

# **1. Introduction**

## **BARD Offshore NL 1**



# **BUITENGAATS**

IN COOPERATION WITH THE

**BARD - Group**

“The Offshore Wind Specialist”



**BARD Offshore NL 1**  
**Introduction Applicant**  
Documentation for SDE Tender Submission

# **1.1 Introduction Applicant**

## **BARD Offshore NL 1**




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“The Offshore Wind Specialist”

 <b>BUITENGAATS</b>	<p><b>BARD Offshore NL 1</b></p> <p><b>Company Description</b></p> <p>Documentation for SDE Tender Submission</p>	<p>Seite 1 von 12</p>
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## **1.1.1. Company Description**

### **BARD Offshore NL 1**



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### 1.1.1 Company description (Executive Summary)

Buitengaats C.V. is voornemens een offshore windmolenpark in de Noordzee te realiseren. Hiervoor zal zij gebruik maken van het turn-key concept van de BARD Groep.

De BARD Groep is in 2003 opgericht met de filosofie om turn-key windmolenparken te ontwikkelen en leveren. In 6 jaar tijd heeft zij ten behoeve van deze ambitie onder andere de volgende zaken bereikt:


- Ontwikkeling van een eigen windmolen specifiek voor offshore toepassingen. De windmolen heeft een opgesteld vermogen van 5 MegaWatt en een innovatieve Tripile fundatie;
- Bouwvergunningen voor twee offshore windmolenparken in de Duitse Noordzee respectievelijk BARD Offshore 1 en Veja Mate. Het windmolenpark BARD Offshore 1 zal in 2010 geïnstalleerd worden
- Ontwikkeling van een eigen turn-key concept voor installatie en onderhoud van windmolenparken met een zelf ontwikkeld installatieschip, voor toepassing binnen BARD Offshore 1.

De BARD Groep bestaat uit de volgende onderdelen:

- Bard Holding GmbH, Bremen - Administratieve functie
- Bard Engineering GmbH, Emden - Planning, coördinatie, onderzoek & ontwikkeling en management
- Bard Emden Energy GmbH, Emden - Productie van turbine and rotorbladen
- Cuxhaven Steel Construction, Cuxhaven - Productie Tripile fundatie
- Bard Building GmbH, Emden - Installeren van fundaties en erectie van de windmolens en het transformatorplatform
- Bard Logistics GmbH, Emden - Transport en logistiek voor de bouw
- Bard Service GmbH, Emden - Installatie van de windmolens offshore, testen, in gebruik nemen, en onderhouden

Met haar ervaring op het gebied van offshore windmolenparken en de strategische ligging van haar productiefaciliteiten vormt de BARD Groep een perfecte partij om voor Buitengaats C.V. een offshore windmolenpark in de Noordzee te realiseren.

4.3

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**Appendix 1.1**

**Quality Management Systems**

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## **Appendix 1.2**

# **Occupational Health and Safety Management System**

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**Appendix 1.3**  
**Bard Offshore Academy**  
**BARD Offshore NL 1**




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## **1.1.2. Initiatives & compliance to policy**

### **BARD Offshore NL 1**




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### **1.1.2. Initiatives and compliance policy (executive summary)**

Buitengaats C.V. heeft er voor gekozen BARD te contracteren voor de bouw van het windmolenpark. BARD bezit alle relevante stappen in de keten voor het ontwikkelen en bouwen van haar eigen windmolenparken. De ontwikkeling van haar eigen turbines, rotorbladen en offshore fundaties is hier een goed voorbeeld van. Om deze volledige keten te testen heeft BARD reeds enkele test windmolens geplaatst. Daarnaast is zij momenteel bezig met de installatie van het eerste full scale windmolenpark. Onderstaand worden de reeds gerealiseerde projecten en initiatieven van BARD kort genoemd:

- 2007, Riesumer Nacken, twee test windmolens van 5 MW op land
- 2008, Hooksiel , één test windmolen van 5 MW met Tripile fundatie, near shore
- 2010, BARD Offshore 1, 80 windmolens van 5 MW, offshore
- 2011, Veja Mate, 80 windmolens van 5 MW offshore
- 2013, Drie Nederlandse projecten, per windmolenpark circa 60 windmolens van 5 MW offshore

De Europese Unie heeft de afspraak gemaakt om in 2020, 20% van haar energie uit duurzame bronnen te onttrekken. Windenergie, voornamelijk offshore wind energie, zal hieraan een belangrijke bijdrage leveren. Daarnaast wil Europa haar technologische voorsprong op het gebied van windenergie op de rest van de wereld behouden. Het park van Buitengaats C.V. kan hier een aanzienlijke bijdrage aan leveren. De Nederlandse overheid heeft als doelstelling om in 2020 6.000 MW geïnstalleerd vermogen aan offshore windparken gerealiseerd te hebben. Vooralsnog is hiervan 228 MW gerealiseerd met turbines met een vermogen van circa 3 MW.

Ten opzichte van de huidige stand der techniek kan zij met haar turbines derhalve veel efficiënter gebruik maken van de beperkte ruimte in de Noordzee. Het installatieconcept van BARD zorgt daarnaast tijdens constructie van het park voor een relatief lage milieu-impact. Daarnaast is BARD voornemens voor de constructie vooral gebruik te maken van Nederlandse bedrijven om zo de lokale en nationale economie te stimuleren.

Met haar park kan Buitengaats C.V. derhalve een aanzienlijke duurzame bijdrage leveren aan het realiseren van de door de Nederlandse overheid gestelde targets en zorgen voor een stimulering van de Nederlandse economie.

## 1 Introduction

For the realization of the offshore wind park Buitengaats C.V. will make use of the integrated turn-key concept of the BARD-Group. BARD believes in their integrated turn-key concept and that it is important to own and control critical value chain factors such as wind turbine, rotor blades and offshore foundation structure. To test this turn-key concept the BARD Group has built several test wind mills onshore and near shore and is building its first offshore wind parks as we speak. Below the different initiatives of the BARD Group are shortly discussed, showing BARD is the perfect partner for Buitengaats C.V. to realize the wind park.

## 2 Bard Projects

### Onshore project Germany

#### *Rysumer Nacken*

In late autumn of 2007 the BARD Group has built two "BARD 5.0" onshore test windmills at Rysumer Nacken. These two windmills fall within the 5 Megawatt and are originally designed for offshore application. The windmills are erected on land for research purposes. Goal is to put the total construction through intensive tests comparable to those on the open sea. The generated electricity will be fed into the electricity grid. Since the beginning of their run-time, at the end of 2007, both prototypes show outstanding values for reliability and availability. In figure 3 the two test windmills are displayed.



Figure 3. "BARD 5.0" Onshore test windmills at Rysumer Nacken.

### **Near shore project Germany**

#### *Hooksiel*

In fall of 2008, BARD has erected the first BARD 5.0 test- and demonstration windmill in the proximity of Hooksiel, north of Wilhelmshaven. For this first near shore windmill the "BARD Tripile Foundation" has been used for the first time. In figure 4 this test windmill with the innovative Tripile Foundation is displayed. Both the windmill as well as the foundation are described in more detail in chapter 1.2 (Technical information). This near shore windmill, with a rated output of five Megawatt, has been erected at approximately 400 meters distance from the shore. For the first time the BARD design team and the service providers could experience the interaction between the installation process for the fundamentals, the windmill and all the other components under offshore conditions. This experience will be used during offshore installation of future windmills. The generated electricity is delivered over a 20 KV cable to the electricity grid of Willemshaven.

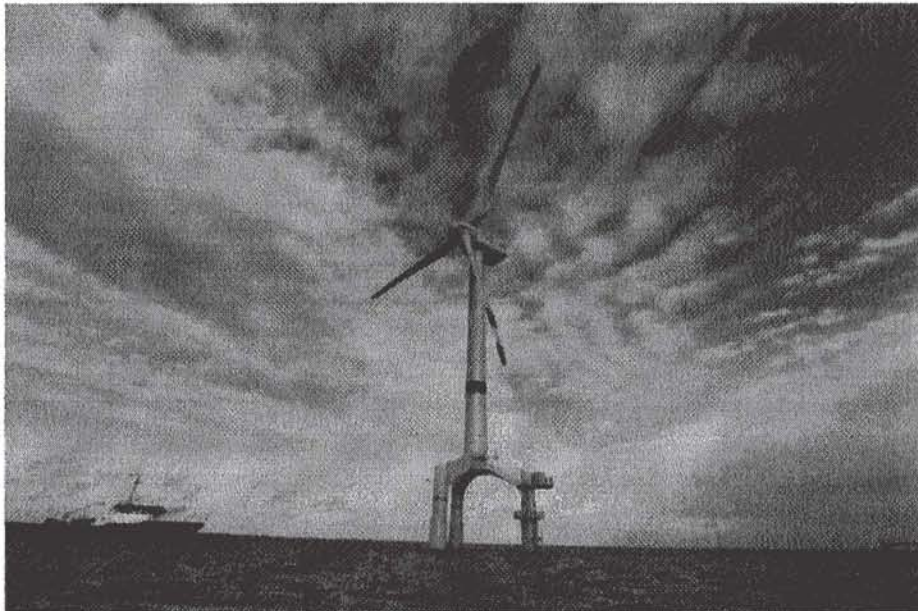



Figure 4. The BARD Nearshore Hooksiel (BNH).

### **Offshore projects Germany**

#### *BARD Offshore 1*

At this moment BARD is building the wind park BARD Offshore 1 will be constructed around 100 km off the German coast northwest of the isle Borkum. Laying of external cables to connect the wind farm started on July 23, 2009 and is completed. The 200 km connection is the longest connection to an offshore wind farm in the world. The project area for the wind

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farm "BARD Offshore 1 "includes approximately 60 square kilometers. The water depth is around 40 meters. By the end of 2010 BARD will have built 80 windmills of type "BARD 5.0" with an installed capacity of 400 Megawatt. The delivery of the generated electricity to the electricity grid is the responsibility of the Transpower Stromübertragungs GmbH. (see figure 5 Number I)

#### *Veja Mate*

"Veja Mate" is the second wind park to be realized offshore after "BARD Offshore 1". The approval of the Federal Maritime and Hydrographic Agency (BSH) for this wind park was granted on the 31 august 2009. The first 40 windmills for this wind park should be connected to the electricity grid by the end of 2011. The park is situated to the west of the "BARD Offshore 1", which will then already be erected and feeding electricity into the electricity grid. The site is located northwest of the island of Borkum, approximately 129 kilometers northwest of Helgoland. In total 80 "BARD 5.0" windmills will be erected with an installed capacity of 400 Megawatt within a space of approximately 50 square kilometers with a water depth of approximately 39 to 41 meters (see figure 5 Number II).

#### *Deutsche Bucht*

The planned wind park "Deutsche Bucht" is also located Northwest to the island of Borkum and approximately 134 km West-Northwest of Helgoland. The planned space is 22.6 square kilometer and has a water depth of 39-40 meters. In this park BARD will install the first innovative more powerful "BARD" wind mills. These wind mills fall within the Megawatt category. In total 42 Wind mills will be built here with an installed capacity of Megawatt (see figure 5 Number III).

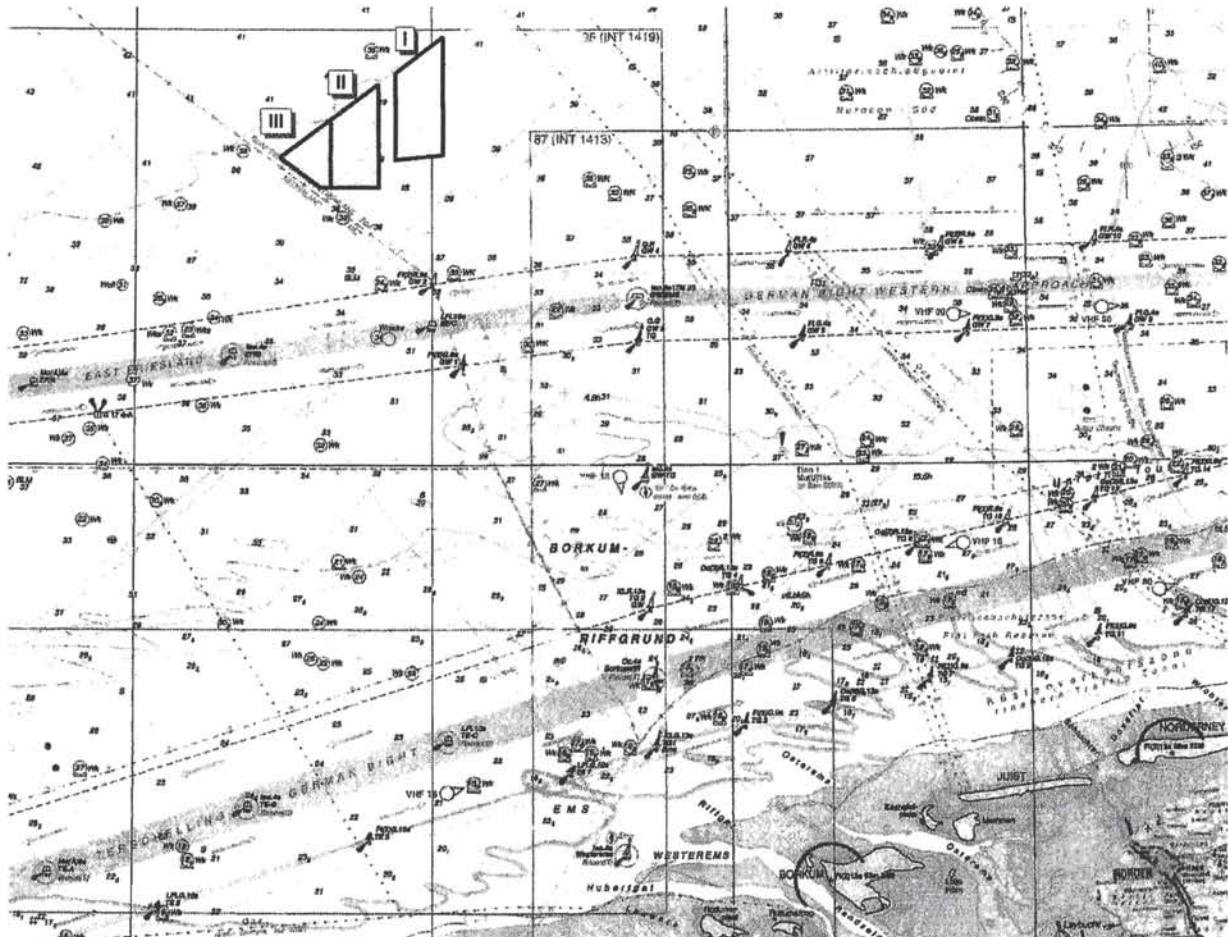


Figure 5: Locations of German Offshore projects

## Offshore projects the Netherlands

### *Dutch projects*

In the Dutch North Sea EEZ (Exclusive Economic Zone) BARD has planned to help erect offshore wind farms. Permits for "BARD Offshore NL 1", "EP Offshore NL 1" and "GWS Offshore NL 1" were granted in December 2009 by the relevant Dutch government agency Rijkswaterstaat. The wind farms are located approximately 60 kilometers north of the west Friesian island Schiermonnikoog just next to the German border. Due to the curving of the earth surface these wind parks will not be visible from the shore.

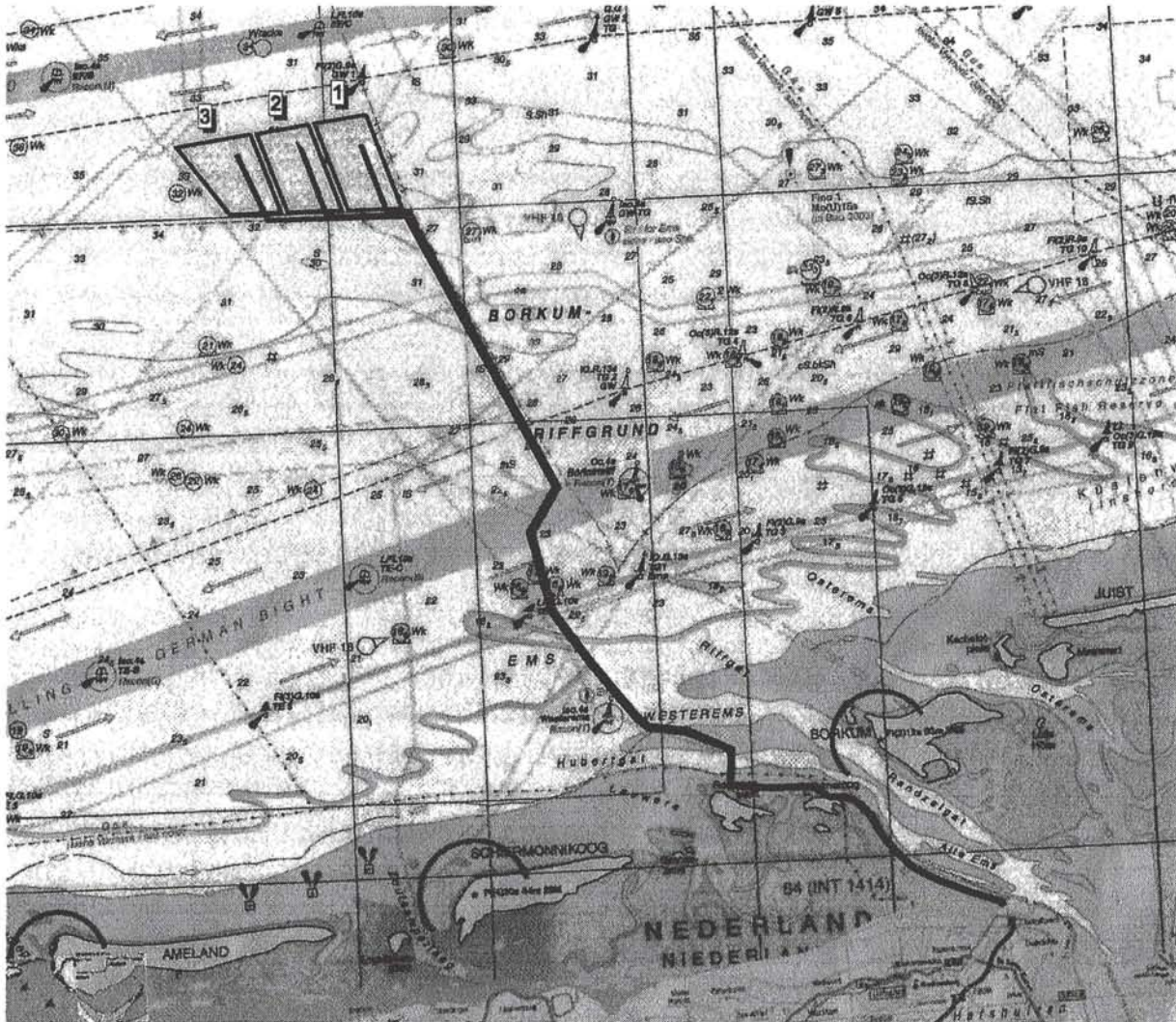


Figure 6: Locations of Dutch Projects

This tender concerns the erection of the wind park BARD Offshore NL 1 shown as park 3 in figure 6. More in depth information on this wind farm will be provided in Chapter 2.

### 3 Wind Policy

#### EU Policy

In 2009 the European Union agreed the Renewable Energy Directive which establishes the rules for achieving 20% of EU energy consumption from renewable energy sources by 2020. In practice, the directive establishes the mandatory targets for renewable energy by 2020 for each EU Member State. The 20% target means that more than one-third of the EU's electricity must come from renewable energy in 2020 – up from 16% in 2006. By 2020, wind

energy is expected to have overtaken hydropower as the EU's largest source of renewable electricity (see table 2).

Renewables' contribution to EU electricity consumption up to 2020				
Type of energy	2005 Eurostat TWh	2006 Eurostat TWh	2010 Projections TWh	2020 Targets TWh
Wind	70.5	82	176	477 (34.8%)
Hydro	346.9	357.2	360	384 (28%)
Photovoltaic	1.5	2.5	20	180 (13.1%)
Biomass	80	89.9	135	250 (18.3%)
Geothermal	5.4	5.6	10	31 (2.3%)
Solar thermal elect	-	-	2	43 (3.1%)
Ocean	-	-	1	5 (0.4%)
<b>Total RES</b>	504.3	537.2	704	1370
<b>Total Gross Electricity Generation EU-27</b>	<b>3320.4</b>	<b>3361.5</b>		
(Trends to 2030-baseline)			3568	4078
(Combined RES and EE)				3391
Share of RES	15.20%	16.00%	19.70%	33.6-40.4%


European Renewable Energy Council: European Renewable Technology Roadmap 2008

Table 2: EU 2020 targets on renewable energy

Based on current estimates the European Wind Energy Association (EWEA) predicts that 80,000 MW (80 GW) will be installed in the EU by the end of 2010 – up from 48,000 MW at the end of 2006. By 2020, most of the EU's renewable electricity will be produced by onshore wind farms. Europe must, however, use the coming decade to prepare for the large-scale exploitation of offshore wind power. A study by the European Environment Agency's (EEA) states that offshore wind power will be key to Europe's energy future.

Besides offshore wind energy has been identified by the European Union as a key power generation technology for the renewable energy future. The support of the EU is necessary to maintain Europe's technological lead in offshore wind energy by improving turbine design, developing the next generation of offshore wind turbines, substructures, infrastructure.

Besides BARDs own control on the critical value chain factors such as own development of wind turbine, rotor blades and offshore foundation structure Buitengaats C.V. will contribute with BARD significantly to EU targets on renewable energy as well as maintaining Europe's technical lead in offshore energy.

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### **Dutch Policy**

The Dutch government has the ambitious objective of creating large-scale offshore wind farms in the next few years. By the year 2020 about 6.000 Megawatt of offshore wind power should be installed in the Dutch sector of the North Sea. At this moment already two offshore wind farms, in total 228 MW, (The Prinses Amalia wind park (Q7) 120 MW, The NoordzeeWind windpark (Q8) 108 MW) are operational.

To reach the goal of 6.000 Megawatt by 2020 amongst others this tender is issued. For this tender the Dutch government has issued 12 WBr permits. With this tender the Dutch Government aims to realize an additional installed capacity of approximately 950 Megawatt. For an oversight of the Dutch projects that can apply for the tender we refer to Appendix 1.4 (Overzicht definitief vergunde windparken).

As already emphasised before, per Wbr-permit BARD intends to aid erection it is expected an installed capacity of 300 MW can be realized, depending on the final configuration, making a total of 900 MW of installed capacity. With these projects BARD can therefore contribute significantly to the goals of the Dutch Government to realize 6.000 Megawatt of offshore wind power in the North Sea!

With the current standards for wind turbines with a capacity of approximately 3 MW per turbine this means approximately 2.000 turbines must be installed to realize these goals. With the new innovative turbines from BARD with an installed capacity from 5 MW this would mean significantly less turbines have to be installed, reducing the impact on the environment and optimizing efficiency of the use of the North Sea area. This complies fully with the Dutch goals from the "Vierde Nota Ruimte" stating the following:

*"De hoofddoelstelling voor de Noordzee is versterking van de economische betekenis van de Noordzee en behoud en ontwikkeling van internationale waarden van natuur en landschap door de ruimtelijk-economische activiteiten in de Noordzee op duurzame wijze te ontwikkelen en op elkaar af te stemmen met inachtneming van de in de Noordzee aanwezige ecologische en landschappelijke waarden. Onderdeel is een onbelemmerd uitzicht vanaf de Kust. Uitgangspunten hierbij zijn een duurzaam*




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*gebruik en beheer van het watersysteem Noordzee en een efficiënt ruimtegebruik, zowel in ruimte als in tijd."*

Besides the more efficient use of the Dutch North Sea during the lifetime of the wind farm, also during construction the BARD concept does everything to minimize the impact of the wind farm. For example the state of the art vibrating techniques, in combination with the proven technique of pile driving, for installing the tripile foundation will cause a substantial lower sound impact on the surroundings during construction of the wind park (see chapter 1.2. for a detailed explanation), reducing the impact on marine life substantially. This is possible because the tripile foundation has a much smaller diameter per pile compared to mono-piles for substructures of comparable turbines.

Finally Buitengaats C.V. has contracted BARD because it intends to make significant use of Dutch subcontractors realizing large parts of the wind park. Besides harbour facilities in the Netherlands BARD will need Dutch production facilities to facilitate the building. An estimated amount of money has already been going into the Dutch economy from the German wind farm BARD Offshore 1. The Dutch projects will also increase the local content substantially.

4.4

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**Appendix 1.4**

**Overzicht Definitief Vergunde  
Windparken 18-12-2009**

**BARD Offshore NL 1**



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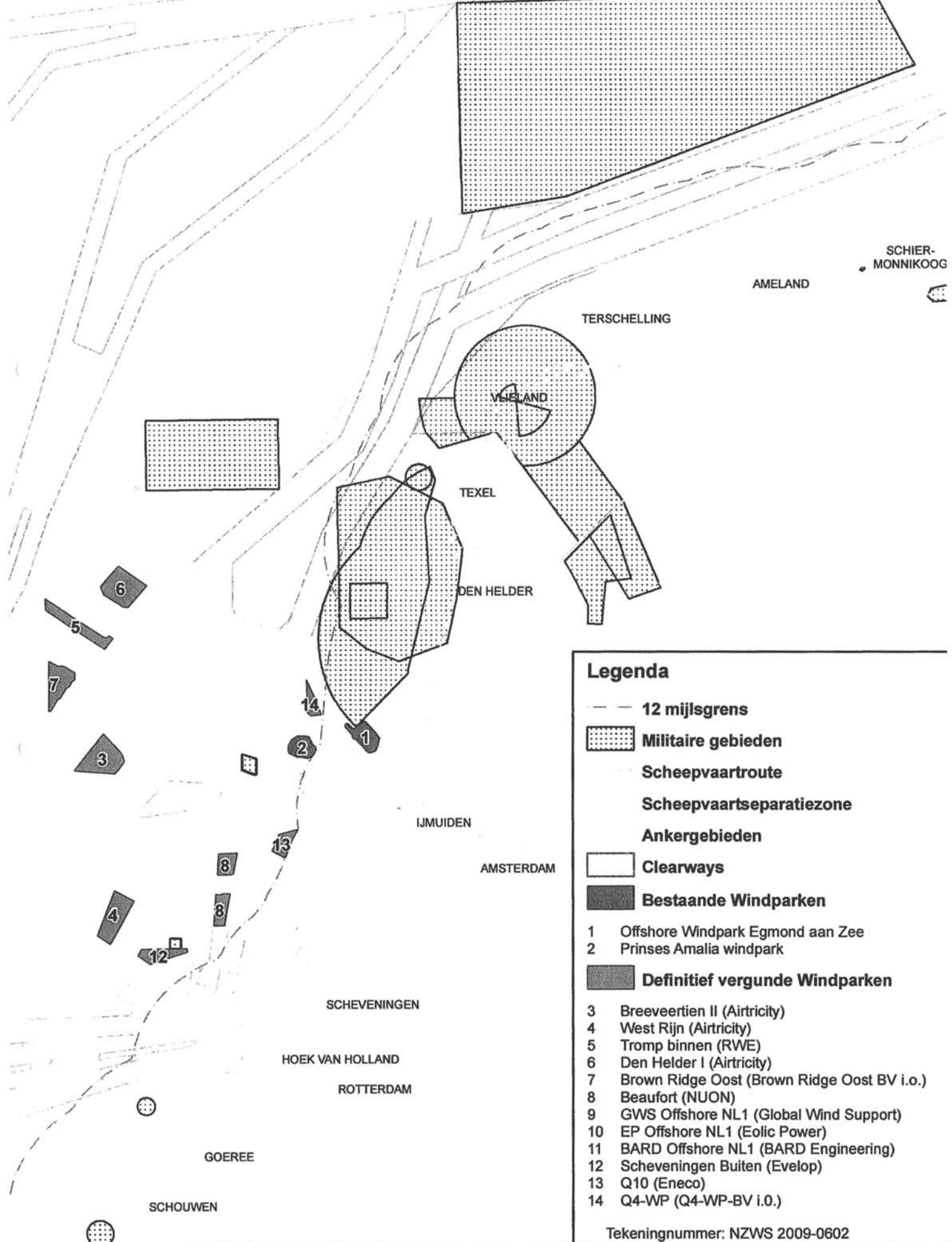
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# Overzicht definitief vergunde Windparken

Datum: 18 december 2009



## Legenda

- 12 mijlsgrens
  - Militaire gebieden
  - Scheepvaartroute
  - Scheepvaartseparatiezone
  - Ankergebieden
  - Clearways
  - Bestaande Windparken
  - Definitief vergunde Windparken
- 1 Offshore Windpark Egmond aan Zee
  - 2 Prinses Amalia windpark
- Definitief vergunde Windparken
  - 3 Breeveertien II (Airtricity)
  - 4 West Rijn (Airtricity)
  - 5 Tromp binnen (RWE)
  - 6 Den Helder I (Airtricity)
  - 7 Brown Ridge Oost (Brown Ridge Oost BV i.o.)
  - 8 Beaufort (NUON)
  - 9 GWS Offshore NL1 (Global Wind Support)
  - 10 EP Offshore NL1 (Eolic Power)
  - 11 BARD Offshore NL1 (BARD Engineering)
  - 12 Scheveningen Buiten (Evelop)
  - 13 Q10 (Eneco)
  - 14 Q4-WP (Q4-WP-BV i.o.)

Tekeningnummer: NZWS 2009-0602



**BARD Offshore NL 1**

**Introduction Technical Information**

**BARD-Group**

## **1.2 Introduction Technical Information**

### **BARD Offshore NL 1**

