination of a safe exposure guideline by quantifying the amplification effects of human lung resonance underwater and the frequency and depth dependence of these effects.

Cost: \$33990

Study title: Pinniped bioacoustics: auditory mechanisms, temporary threshold shift, and effects of noise on signal reception

Author(s): Schusterman, Ronald J

Publication date: N/A

Institution: University of California Santa Cruz

Further details on study:

To investigate properties of acoustic signal production and detection in three pinniped species, harbor seal, and California sea lion. Emphasis is placed on the effects of noise on hearing because of the potential negative impacts of anthropogenic noise.

Cost: \$173,619

Study title: Pinniped bioacoustics: New techniques for assessing the effects of anthropogenic noise

Author(s): Schusterman, Ronald

Publication date: N/A

Institution: University of California Santa Cruz

Further details on study:

The goals of this research are to obtain rapid and reliable measures of auditory sensitivity in pinnipeds that are methodologically comparable to those obtained with human subjects.

Cost: \$234,737

Study title: Responses of Whales to Experimental Playback of Low Frequency Sound from the Navy SURTASS LFA

Author(s): Tyack, Peter L

Publication date: N/A

Institution: Woods Hole Oceanographic Institution

Further details on study:

The overall objective of this study is to evaluate the effects of low frequency sound on the behavior of those marine mammal species judged to be most sensitive or vulnerable to low frequency sound in the wild.

Cost: \$90,000

Study title: Assessing Risk Factors in Right Whale Vessel Collision Using an Acoustic Recording Tag and Controlled Sound Exposure

Author(s): Tyack, Peter

Publication date: N/A

Institution: Woods Hole Oceanographic Institute

Further details on study:

Acoustic Datalogger tags (D-tags) were applied to right whales. The tags show great promise for a variety of future applications in assessing the functional role of vocal signals and the impacts of noise on behavior.

Cost: \$80,000

Study title: Marine Mammal Responses to Low-Frequency Sound

Author(s): Westbrook, David

Publication date: N/A

Institution: National Research Council, Washington D.C

Further details on study:

To compare new observations from the Marine Mammals Research Program (MMRP) with the research needs specified in a 1994 National Research Council report, Low-Frequency Sound and Marine Mammals: Current Knowledge and Research Needs

Cost: \$15000

Study title: Information and Technology Tools for Assessment and Prediction of Potential Impact of Military Noise on Marine Mammals

Author(s): Helweg, David

Publication date: N/A

Institution: SPA W ARSYSCEN San Diego

Further details on study:

The objective is to transition information about effects of DoD sound types on marine mammal auditory anatomy and acoustic ecology to predictive models and mitigation tools.

Cost: \$ 370,000

Study title: Marine Mammal Acoustic Impact Analysis -AIR

Author(s): Lazauski / Fetherston / Mitchell

Publication date: N/A

Institution: NA V SEA Newport

Further details on study:

Develop and document a method for analysing the impacts of training operations on proposed sites for shallow water ranges on the east coast of the U.S.

Cost: \$ 500,000

Study title: Experimental Measures of Blast and Acoustic Trauma in Marine Mammals

Author(s): Ketten, Darlene R

Publication date: N/A

Institution: Woods Hole Oceanographic Institution

Further details on study:

To provide fundamental information that will improve our understanding of middle and inner ear response mechanisms specific to marine mammals.

Cost: \$101,046

Study title: Marine Mammal Acoustic Impact Analysis

Author(s): Lazauski / Ward / Fetherston / Mitchell

Publication date: N/A

Institution: NA V SEA Newport

Further details on study:

Analyze the impacts of training operations on proposed sites for shallow water ranges on the west coast of the U .S. Will be published in a NUWC technical report

Cost: \$200,000



Study title: New Directions in the Study of Low-Frequency Sound in Baleen Whales

Author(s): Croll, Donald A

Publication date: N/A

Institution: University of California, Santa Cruz

Further details on study:

The data obtained will inform models of the potential behavioral effects of manmade low frequency noise on acoustic sensing and communication by protected whales.

Cost: \$90,000

Study title: Porpoise at Horns Rev where they are found during calving and their stay foolow that

Author(s): ELSAMPROJEKT A/S

Publication date: N/A

Institution: ELSAMPROJEKT A/S

Further details on study:

Part of an EIA for the first four large Danish offshore wind farms

Cost: N/A

Study title: Migrating birds at Rodsand with respect to collision risk for land and sea birds

Author(s): ELSAMPROJEKT A/S

Publication date: N/A

Institution: ELSAMPROJEKT A/S

Further details on study:

Part of an EIA for the first four large Danish offshore wind farms

Cost: N/A

Study title: Harbour seals at Rodsand (a seal reservation is only 4 km away)

Author(s): ELSAMPROJEKT A/S

Publication date: N/A

Institution: ELSAMPROJEKT A/S

Further details on study:  
Part of an EIA for the first four large Danish offshore wind farms

Cost: N/A

Study title: Ducks (mainly common scoter) at Laeso during wintering and moulting

Author(s): ELSAMPROJEKT A/S

Publication date: N/A

Institution: ELSAMPROJEKT A/S

Further details on study:  
Part of an EIA for the first four large Danish offshore wind farms

Cost: N/A

Study title: Fish and fishery at Omo Stalgrunde

Author(s): ELSAMPROJEKT A/S

Publication date: N/A

Institution: ELSAMPROJEKT A/S

Further details on study:  
Part of an EIA for the first four large Danish offshore wind farms

Cost: N/A

Study title: The potential effects of electromagnetic fields generated by cabling associated with offshore wind turbines upon Elasmobranch fishes

Author(s): Gill, A. B

Publication date: 2001

Institution: University of Liverpool

Further details on study:  
8-10 Week project.

Cost: £6500+vat

Study title: Various studies on marine mammals observed around the UK including annual counts of pinniped population sizes.

Author(s): Dr Phil Hammond (Director)

Publication date: N/A

Institution: Sea Mammal Research Unit

Further details on study:

Cost: N/A

End of Report