EEMSHAVEN: HUB IN OFFSHORE WIND LOGISTICS
EEMSHAVEN MEETS MARITIME REQUIREMENTS OFFSHORE WIND INDUSTRY

- Draught: 7.5 - 14 m.
- Quay length: 5,085 m. (private and public quays)
- Jetty length: 1,130 m
- Width of fairway and basin(s): 110 - 350 m.
- Wide port entrance: suitable to transport assembled three-bladed rotors
- No infrastructural restrictions sail in/out of big material (power lines, bridges, locks, etc.)
- Near quay jacking
- Heavy load quays: 30 tons/m² | 20 tons/m²
- Limited tide range (2.5 m.)
- Approx. 91 hectares offshore sites available

GOALS | PLANNING
UP TO 2030

GOALS 2020:
Netherlands (west coast): ± 4.5 GW
Germany (German Bight North Sea): ± 6.5 GW

GOALS 2030:
Netherlands (west & northern coast): ± 7 GW
Germany (German Bight North Sea): ± 15 GW
Around a third of all the energy that is produced in the Netherlands comes from Eemshaven. With an installed capacity of 8,000 MW Eemshaven is an energy port of note. Major energy producers have invested billions of Euros in new power stations; an oil terminal was built; Google is expanding its immense data centre; and Eemshaven houses the largest onshore wind park in the Netherlands. The port also plays a prominent role in the development of wind parks at sea during their construction and the subsequent maintenance of the wind turbines. Eemshaven lives and breathes offshore wind. The port has become a base, marshalling and service port for offshore windfarms especially in the German neighbouring part of the North Sea. Eemshaven is geographically well-situated for the offshore wind activities in the North Sea. Moreover, Eemshaven meets all maritime requirements and has the facilities regarding the assembly and shipping of wind turbines.

**IMPRESSIONIVE TRACK RECORD**

Since 2009 Eemshaven plays an important role regarding assembly and shipping activities of wind turbines, which results in an impressive track record of wind farms launched from Eemshaven: successively Alpha Ventus, Bard Offshore I, Borkum Riffgat, Borkum Riffgrund I, Trianel Windpark Borkum, Global Tech I, Gemini, Gode Wind I & II, Veja Mate, Race Bank (UK), Nordsee One and Borkum Riffgrund II. Currently the wind farms Merkur Offshore and Hohe See are launched from Eemshaven to be followed by Albatros. In the near future many offshore wind projects in which Eemshaven could fit as base or service port are planned.

**PLUG IN**

Follow the energy and plug into your opportunities in Eemshaven. Contractors, construction companies, service and maintenance companies in the offshore wind industry, please contact our business manager below.

**ERIK BERTHOLET**

business manager logistics & offshore wind
E-mail e.bertholet@groningen-seaports.com
Phone +31 (0)65 353 9275
‘EEMSHAVEN CAN EASILY ACCOMMODATE THE LARGEST HEAVY-LIFT JACK-UP VESSELS’
TABLE OF CONTENT

1. EEMSHAVEN: ............................................. 4
   HUB IN OFFSHORE WIND LOGISTICS

2. EEMSHAVEN: ............................................. 6
   SERVICE PORT FOR MAINTENANCE ACTIVITIES

3. BEATRIXHAVEN: ........................................... 8
   DEDICATED FOR OFFSHORE WIND FACILITY

4. HELIPORT EEMSHAVEN ..................................... 10

5. OFFSHORE WIND ........................................... 11
   TEST TURBINES EEMSHAVEN

6. STEVEDORING COMPANIES ................................ 12

7. 4-6 GW WIND AT SEA ..................................... 13
   ABOVE THE WADDEN

8. REFERENCES EEMSHAVEN ................................... 14
   OFFSHORE WIND

9. SOIL CONDITIONS EEMSHAVEN .............................. 16
   SUITABLE FOR JACKING

10. EEMSHAVEN ............................................. 18
    POWER POINT FOR WIND ENERGY

11. NAUTICAL POSSIBILITIES .................................. 19

12. MEMBERSHIPS ............................................. 20
EEMSHAVEN: HUB IN OFFSHORE WIND LOGISTICS

EXCELLENT SITUATED AND MANY FACILITIES
Eemshaven lives and breathes offshore wind. The port has become a base, marshalling and service port for offshore windfarms especially in the German neighbouring part of the North Sea. Eemshaven is excellent situated, close to the North Sea, and well-equipped to accommodate logistic (offshore) projects. Many facilities are available in Eemshaven, like business sites, service locations, storage possibilities, (heavy load) quays, jetties, office space, etc. which makes this port excellent suitable as base, marshalling or service port. The distance to the wind farms (under construction, planned or completed) is short.

TRACK RECORD
The last years it has been busy in Eemshaven regarding assembly and shipping activities of wind turbines, which results in an impressive track record of wind farms launched from Eemshaven: successively Alpha Ventus, Bard Offshore I, Borkum Riffgat, Borkum Riffgrund I, Trianel Windpark Borkum, Global Tech I, Gemini, Gode Wind I & II, Veja Mate, Race Bank, Nordsee One, Merkur Offshore, Borkum Riffgrund II, Hohe See and Albatros. Eemshaven is also used for operation and maintenance activities. Currently the wind farms Gemini (Siemens Gamesa), Veja Mate (Siemens Gamesa), and Merkur Offshore (General Electric - GE) have their O&M service base in Eemshaven. Also Global Tech I and BARD Offshore are maintained from Eemshaven. In the near future many offshore wind projects are planned, in which Eemshaven could fit as base, marshalling or service port.

DIRECT ACCESS TO THE NORTH SEA
Due to the uncongested roads and ports, and efficient logistics there are hardly any waiting times in the Eemshaven. Eemshaven is multimodal attainable and has direct access to the North Sea. The port basins are wide and there are no sealocks or bridges, which makes it possible to pre-assemble the rotor blades and the nacelle in Eemshaven and transship the complete rotor star to the concerned wind farm. Furthermore an airport is in the vicinity and a heliport is under construction in Eemshaven.

SERVICE PORT
Both Emmahaven and Beatrixhaven are suitable for service and maintenance activities regarding the offshore wind business. There are sufficient berthing places for small and medium sized vessels and it is possible to embark passengers. Besides that, plenty of storage areas are available: paved or unpaved, outside and/or in warehouses. Furthermore, several sites for permanent use are available around the Emma- or Beatrixhaven and can be bought or leased. It is also possible to rent existing locations or make use of existing facilities.

“EEMSHAVEN: BASE, MARSHALLING AND SERVICE PORT FOR THE OFFSHORE WIND INDUSTRY”
Offshore wind farms launched from Eemshaven

- ALPHA VENTUS
  - 12 TURBINES | 60 MW | 28 MILES TO EEMSHAVEN
- BARD OFFSHORE I
  - 80 TURBINES | 400 MW | 43 MILES TO EEMSHAVEN
- BORKUM RIFFCAT
  - 30 TURBINES | 108 MW | 21 MILES TO EEMSHAVEN
- BORKUM RIFFGRUND I
  - 78 TURBINES | 312 MW | 28 MILES TO EEMSHAVEN
- TRIANEL WINDPARK BORKUM
  - 40 TURBINES | 200 MW | 35 MILES TO EEMSHAVEN
- GLOBAL TECH I
  - 80 TURBINES | 400 MW | 54 MILES TO EEMSHAVEN
- GEMINI
  - 130 TURBINES | 600 MW | 30 MILES TO EEMSHAVEN
- CODE WIND I EN II
  - 97 TURBINES | 582 MW | 40 MILES TO EEMSHAVEN
- VEJA MATE
  - 67 TURBINES | 402 MW | 43 MILES TO EEMSHAVEN
- RACE BANK
  - 91 TURBINES | 380 MW | 265 MILES TO EEMSHAVEN
- NORDSEE ONE
  - 54 TURBINES | 332 MW | 28 MILES TO EEMSHAVEN
- MERKUR OFFSHORE
  - 65 TURBINES | 396 MW | 35 MILES TO EEMSHAVEN
- BORKUM RIFFGRUND II
  - 56 TURBINES | 450 MW | 28 MILES TO EEMSHAVEN
- HOHE SEE
  - 21 TURBINES | 497 MW | 50 MILES TO EEMSHAVEN
- ALBATROS
  - 16 TURBINES | 112 MW | 54 MILES TO EEMSHAVEN

EEMSHAVEN

- The Netherlands
- Germany
- Denmark
- United Kingdom

**General Settings Eemshaven**

- Within nautical range of planned windfarms (low costs)
- Direct access to the North Sea
- Competitive purchase and lease prices
- Multimodal accessibility (road, rail, water)
- Close to airport
- Approx. 91 hectares offshore sites available
- Sufficient paved/unpaved storage area available (also adjacent to quay)
- Heavy cargo storage areas available
- Presence of a heliport

- Impressive track record (see pages 14/15 and below)
- Specialized stevedoring companies available: Orange Blue Terminals, Sealane, Wagenborg, and Wijnne Barends
- Specialized offshore service companies available: Amasus, DHSS, EMS Maritime Offshore, Seaway Offshore Cables, TenneT GmbH.
- Heavy load quays (30 tons/m² and 20 tons/m² available
EEMSHAVEN:
SERVICE PORT FOR
MAINTENANCE ACTIVITIES

The profile of Eemshaven answers to be a service port for activities regarding the operations and maintenance (O&M) of offshore wind turbines. Both Emmahaven and Beatrixhaven are suitable to accommodate these kind of activities. There are sufficient berthing places for small and medium sized vessels and it is possible to embark passengers. With connections for power supply and fresh water, storage possibilities, office space, customs clearance, and the presence of several logistic providers Eemshaven meets all requirements to accommodate maintenance and service companies.
EMMAHAVEN
Emmahaven is 500 metres long with a width of 120 to 150 metres, and a depth of 9.0 metres. A floating jetty and a services jetty provide more than 700 metres of berthing places for small and medium sized vessels. At the northern part of the Emmahaven Sealane operates a quay of 130 metres for general and/or dedicated cargo. At the western part Amasus has a jetty with a capacity of 130 metres and Gulf Bunkering operates a bunker terminal and supplies various high-quality fuels and lubricants for all oceangoing and inland vessels.

BEATRIXHAVEN
Beatrichaven is 1,200 metres long with a width of 110 to 150 metres, and a depth of 9.0 metres. At the northern part AG Ems operates a ferry terminal and EMS Maritime Offshore (EMO) runs an offshore service facility. EMO provides direct access to the water via a jetty with a capacity of 300 metres and offers lots of space for different configuration options. EMO is also the offshore service base for Siemens Gamesa (Gemini, Veja Mate) and General Electric (Merkur Offshore). At the southern part stevedoring company Wijnne Barends operates a terminal and accommodates the Norwegian company Seaway Offshore Cables. Bek & Verburg, a specialist in waste collection and segregation, and DHSS, a vessel agency and port service provider, together construct a new offshore service base behind the southern quay as well.

LOGISTIC PROVIDERS
Specialized stevedoring companies have been established in Eemshaven like Orange Blue Terminals, Sealane, Wagenborg and Wijnne Barends. They all offer quay facilities and handle logistic activities and have lots of experience in offshore wind business. Amasus Shipping and EMS Maritime Offshore also provide logistic services and offer for instance jetty capacity.

FOR SALE/LEASE MOORING FACILITIES, OFFICES, STORAGE, BUSINESS SITES

FOR RENT (THIRD) PARTIES
1. Wijnne Barends (storage + quay)
2. EMS Maritime Offshore (storage + jetty)
3. Orange Blue Terminals (storage + quay)
4. Wagenborg (storage + quay)
5. Sealane (storage + quay)
6. Amasus Shipping (storage + jetty)
7. Gulf (bunkering)
8. Nijlucht (offices)
9. Services jetty (mooring facility)
10. Floating jetty (mooring facility)
11. Business sites (buy or lease)
BEATRIXHAVEN: DEDICATED FOR OFFSHORE WIND FACILITY

HEAVY LOAD QUAY; 30 TONS/M² | NEAR QUAY JACKING
**ALLREADY ESTABLISHED**
On the southern side the stevedoring company Wijnne Barends, that stores, transships and handles a broad range of cargo, is established. It also accommodates the offshore service company Seaway Offshore Cables. Bek & Verburg, a specialist in waste collection and segregation, and DHSS, a vessel agency and port service provider, together construct a new offshore service base behind the southern quay as well. On the northern side AG Ems operates a passenger terminal with a ferry service to the German Wadden island of Borkum. Besides this terminal EMS Maritime Offshore (EMO) runs an offshore service facility with a jetty to accommodate service and crew transfer vessels. Siemens Gamesa and Merkur Offshore (General Electric) have offshore servicehubs on the EMO premises to operate and maintain (O&M services) 273 wind turbine generators for Gemini, Veja Mate and Merkur Offshore.

**AVAILABILITY OF LAND**
Sites for permanent use can be bought or leased. It is possible to build a private terminal behind the quay or to rent existing locations. It is also possible to make use of existing facilities. With over 90 hectares there is more than enough space for establishment.

**BEATRIXHAVEN**
Beatrixhaven is the Eemshaven’s youngest harbour basin. With the completion of the Beatrixhaven Eemshaven has strengthened its position as base and service port in the offshore wind industry. A special quay with a length of 220 metres has been built for extra heavy cargoes on the western side. This heavy load quay has a maximum capacity (equally divided load) of 30 tons/m² and has been especially designed for the transhipment of extra-heavy cargoes such as wind turbine components. Jack-up ships can moor just in front of the quay. IHC IQIP e.g. used this quay to build up its 1300 tons Noise Mitigation Systems (NMS) for monopile installation. The Beatrixhaven has a length of 1,200 metres and a turning basin has been put in place at the end. On the southern side a 1,200 metres long quay is available with space for companies to establish their businesses.

**NEAR QUAY JACKING BEATRIXHAVEN**
Jack-up vessels can moor in the Beatrixhaven just in front of the quay. That means these vessels can use their own cranes for loading activities.

**FOR SALE**
APPROX. 91 HECTARES OFFSHORE SITES IN THE EEMSHAVEN

- ± 41 ha
- ± 33 ha
- ± 17 ha

BUSINESS SITES • (HEAVY CARGO) QUAYS • MOORING FACILITIES FOR JACK-UP VESSELS

Groningen Seaports has examined the logistic possibilities of the Beatrixhaven for offshore construction and transhipment vessels like jack-ups, pontoons and freighters with large cranes. Simulations demonstrated that most offshore vessels can approach this basin without problems in wind conditions mounting 8 Bft.
In recent years Eemshaven has become the backdrop to large-scale activities concerning the assembly and shipping of wind turbines. For the next years many wind park initiatives are planned for the North Sea as well. Eemshaven is able to play a key role in maintaining and repairing these planned wind turbines. Therefore a starting and landing site for helicopters is constructed in the northwestern part of Eemshaven, close to the Beatrixhaven. For the wind farms Gemini, Veja Mate and Merkur Offshore (273 wind turbine generators), Eemshaven already is the service base for O&M services. It is expected that the heliport Eemshaven will be operational by the end of 2018. A train station is close by, which means heliport Eemshaven is directly connected with the public transport network.
Senvion, 2-B Energy and Lagerwey have test turbines in Eemshaven. Senvion hosts two 6MW test turbines on the Wagenborg Stevedoring premises. Both turbines are 114 m high and are part of the Westereems wind farm of RWE Innogy. The 6MW 2-B Energy test turbine is carefully designed and integrated in an overall plant view that reaches substantial cost of energy savings over plant life. The 2-B Power Plant is a true offshore design, setting new standards and targets. It is a two bladed design, with a total length of 140 m. The turbine is 105 m high and offers access for helicopters. By having the two Lagerwey 4.5 MW turbines, Eemshaven houses the tallest wind turbines in the Netherlands. These turbines, with a tip height of 200 metres, were installed by the Dutch wind-turbine construction company Lagerwey. The second turbine was built with a special climbing crane; the first climbing crane in the world.
STEVEDORING COMPANIES

OFFERING BERTHS
QUAYS


PRIVATE JETTIES

www.offshoreservice.de  www.amasus.nl

OFFSHORE RELATED COMPANIES

- 2-B Energy
- Alert
- Broekman Logistics
- CIV Offshore
- Collé Rentals
- Customs
- Datema Nautical Safety
- DHSS
- Eekels
- Geoplus
- Hydraulcom
- KSML
- Lagerwey
- Maintec
- Military Police
- Niestern Sander
- OWF (Boskalis | Volker Wessels)
- Peterson
- Reyn
- Seaway Offshore Cables
- Senvion
- Siemens Gamesa
- Siri Marine
- TenneT GmbH
- Tideway
- Total Ship Supply
- Total Wind
- Van Oord
- Windea
There are many more wind farms planned, particularly for the German Bight in the North Sea. However, there is still space in the Dutch part. Near the Gemini wind park, north of Schiermonnikoog, there is room for 1,000 wind turbines (4-6 GW) and the authorities and politics in Groningen have asked the State to release the area. At the moment it is partly used as a military training area and this training area would need to be moved for the purpose of planning permission. It merely highlights that the province of Groningen and other authorities are very positive and cooperative regarding offshore wind. It considers Eemshaven to be at the heart of it all.
REFERENCES
EEMSHAVEN
OFFSHORE WIND

July 2009
JB 114 for Alpha Ventus
Julianahaven

June 2011
Thor (Hochtief) for Alpha Ventus
Wagenborg, Julianahaven

September 2012
Oleg Strashnov for Borkum Riffgat
Wilhelminahaven

April 2013
Bold Tern for Bard Offshore I
Wagenborg, Julianahaven

July 2013
Innovation for Global Tech I
Orange Blue Terminals, Julianahaven

September 2013
MPI Adventure for Trianel Borkum
Orange Blue Terminals, Julianahaven

March 2014
Pacific Orca for Riffgrund I
Orange Blue Terminals, Julianahaven

March 2014
Borwin Beta for Merkur Offshore
Wijnne Barends, Beatrixhaven

August 2014
Wave Walker for Gemini
Sealane, Emmahaven

February 2015
Flintstone for Godewind II
Orange Blue Terminals, Julianahaven

September 2015
Aeolus | Pacific Osprey for Gemini
Orange Blue Terminals, Julianahaven

September 2015
Brave Tern
Beatrixhaven
“EEMSHAVEN OFFERS OPTIMAL CONDITIONS FOR OFFSHORE VESSELS. SPACE, WELL-SKILLED LOGISTIC PROVIDERS AND THE PRESENCE OF FACILITIES WE NEED”

October 2015
Nexus for Windpark Gemini
Beatrixhaven

March 2016
Windlift 1 for Bard Offshore
Wagenborg, Julianahaven

March 2016
Saipem 7000 (maintenance)
Orange Blue Terminals, Julianahaven

August 2016
Seajacks Zaratan for Veja Mate
Orange Blue Terminals, Julianahaven

August 2016
Innovation for Race Bank (UK)
Orange Blue Terminals, Julianahaven

October 2016
Windea La Cour for Gemini
Julianahaven

November 2016
Saipem 7000 (maintenance)
Wilhelminahaven

March 2017
MPI Enterprise for Nordsee One
Orange Blue Terminals, Julianahaven

November 2017
Sea Challenger for Merkur Offshore
Orange Blue Terminals, Julianahaven

February 2018
Vole au Vent for Borkum Riffgrund II
Wagenborg, Julianahaven

May 2018
Seafox 5 for Merkur Offshore
Orange Blue Terminals, Julianahaven

June 2018
Pacific Osprey for Hohe See
Orange Blue Terminals, Julianahaven
SOIL CONDITIONS

EEMSHAVEN SUITABLE FOR JACKING

The port of Eemshaven is situated in the north of the Netherlands at the river Ems close to Germany, bordering the Wadden Sea. Most of the port area is reclaimed land outside the primary dikes. The area has been raised with 4 to 5 m sand, therefore providing stable soil conditions for on-shore developments.
JACK-UP VESSELS

Jack-up vessels frequently visited Eemshaven during the last years. Due to the recent offshore wind farm projects these vessels frequently visit Eemshaven to load heavy equipment required for the construction of these wind farms.

The depth of the Juliana harbour basin varies between NAP-14 m and NAP-17 m. For jack-up vessels visiting the Juliana harbour leg penetration analysis have been carried out based on cone penetration tests. These results indicate that for loads between 150 Mega Newton and 250 Mega Newton penetrations between 4 m to 7 m below the seabed are to be expected. The legs penetrate the silty clay layer but penetration in the underlying sands is limited.

The maximum safe proximity of the legs of a jack-up vessel to the quay depend on the penetration depth of the legs. In order not to endanger the stability of the quay walls, leg penetration is not allowed in the passive zone of the quay walls. Depending on the exact loads, quay and soil conditions distances from 15 m are to be expected. Please note that calculations of leg penetration and safe distance of legs to the quay wall are mandatory before acquiring permission from the harbour board.

NEAR QUAY JACKING BEATRIXHAVEN

Jack-up vessels can moor in the Beatrixhaven just in front of the quay, which enables them to use their own cranes for loading activities.

JULIANA- AND BEATRIXHAVEN BASINS

Based on cone penetration tests a W-E profile has been constructed directly North of the western part of the Juliana harbour basin. The depth of the soil profile is 50 m starting at approximately NAP+4.5 m. The profile shows a sandy top layer to approximately NAP-15 m, followed by a layer of clayey silt, silty clay to NAP-19 m/ NAP-23 m. Underneath follows generally a well compacted sand layer.

FIGURE 1 >>
Soil profile W-E North side western part of the Julianahaven basin (length profile appr. 600 m.). The soil profile shown in figure 1 gives an impression of the soil conditions of this part of the Eemshaven. Variations can occur depending on the exact area of interest.
Eemshaven is not only base port or service port for the offshore wind industry, but it is also the landing port for international connections, especially for wind energy. Several converter stations are operational in Eemshaven and there are connections with Norway, UK, and Germany. In the near future, when the COBRA cable is finished, Eemshaven is also connected with Denmark (2019). Add the energy producing companies established in Eemshaven and it is obvious that with a capacity of 8,000 MW Eemshaven is the power point of and balancing hub for Northwest Europe.
JULIANAHAVEN
Length 1,200 m
Width 200-250 m
Draught max. 11.5 m
Jacking permitted Yes, >15 m from quay *
QUAY:
Quay length (north) 1,100 m (pressure 6-20 ton/m²)
Quay length (south) 1,200 m (pressure 2.5-7.5 ton/m²)
Quay width varies
Quay height 4.4 m

WILHELMINAHAVEN
Length 1,200 m
Width 275-350 m
Draught max. 14 m
Jacking permitted Not allowed
QUAY:
Quay length (north) 525 m (pressure 4-6 ton/m²)
Quay length (south) 450 m (pressure 4-6 ton/m²)
Quay length (east) 275 m (pressure 4-6 ton/m²)
Quay width 40 m
Quay height 5.5 m

BEATRIXHAVEN
Length 1,200 m
Width 110-150 m
Draught max. 7.5 m
Jacking permitted Yes
QUAY:
Quay length (south) 1,200 m (pressure 4-6 ton/m²)
Quay length (west) 220 m (pressure 30 ton/m²)
Quay width 30 m
Quay height 4.4 m

EMMAHAVEN
Length 500 m
Width 110-150 m
Draught max. 7.5 m
Jacking permitted Not allowed
QUAY:
Quay length (north) 135 m (pressure 4-6 ton/m²)
Quay width varies
Quay height 4.4 m
OTHER FACILITIES:
Private jetty 130 m
Services jetty 120 m
Floating jetty 740 m
Losstoep Wagenborg 320 m (mooring location pontoons)

* Subject to location and penetration spudcans
"Groningen Seaports believes that the mentioned details are correct, but some data may be subject to changes"
OUR MEMBERSHIPS

www.windeurope.org

www.nwea.nl

www.nnow.nl

www.windeurope.org/policy/topics/offshore-wind-ports/
MORE INFORMATION
GRONINGEN SEAPORTS
Handelskade Oost 1
9934 AR Delfzijl
P.O. Box 20004
9930 PA Delfzijl
The Netherlands
Phone +31 (0)596 640400
E-mail salessupport@groningen-seaports.com
Website www.groningen-seaports.com
Twitter @WindEemshaven