

Offshore Wind Port Bremerhaven





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Bremerhaven. Home port for the offshore wind industry

Whenever people seek new horizons, we are there.

When emigrants sought good fortune overseas in the 19th century, their steamers set off from Bremerhaven. When industry and trade began to open up new markets around the globe, we developed our port into a hub for the international goods industry. Each year in Bremerhaven we handle some two million vehicles alone. The next advance is on the march – a new industry is taking shape. Nacelles, foundations and rotor blades for tomorrow's offshore wind farms are being produced in new halls.

Over 300 turbine manufacturers, suppliers and service providers as well as research institutions are forming a wind energy cluster in the region, unequalled elsewhere in the world. At the centre of this is the Fraunhofer Institute for Wind Energy and Energy System Technology (IWES), an institution that enjoys worldwide recognition and where both national centres of excellence for rotor blades and maritime structures and plants are based.

One of Europe's largest ports, Bremerhaven has long been closely associated with logistics and the maritime industry. In the past decade, the wind industry has established itself as another growth sector. With the industry now taking its turbines out to sea, it's able to profit from the comprehensive experience of our local maritime industry, coupled with scientific excellence.

Shipyards, ship owners and logistics specialists are in place to make their contribution to the low-impact and environmentally-friendly production of power at sea. In the area of maritime research and development, scientific progress will offer further vital components for Bremerhaven's expansion as the European centre for wind energy.

We too at the BIS Bremerhaven Economic Development Company will support you by quickly getting you in touch with decision-makers and responding rapidly to your questions and wishes. We have already set up important conditions for success – along with access roads and storage areas, deep water ports with quays and cranes have been created for bulky heavy-load structures for offshore plants.



We have done our homework. Barrier-free production Our ports are ready.

A central pillar of our overall plan is the Luneort wind industry park.

It is here that well-known businesses like AREVA Wind GmbH, REpower Systems AG, PowerBlades GmbH or WeserWind GmbH are manufacturing multi-megawatt offshore turbines and rotor blades as well as the foundations needed for them. The 80-hectare site, situated in the port itself, has enough space to attach buffers during seasonal peak periods and to load them efficiently onto ships. As not all turbines are destined for offshore use, we have developed the site in such a way as to provide barrier-free access to the nearby A27 motorway, as well as a rail connection to the German rail network, enabling wind components made in the park for land use to be transported without a problem.

As for the port, deep enough for seagoing vessels, routes are short. In the docks, the Weser river estuary, and in North Sea shipping lanes there's always plenty of water below the keel, even at low tide. In summer months, when demand for the chartering of transport and construction ships is high, time is money. Waiting for the tide to turn isn't an option.

with direct access to the water's edge

Short routes don't just apply to the building of offshore wind farms. Efficiency, too, of service and maintenance has a direct link with distance to the service port. Helicopters can quickly fly out assembly workers to the turbines. When bulky or heavy replacement parts require transporting, fast transfers by ship are necessary. That's why, when it comes to service and maintenance ideas, the name Bremerhaven regularly crops up. Both manufacturers and independent service providers are setting up service and training centres here.

In Luneort and our cluster, contacts come about by themselves. However, we at BIS are happy to introduce you to potential partners. And if you intend to set up a business here, we'll help with choosing the location. As industrial developers, we're the people to approach regarding state, federal and European Union subsidies. Come and talk to us!

Bremerhaven offers your employees ideal surroundings

The bustling life of the port carries on side by side with sea views, dyke promenades and a fresh sea breeze. In Bremerhaven and in the Cuxland area, work goes on where many take their holidays.

The offshore wind industry has found a home here amongst the breezes of the sea. Wind farms, and those who work on them, feel at home here as they get to grips with future energy provision. Wind farms far out at sea are an enormous challenge. Here in Bremerhaven we provide optimal conditions that will bring you success.

For investment, we are your port of call!



European champions enter and leave here

Are there such things as miracles? – In the north of Germany we prefer to take a realistic view.

In these parts we like to say that the apple doesn't fall far from the tree. But sometimes we do rub our eyes in astonishment when we look at our port statistics. In 1960, Bremen's ports handled some 14 million tons of goods. We find it astonishing today that as much as 75 million tons of goods enter and leave Bremen's ports in a good year. Bremerhaven alone saw a 35-fold increase in the past 50 years!

A wonderful achievement. But this is no miracle, more a testimony to the clear plans we have been pursuing. If we are going in the right direction, we're not reluctant to make investments because we've known ever since the Hanseatic League was set up some 800 years ago that it's all a question of establishing efficient transport routes.

Seaports have a special role as an intersection between sea and land transport.

Maintenance of the waterways is guaranteed for the long term – thanks to cars and bananas.

Our container terminal with its five-kilometre quay directly on the bank of the Weser is one of Europe's four largest. We are one step ahead in Bremerhaven when it comes to handling cars. Each year, two million vehicles are handled (export and import). Statistically speaking, this means 15 seconds per car, assuming a working year of 365 days.

A third cornerstone of our port's activity is to provide Germany with fresh vitamins. No European port handles more fruit than we do.

This highlights the enormous economic significance of Bremen's ports. Here in the north, when we say that our ports are important, this sentiment is shared by the national waterways and shipping administration, which recently graded Bremerhaven's and Bremen's links to the sea as priority waterways.

Although public funds are lean today, they will continue to be used in future for the expansion and upkeep of these waterways. With good reason we can proudly say that you will always be able to plan on excellent sea routes to and from Bremerhaven and Bremen.



Athletes save their strength when they are in the slipstream. The wind energy industry benefits here from the same advantage.

Seagoing ships from the North Sea reach Bremerhaven in two hours along a 55-kilometre or 32 nautical-mile stretch of the Weser estuary. The German government until now has focussed primarily on the expansion and upkeep of waterways for vessels carrying vehicles, containers and fruit, enabling the smooth operation of over 100 scheduled services that connect Bremerhaven with the world's main trans-shipment centres.

Now the offshore wind industry has sufficient water below its keel to follow in the slipstream. This is an important advantage when hundreds of tons of heavy turbines, towers and foundations need to be transported to construction sites far out at sea. A synergy that is both fine and unusual at the same time, because the industry and the notion of a slipstream are at odds with one another.

Here in Bremerhaven, things are different. The offshore wind energy industry, together with other maritime businesses, enjoys the benefits of an excellently developed infrastructure. It benefits from deep channels and the heavy-load terminals at Labradorhafen and Containerterminal 1, where reinforced quays and high-performance cranes are ideally suited to the pre-assembly and loading of the giants of wind power.

Together with the handling of cars, containers and fruit, offshore wind power is becoming the port's fourth pillar.

With the development of the Luneort wind industry park and the investment put into heavy load-bearing quays - capable of withstanding over 50 tons per square metre - we've set our sights over the past 10 years on the specific needs of the offshore wind energy industry.

We're convinced of the opportunities offered by climate-friendly energy production at sea. In years to come, this industry will become the fourth pillar for Bremen's ports, providing a solid cornerstone for the region's economy. We're a home port that serves as a firm base.

Offshore begins in Bremerhaven.



Pioneering. We've been there. We can do that.

Wind farms far out in the harsh North Sea environment? Our experience goes back 10 years.

Water depths of up to 40 metres and sites between 30 and 100 kilometres off the coast – this is the framework of operations for Germany's offshore wind farms. Offshore wind energy offering a sustainable power supply holds the greatest potential for growth amongst the renewables. It's a vital element in fulfilling the climate-policy goals of Europe, Germany and the State of Bremen.

We grasped the opportunities that offshore wind energy presented very early on. A large number of wind turbines, foundations, logistics concepts and, last but not least, offshore measuring masts come from Bremerhaven and its surroundings. Germany's first three offshore wind farms have begun producing power on our doorstep. Dozens more will follow in years to come.

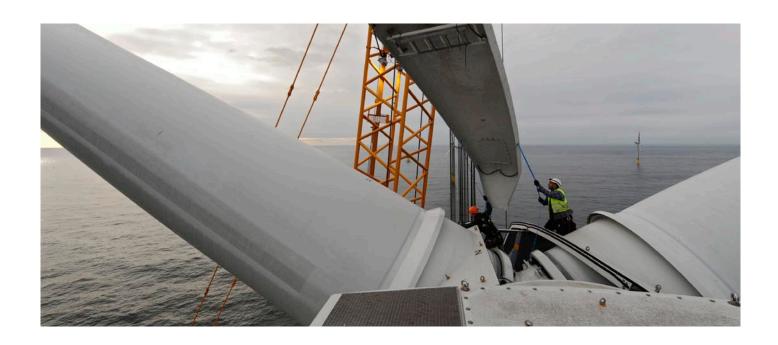
Wind farms are expected to reach a total capacity of 25,000 megawatts by 2030. For the German government's goal to be met, one wind turbine with a capacity of 5 megawatts needs to be built at least every other day. This is an enormous challenge, but it is achievable, as demonstrated by the construction of initial offshore wind projects far out to sea.

To realise the potential here and overseas, manufacturers need to have lots of space, a perfect infrastructure and qualified personnel.

The wind power industry is currently expanding its production capacity for multi-megawatt wind energy turbines. Other countries around the North Sea, such as Britain, Belgium and the Netherlands, are, like Germany, in the process of developing the vast potential for offshore energy. In Europe alone, experts estimate that offshore wind potential will yield around 140 gigawatts of power.

With production facilities located on the heavy-load quay in a port suitable for seagoing vessels, optimal conditions exist for turbine manufacturers in Bremerhaven to meet the demands of these new markets. Moreover, space for future development is available in reserve to enable us to grow with them and meet future challenges posed at home and abroad. As a port location, we know all about pioneers. Research and training for the offshore wind sector in future can have no better base than here in Bremerhaven.

We'll help you to get started.



We are resolved. It's now a matter of ships, capital and implementation.

The Federal Maritime and Hydrographic Agency (BSH) to date has approved wind farms with a total capacity of over 21 gigawatts in Germany's North Sea and Baltic Sea. The time is right to put these plans into action.

The German government is calling for investments of around 75 billion euros. Some 10,000 turbines, each one higher than Cologne Cathedral and with foundations weighing more than 1,000 tons, need to be built, loaded, taken out to sea, erected and linked to the grid.

To make optimal use of spells of good weather for turbine construction, several wind farms have to be built at the same time. When the first wind farms were constructed, not enough jack-up ships were available, for instance. Ships suitable for the transfer of materials and personnel between ports and construction sites were also in short supply. Shipyards and shipping companies are now dealing with this shortage.

Furthermore, workers need to be prepared and trained for the tasks involved and learn to deal with the dangers in working on the high seas. In other words - these challenges are creating a whole new industry in our region.

Bremerhaven is both engine and gearbox for this development. It's here that industry is building its hardware, and its logistics are being directed from here. And it's here that control centres for wind farms are being equipped. Tomorrow's offshore plans are progressing hand in hand with scientific development.

We need energy, but not at the expense of an environment worth living in.

An alternative to offshore wind energy is not in sight. Wind power from the sea is playing a leading role in the planning to shift power generation in order to mitigate climate change and create an environmentally-friendly energy mix. There is the expectation that the importance of fossil fuels will have diminished significantly by 2050. It is Germany's goal as an industrialised nation to reduce greenhouse gas emissions by four-fifths compared to 1990 levels. In turn, renewable energies are to cover 80 percent of power consumption.

The offshore wind farms approved so far will on their own prevent 100 million tons of carbon dioxide from being released to the atmosphere each year. In doing so, they will also make a valuable contribution to the security of supply and meet 15 percent of Germany's power requirements.

These plans can become reality only if the wind and maritime industries, ports, logistics providers and the financial sector work in close collaboration with politicians and science. This kind of collaboration is a reality in Bremerhaven already.

The climate is right in Bremerhaven, and so is the infrastructure.



From the factory to the quay.

1 Labradorhafen

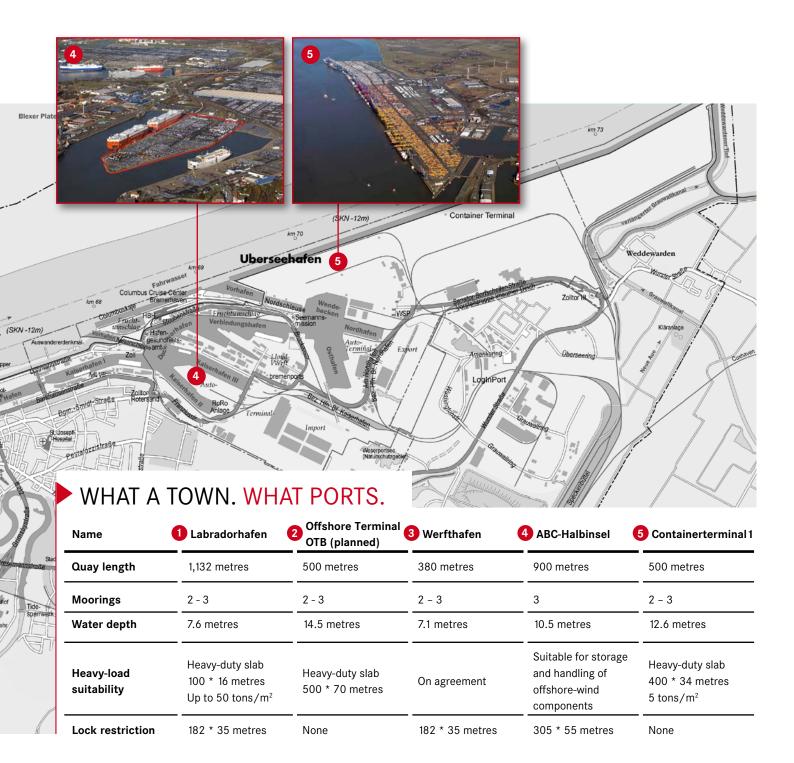
In Labradorhafen today, manufacturers handle nacelles, rotor blades and foundations. On the east and west sides as well as at the head of the dock, the kilometre-long quayside ensures there is sufficient space for large-scale manoeuvres. The large heavy-load area comprises 1,600 square metres and can bear up to 50 tons per square metre.

2 Offshore Terminal Bremerhaven OTB

In Blexer Bogen, a new terminal is going to be built on the bank of the Weser itself. With a heavy-load quay of half a kilometre in length, a 25-hectare surface area and two to three moorings it will also be able to handle seasonal transportation for the offshore wind industry from 2014. Turbines can be loaded from the factory straight onto ships having a draft of up to 14.5 metres. As soon as cranes and equipment are available, 160 wind turbines per year can be assembled and loaded onto special ships and jack-ups.

Werfthafen

Plans presently call for the old shipyard site of SchichauSeebeck to become the Seebeck offshore industrial park. Centrally located offices along with storage areas and moorings for service ships will be made available.



4 ABC-Halbinsel

Located between Kaiserhafen II and III, on the car terminal, the ABC-Halbinsel serves as a buffer zone. Here you will find ship mooring areas next to stacking grounds where equipment and replacement parts for service and maintenance at sea can be safely stored - very close by. The 900-metre quay and a dock with a depth of 10.5 metres allow for full freedom of movement. Access is via the 305 by 55 metre Kaiserschleuse lock.

5 Containerterminal 1

As a temporary solution until 2013, our Containerterminal 1 serves as a base port for the construction of the Nordsee Ost I offshore wind farm located 35 kilometres to the north of Helgoland in the middle of the German Bight. Along the 500-metre heavy-load quay, 48 six-megawatt turbines and their foundations are being assembled and loaded. As the terminal has a water depth of 12.6 metres, the wind farm can be reached without transport vessels needing to stop at a lock.



Offshore services start in the harbour

Breakdowns happen by themselves. Intelligent service and maintenance plans do not.

Wind turbines on land and out at sea may appear at first sight to be very similar to each other, but they're quite different when it comes to service, maintenance and operational plans. At sea, other forces affect offshore turbines: breaking waves, corrosion, dampness, the finest of salt particles and high wind speeds that are seldom encountered on land.

The best ways of countering such extreme conditions are to invest in research and development, education and training, constant technical supervision and fully developed maintenance plans. Much more so than on land, offshore operations must rely on prevention as the only way to avoid small problems turning into major damage. Since remote supervision and redundant systems are constants in operational plans, assembly workers can often cut back on their deployment at sea.

25 per cent of offshore costs go on service and maintenance.

Despite continuous supervision there is no way to avoid regular visits to turbines. This is a sensitive area. For offshore wind farms, service and maintenance constitute a guarter of the total costs. Breakdowns at multi-megawatt plants leading to production loss can be expensive. All the more so if strong winds and high waves make them inaccessible. Cost reduction is a key factor in the planning of service and maintenance.

Two things are needed: fast access to wind farms without being dependent on good weather, and a base port with necessary effective structures in place.

Bremerhaven provides both. Spacious storage areas and moorings at the harbour shipyard and on the ABC peninsula at Kaiserhafen facilitate rapid logistics for replacement parts, keep equipment readily available and provide rapid means of transportation for transferring workers to wind farms. For those businesses wishing to use time-saving helicopter transfers for personnel, the region offers a choice of providers. Four notable repair yards offering efficient service are Bredo Werft, Lloyd Werft, MWB-Motorenwerke and Rickmers Lloyd Dockbetrieb. The logistics sector has traditionally been strongly represented at the large port as well.

We have pearls aplenty. Which ones you want to thread onto your service chain is completely up to you.



Short routes strengthen networks. Cooperation comes about by itself.

Bremen's maritime profile provides excellent research institutions and universities as well as education and training facilities. The transfer of knowledge goes on here as it were by being in touch with those around you - sometimes even over lunch.

Study and work at our universities and research institutions goes on in an informal way. Young logisticians and wind energy experts pursue their studies and seem to grow naturally into the sector's specialist and crosssector networks. It is these young people who will one day assume responsibility for the operation, maintenance and service of up to 10,000 wind turbines in the North Sea.

The Wind Energy Agency Bremerhaven/ Bremen (WAB) in Bremerhaven is Germany's, if not the world's, largest network for the offshore wind industry. In less than 10 years, WAB has grown into a central point of contact for 300 member businesses from all sectors of the offshore power industry. It maintains the network in regular, informal meetings and holds an annual WINDFORCE - DIRECTION OFFSHORE conference, attended by hundreds of experts from all over the world.

The strongest chain is only as good as its weakest link.

A fast-growing sector provides security. Alongside special ships, heavy-load quays, helicopters and offshore wind turbines, a human being appears small and vulnerable. A person is indeed so unless he or she undergoes the instruction and safety training needed for offshore work.

Here at the new Offshore Safety Training Centre in the research and development area, your employees will learn what they need to keep in mind when working at sea - how to abseil from a helicopter or what to do when someone falls into a choppy sea. This knowhow comes about as a direct result of the maritime industry forging close links with wellestablished wind energy businesses. Knowing how to minimise dangers when working at sea is something that Bremerhaven has discovered over the centuries.

You can trust in this knowledge.



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- ▶ Education and training facilities that perfectly match the needs of wind turbine manufacturers
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- Offshore Safety Training Centre
- Large maritime supplier industry
- Headquarters of the Wind Energy Agency Bremerhaven/ Bremen, Germany's largest offshore network



A selection of businesses in the offshore wind energy sector in Bremerhaven

Areva Wind GmbH

Am Lunedeich 156 27572 Bremerhaven t: +49(0)471 - 8004 0 info@arevawind.com www.arevawind.com



AREVA Wind

AREVA Wind manufactures and designs the AREVA M5000 a 5 Megawatt wind energy converter for offshore wind farms in the production facility in Bremerhaven, a location which also offers best conditions for installation, service and transportation on the high seas. The AREVA M5000 is the first 5MW wind energy converter that has been exclusively designed for offshore conditions. AREVA Wind is a subsidiary company of the AREVA Group and part of the business group AREVA Renewables.

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For more than 50 years now, the Berufsfortbildungswerk des DGB (bfw) offers highly qualified advanced training modules for the various branches and private persons throughout Germany.

It is this experience and the highly motivated team which guarantees professional trainings also for the wind energy branch. The bfw qualifies workers for the production, installation, service and maintenance of wind turbines as well as for the production and maintenance of rotor blades.

BLG LOGISTICS GROUP AG & Co. KG

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f: +49(0)421 - 398 3487 windenergy@blg.de www.blg.de



BLG develops logistical systems for the coordination and supply chain management for wind farms - from procurement to production and installation at sea, and all along the value chain. The standardisation of logistical processes is the basic requirement for the industrialisation of production in order to increase the efficiency of the supply chain and to considerably reduce logistical costs. BLG offers complete solutions and is a reliable partner for operative processing.

DOC Deutsche Offshore Consult

DOC Office Bremerhaven Barkhausenstraße 4 27568 Bremerhavent t: +49 (0)471 - 958 466 10

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www.deutscheoffshore.de



Deutsche Offshore Consult (DOC) provides operational and project management expertise within the dynamic offshore wind sector. Offices in Bremen and Bremerhaven were carefully selected placing us in the centers of German offshore activity. Offshore experts with decades of experience were recruited by DOC, thus establishing DOC as a reliable and experienced partner for the implementation of offshore projects.

EUROGATE Container Terminal Bremerhaven GmbH

Friedrich Stuhrmann Senator-Borttscheller-Straße 1 27568 Bremerhaven t: +49(0)471 - 1425 989 friedrich.stuhrmann@eurogate.eu www.eurogate.eu



EUROGATE is the leading container terminal logistics Group in Europe. Jointly with Contship Italia, the network operates nine container terminals from the North Sea coast to the Mediterranean area with excellent connections to the European hinterland. Our range of services is rounded off by intermodal transport and logistics management. The company was founded in 1999 and handled 12.6 million TEU in 2010.

FIELAX

Gesellschaft fuer wissenschaftliche Datenverarbeitung mbH

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FIELAX offers scientific-technical services and products for marine science and technology. These services include the installation, operation, maintenance and supervision of research platforms, scientific devices and IT systems in the marine environment. The company also provides a range of underwater testing services using its own ROVs (Remote Operated Vehicles) and Heat Flow Probes.

HMN-Beteiligungsgesellschaft mbH & Co. KG

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HMN Beteiligungs-GmbH & Co. KG consolidates three business companies:

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Falck Nutec is one of the world's leading providers of safety training and offshore services. Our wind training courses are created in close cooperation with the wind turbine industry, and provide the realistic and critical training needed to prevent accidents. Our courses consist of a selection of training disciplines which can be put together according to your needs.

fk-wind

Prof. Dipl.-Ing. Henry Seifert An der Karlstadt 8 27568 Bremerhaven t: +49(0)471 - 4823 547 fk-wind@fk-wind.de www.fk-wind.de



The Institute for Wind Energy at the University of Applied Sciences Bremerhaven carries out applied research in the field of on- and offshore wind energy in close collaboration with the Bachelor study course Maritime Technologies and the Master study course Wind Energy Technology under the motto: "To understand the wind turbine as a whole". Main research topics are rotor blades and structures, sensor and measurement techniques, condition monitoring and simulation.

Heise Schiffsreparatur & Industrie Service GmbH

Thorsten Heise Hoebelstraße 55 27572 Bremerhaven www.heise-schiffsreparatur.de



Heise Schiffsreparatur & Industrie Service GmbH has been established since 1987 and is situated in the Fischereihafen in Bremerhaven. Here we have a repair berth with a length 220 m alongside yard premises.

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iSiTFC

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iSiTEC offers scientific and industrial products and services in the field of environmental and marine technologies. This includes the development and manufacturing of customized devices for measurement, automation and communication together with the programming of data acquisition, visualization and automation software. In addition a competent service for technical devices and facilities is offered.

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The ISL - Institute of Shipping Economics and Logistics was founded in Bremen in 1954. By combining tradition with modern science, we have since positioned ourselves as one of Europe's leading institutes in the area of maritime research, consulting and knowledge transfer.

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Lloyd Werft Bremerhaven GmbH

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We offer 35 years of experience with officially appointed and sworn experts and qualified marine surveyors. Our scope of work comprises, besides other, consultancy in the oil and gas field industry. Since 1995 we are employed in wind energy projects on- and offshore. Our clients are major insurance, wind energy and shipping companies and they appreciate the quality and reliability, as well as neutrality and loyalty of the company with a wide range of own offices or partners world wide.

REpower Systems AG

www.repower.de info@repower.de



REpower Systems AG is a leading system provider of wind turbines in the offshore sector. The company offers its customers project specific solutions in the areas turbine construction, service, transport and installation, foundation construction as well as financial engineering. In Bremerhaven REpower manufactures nacelles and hubs of the successful offshore series 5M/6M, of which more than 100 units have been sold already, as well as the 3.XM series. The turbines for the German test field alpha ventus have also been assembled here. The serial production of the recently won projects Nordsee Ost and Thornton Bank will be carried out in Bremerhaven too.

STA Schiffstechnik & Anlagenbau GmbH

Dietmar Kircher Westkai 46 27572 Bremerhaven info@sta-gmbh.com www.sta-gmbh.com



STA is specialize in the field of new constructions and installations, repairs, maintenance and service of all types of electro-technical systems and machinery including retrofitting and similar work on ships.

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trend:research was founded in 1997 and focuses on energy and waste markets. It covers all areas along the value chain: from energy production up to sales, from metering up to billing. In addition to multi client studies, trend:research compiles surveys and exclusive projects in close coordination with the customer and also provides geodata on all topics. Besides the national market, international markets and developments are analysed.

ttz Bremerhaven

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ttz Bremerhaven is an innovative research service provider and conducts application-oriented research and development. Under one roof an international team of experts works in the fields of food, environment and health. The environment field researches and develops the areas of water-, energy- and land management worldwide.

WeserWind GmbH

Offshore Construction Georgsmarienhütte

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WeserWind offers foundation structures for offshore wind turbines. An integrated approach, use of innovative technologies and continuous integration of the affiliated manufacturing works from the design phase to installation phase are of main importance. Our product range includes serial production of Jacket-, Tripod and Tripile substructures as well as the supply of turnkey transformer substations up to special solutions.

Deutsche WindGuard GmbH

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We offer 35 years of experience with officially appointed and sworn experts and qualified marine surveyors. Our scope of work comprises, besides other, consultancy in the oil and gas field industry. Since 1995 we are employed in wind energy projects on- and offshore. Our clients are major insurance, wind energy and shipping companies and they appreciate the quality and reliability, as well as neutrality and loyalty of the company with a wide range of own offices or partners world wide.

WindMW GmbH

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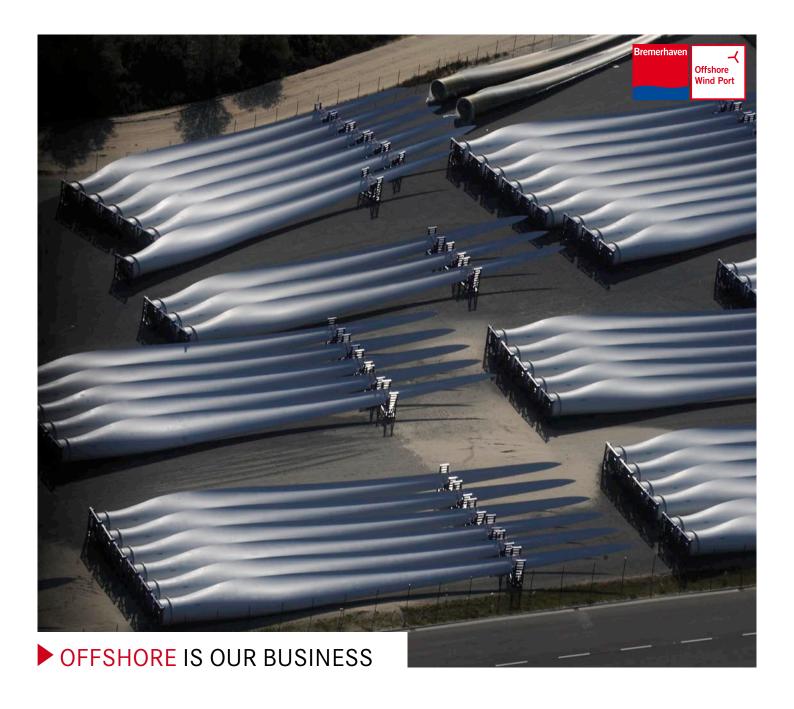
We provide superior engineering services in all areas of wind energy, ranging from site assessments to power curves, due diligence, technical management and optimization of wind farms, as well as anemometer calibration and rotor blade profile measurements in four different wind tunnels. Offshore-specific we offer: Offshore Consulting, Licence Planning, Planning of Construction and Execution, O&M, Safety Training, BOSIET, HUET.

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wind:research, a brand of trend:research, focuses on all wind energy (on- and offshore) projects at the subsidiary in Bremerhaven. A comprehensive and daily updated worldwide database with offshore and onshore parks and projects as well as thousands of conducted expert interviews are used for analyses and forecasts in the fields of market, technology, competition, trends, opportunities and risks.



More information:

www.offshore-windport.de www.wab.net

