BREMEN
BREMERHAVEN
HOME OF INNOVATION

BREMEN:
THE WIND POWER STATE
A PREMIUM SITE FOR ONSHORE AND OFFSHORE WIND POWER

Ministry of Economic Affairs, Labour and Ports

Free Hanseatic City of Bremen

TWO CITIES, ONE STATE
BREMEN, A TOP TEN LOCATION FOR INDUSTRY

The Seaside City of Bremerhaven and the Hanseatic City of Bremen form the federal state of Bremen. With approx. 670,000 inhabitants, it is one of the top ten industrial locations in Germany.

Bremen is the economic center of a region with two million inhabitants. It presents itself as a powerful, dynamic motor for Northwest Germany. The research and development activities of the local universities, with more than 37,000 students, make significant contributions to the region.

Science and technology
In addition to the exceptionally high concentration of scientific institutions, highly renowned international tech companies contribute to Bremen's reputation as an industrial location that has become a competence-driven premium location for onshore and offshore wind power.

Key facts of in the federal state of Bremen

- 670.000 inhabitants
- Hub for Northwest Germany
- Highest export ratio of all the German federal states
- Eight universities with approx. 37,000 students (2016/2017)
- University of Bremen ranked one of the best universities in Germany since 2012
- Approx. 50 technical research institutes (e.g. Alfred-Wegener-Institute, German Research Center for Artificial Intelligence [DFKI], Fraunhofer Institute for Wind Energy Systems (IWES), German Aerospace Center [DLR], Fraunhofer and Max Planck Institutes, Center of Applied Space Technology and Microgravity [ZARM])
- Second-largest production and development location of the Airbus Group in Germany
- Mercedes Benz's Bremen factory, the second-largest production facility of Daimler AG in the world
- International airport 4 km from the Bremen city center
- Second-largest seaport in Germany
- Container terminal is the fourth largest in Europe and one of the 25 largest in the world
- Europe's second-largest transshipment port for automobiles
- Three port facilities suitable for offshore services

Sources: Statistical Office of Bremen, Annual Statistical Report of the Bremen Chamber of Commerce, Bremeninvest

Top left: Panoramic view of Bremen.
Bottom left: The Havenwelten district of Bremerhaven: a symbol of the maritime tradition and future of the city by the sea.

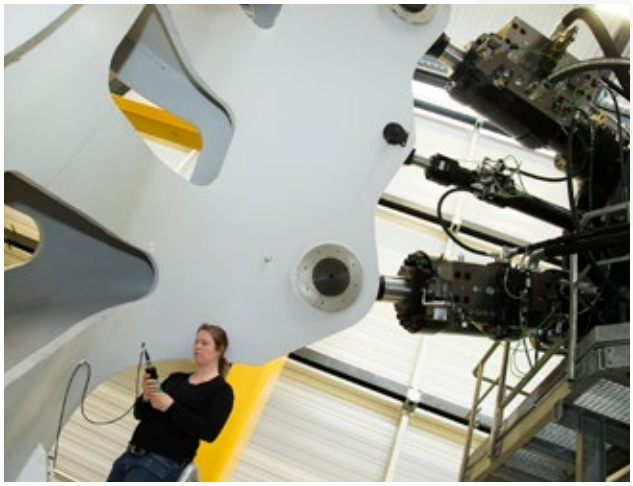
LOCATION AND QUALITY OF LIFE
OPTIMAL LOCATION FACTORS

→ PORT FACILITIES

The port infrastructure in Bremerhaven offers integrated logistics services for the onshore and offshore wind power industry. The terminals are import and export hubs for onshore wind turbines and a base port for the installation of offshore wind farms. Furthermore, the port operators offer comprehensive value-added services.

→ SPACE FOR EXPANSION

Bremen and Bremerhaven constitute a logistical hotspot in the heart of Europe. Their prominent location on the Weser River, proximity to the North Sea, and highly efficient infrastructure provide perfect conditions for global companies. Both cities offer industry-specific properties for large-scale businesses that can be customized to meet specific requirements. Optimal transport connections are a matter of course.



→ EXCELLENT RESEARCH

The federal state of Bremen offers a diversified academic landscape. Numerous research institutes without university affiliation complement the research profile of the cities on the Weser River. In all of Germany, the cities have the highest density of major research facilities in proportion to the number of inhabitants. The distances between the institutions are short, and the scientific facilities are interconnected, highly renowned, and engaged in extensive international collaborations.

→ HUMAN RESOURCES

In Bremen and Bremerhaven, the sciences are closely interconnected with almost every area of life. There are numerous facilities for the training and development of professionals. The cities have been rejuvenated by the students and skilled young talent, and companies profit from their ability to innovate and find creative solutions. Theory and practice are linked by efficient networks.

→ CONCENTRATED COMPETENCE

In the federal state of Bremen, numerous companies along the entire value chain find the best possible conditions for their onshore and offshore wind power projects in a unique network. This young industry benefits greatly from the sophisticated technology of other traditional industries that have long been established in Bremen. The maritime industry and logistics, as well as the aerospace and the automotive industries all provide valuable know-how.

→ THE GOOD LIFE

Cosmopolitan and welcoming. Maritime atmosphere meets urban quality of life. Spaces to live and work at the water's edge are available at attractive prices. Bremen and Bremerhaven offer short distances and a high quality of life. As is characteristic for major cities, there are numerous opportunities to shop and relax at one's leisure. Bremerhaven combines maritime flair with opportunities to experience and learn, and a wide variety of fish.

LARGE AND HEAVY? NO PROBLEM!
PORT FACILITIES THAT CAN HANDLE ANYTHING

Bremen's maritime industry has grown as offshore wind power has emerged and risen. Today, it offers all the prerequisites needed to meet the high demands of the industry at the port's quays. Bremerhaven's port infrastructure currently offers three, soon to be four, port facilities suitable for offshore services. No component is too heavy and no ship too large:

1 — The public heavy-load areas at the **Labradorhafen** offer everything that is needed to handle large components for offshore wind turbines.

2 — The **ABC-Halbinsel** peninsula is located between Kaiserhafen II and III, independent of the tides. In addition to berths for jack-up wind turbine installation vessels, the ABC-Halbinsel peninsula offers heavy-load areas for the storage of offshore systems.

3 — Europe's fourth-largest container terminal, **Container Terminal 1**, has already repeatedly been used as a base port for handling large wind turbine components. As there are no restrictions due to locks, large components can be both handled and stored here on a terminal area of up to 25 hectares.

4 — The **Offshore Terminal OTB** will offer offshore and heavy-load industry companies a port infrastructure that is tailor-made for their needs, with 250 hectares of attractive commercial areas directly at the water, which is deep enough for seagoing vessels. The heavy-load access route has already been developed.

"Size is our daily business. As a base port for large components, we provide all kinds of logistics services for the onshore and offshore wind power industry."

Nina Distler, Director of Operations,
EUROGATE Container Terminal Bremerhaven

Bottom left: The 2000-ton substation for the offshore wind farm "Nordergründe" was shipped from Labradorhafen in Bremerhaven.
Top right: Senvion offshore wind turbine.
Bottom right: Loading tower segments at the Container Terminal Bremerhaven.

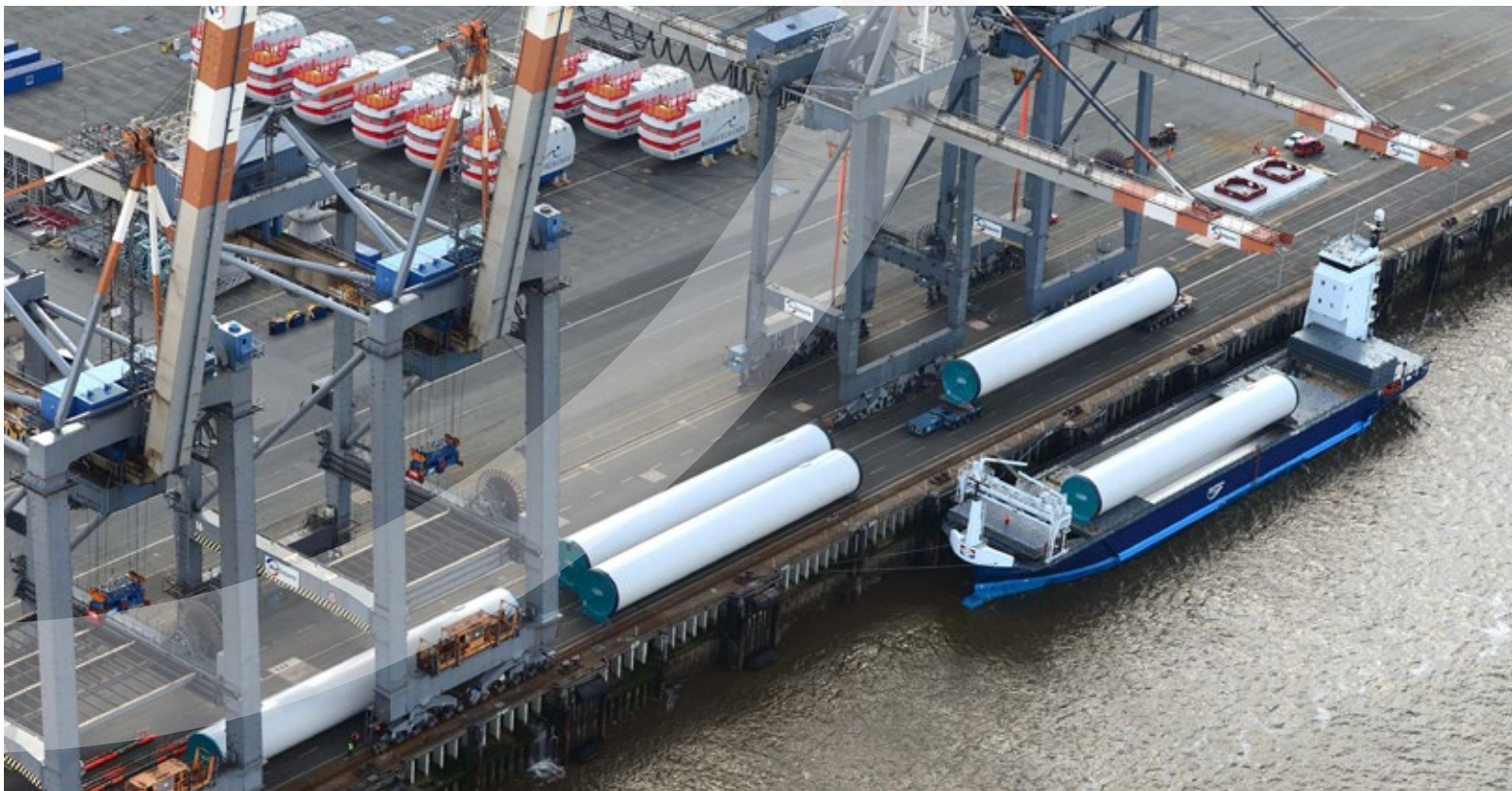
Heavy-load suitability

Labradorhafen
→ 250 m heavy-load quay
→ water depth: 7.60 m
→ load-bearing capacity: up to 70 t / m²

ABC-Halbinsel
→ 900 m quay
→ water depth: 10.50 m
→ access via the Kaiserschleuse lock (305 m × 55 m max.)

Container Terminal 1
→ 500 m quay
→ water depth: 15 m
→ load-bearing capacity: up to 50 t / m²

Offshore Terminal OTB (planned)
→ 500 m quay
→ unrestricted by locks
→ water depth: 14.10 m



ENDLESS POSSIBILITIES:
AMPLE SPACE FOR EXPANSION

The two cities in the "wind power state" Bremen are characterized by their respective focus areas. With quays, storage and commercial areas, test and research facilities, and ample space for new establishments, Bremerhaven is the base port for seagoing vessels and a production location for wind turbines. On **Luneplate Island,** 155 hectares of development space is available for future use, as is another 100 hectares at the former airport nearby (Westlicher Fischereihafen [Western Fishery Harbor]).

Bremen, located 60 km up the Weser River, accommodates offices, businesses, service providers, and the headquarters of the wind power industry. The **Airport-Stadt** business park is located right next to the international airport, just eleven minutes from the city center. Numerous companies use the generous office spaces and benefit from the close proximity of other industries such as the aerospace industry. The **Überseestadt** district is another attractive location where wind power companies value their close proximity to each other.

The best connections by land, water, and air
Located in the heart of Northwest Germany, the "wind power state" is situated at the center of the market, with highly efficient transport connections. Water to rail, to road, to air—in terms of logistics, multimodal transport is perfectly synchronized.

Bremerhaven is one of the most important transshipment ports for global RoRo transports, in particular also in the high & heavy segment. Liner services operate all over the world on a daily basis.

The Bremen Airport is an international transport hub for Northwest Germany, located only 4 km from the Bremen city center. Daily connections to approx. 50 destinations are available by airliner, charter, low-cost, or cargo flight.

Top left: Bremen is an attractive office location. The Überseestadt district is ideal e. g. as a business location for companies of various industries that value a maritime atmosphere as well as close proximity to the city center.
Bottom left: Havenwelten Bremerhaven: Modern office properties on the waterfront.
Top right: The Luneplate industrial park offers an area of 155 ha with excellent conditions for the production, assembly, storage and shipment of wind turbines.
Bottom right: Airport-Stadt Bremen business park: An innovative 130 ha area was created around the airport—and in addition, the companies benefit from the nearby scientific facilities.

"Right at the heart! The central location between the Ems, Jade, Weser, Elbe Rivers, the coast and the inland was decisive for us."

Christopher Iwens, General Manager
German Subsidiaries of DEME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ECONOMY MEETS SCIENCE
EXCELLENT RESEARCH

The outstanding research results achieved in Bremen, the "wind power state", have contributed significantly to the cost reduction of the production and operation of wind turbines. These research findings make it possible to progress through technical learning curves much more quickly, and consequently, more efficiently. Both aspects are particularly important for wind power to be utilized efficiently and profitably.

Design improvements and optimized selection of materials

Universities and internationally renowned institutes and research facilities in the federal state of Bremen are working on groundbreaking projects in the field of wind power technology. With more than 100 scientists, the Fraunhofer Institute for Wind Energy Systems (IWES) in Bremerhaven is the largest research center. On its large-scale test benches, it tests rotor blades of up to 90 meters in length, and even the complete nacelles of 10 MW systems. The Robotics Innovation Center of the German Research Center for Artificial Intelligence (DFKI) develops and tests robotics technologies for navigation, inspection and manipulation both above and under water. Autonomous and partially autonomous submarine vehicles can be adapted to the requirements of the offshore industry here. Other focus areas include research by the Maritime Safety and Security Lab of the German Aerospace Center (DLR) and fundamental materials research for lightweight construction and adhesive technologies (IFAM, EcoMaT).

All research results provide input for design improvements and the optimized selection of materials. Knowledge can be acquired on site using prototypes, and can then be immediately included in the production and management.

Promoting the necessary knowledge transfer has been the task of ForWind, the Center for Wind Energy Research in Northwest Germany since 2003. Today, 300 employees from almost 30 working groups are part of the association, which was expanded to form the "Forschungsverbund Windenergie" (Wind Power Research Association), connecting 600 scientists.

Furthermore, Bremen and Bremerhaven offer optimal business conditions to spin-off companies of the universities and research centers so they can implement the knowledge gained through research.

"The high pace of innovation in the wind power industry necessitates sustainable concepts to secure new developments and reduce energy production costs. With the accelerated validation of system designs on large-scale test benches and the development of concepts to increase reliability, the Fraunhofer IWES supports manufacturers, suppliers and operators in the wind power industry. The main location in Bremerhaven enables the delivery of giant system components by sea and is a good starting point for the Institute's offshore activities."

Prof. Dr.-Ing. Andreas Reuter, Head of the Fraunhofer Institute for Wind Energy Systems IWES

Top left: The powertrain of one of the world's largest wind turbines was thoroughly tested at DyNaLab Bremerhaven in order to accelerate the certification process and launch.
Middle left: New robotics technologies for use above water and underwater can be tested in the 1,300 m² Maritime Exploration Hall of the German Research Center for Artificial Intelligence (DFKI) in Bremen.
Bottom left: New EcoMaT research center in Airport-Stadt. EcoMaT will pool the competences of industry and science in the field of lightweight engineering in Bremen.
Right: Test and research facilities in Bremerhaven play an important part in the development of renewable energy sources.

EXCELLENT HUMAN RESOURCES
QUALIFICATION ON SITE

The qualification of professionals and executives is essential for the wind power industry. In Bremen, the "wind power state", employers are able to connect with specialized graduates. All the graduates are well prepared for the challenges they will face. Future engineers of various disciplines study both at the university and the universities of applied sciences of Bremen/Bremerhaven.

Qualified personnel for the industry
Another focal point of the federal state of Bremen is training for people who are entering the industry or who are already part of it. Advanced training programs and special training courses prepare lateral entrants and facilitate continuous, on-the-job qualification. Together with the Center for Wind Energy Research (ForWind), the Wind Energy Agency (WAB) offers an advanced course of study in "Wind energy technology and management".

At the wind power training center in Bremerhaven, specialists are educated for professions relevant to the industry, such as mechatronics engineer, plastics engineer, or fitter. The vocational training centers in Bremen and Bremerhaven offer training specifically for this industry as well. Safety training courses regarding offshore wind turbines and special maritime training courses are available in Bremerhaven.

Furthermore, the numerous experts working in Bremen in industry and in Bremerhaven in the maritime industry can be recruited for specific tasks if necessary.

Courses of study (selection):
- → Bachelor of Maritime Technologies with a specialization in Wind Power
- → Bachelor of Sustainable Energy and Environmental Technologies
- → Master of Wind Energy Technology (Bremerhaven University of Applied Sciences)
- → Bachelor of Energy Engineering
- → Bachelor of Industrial Engineering with focus on Energy
- → Master of Sustainable Energy and Environmental Systems (City University of Applied Sciences Bremen)
- → Advanced course of study in Wind Energy Technology and Management (WAB and ForWind)

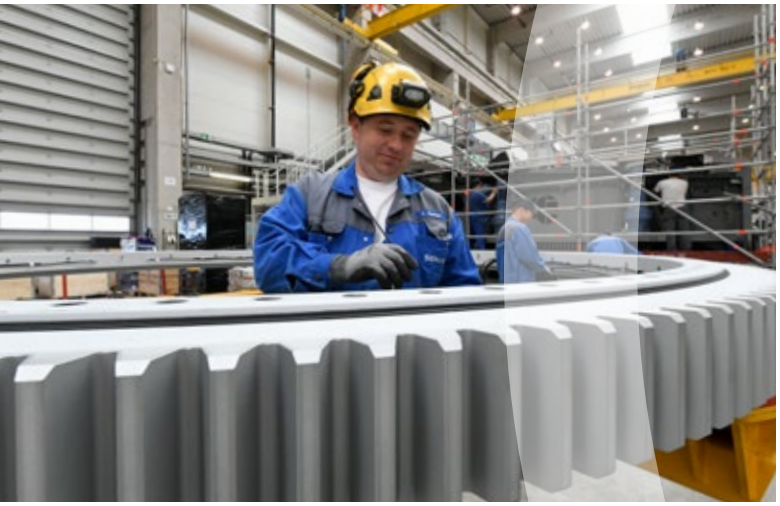
Vocational training:
- → In-company training, external vocational training, and collaborative training partnerships Specialization as installation and service technician or industrial electrician

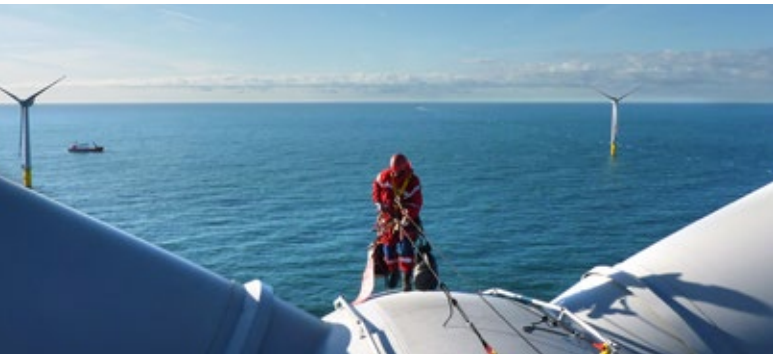
Training courses:
- → Industrial rope access, rescue from height, working in confined spaces, offshore safety training

"A change of location was out of the question for us when we had to relocate due to lack of space after 15 years at Speicher 17. We stayed in the Überseestadt district and were able to consolidate all our business units in one place. This helped optimize work processes, facilitate communication, and make room, e.g. for training and development."

Detlef Lindenau, General Manager of REETEC GmbH

Top right: Innovative and independent wind power services like those provided by REETEC require continuous in-service training.
Middle right: A lecture on wind energy technology being held by Prof. Dr.-Ing. Holger Lange at Bremerhaven University of Applied Sciences.
Bottom right: Offshore safety training: emergency exit from a helicopter—training for an emergency at Falck Safety Services.





SPECIALISTS AND MAJOR PLAYERS
CONCENTRATED COMPETENCE

Today, a state-of-the-art wind turbine not only consists of more than 3,000 components, it also requires technical and commercial management. A close-knit network of competent companies along the value chain has proven to be effective to ensure smooth operations.

Bremen, the "wind power state", now has a closely competence network of manufacturers, suppliers and service providers. More than 100 companies on site provide valuable know-how and tailor-made solutions for the wind power industry. The location is open to new impulses and new companies.

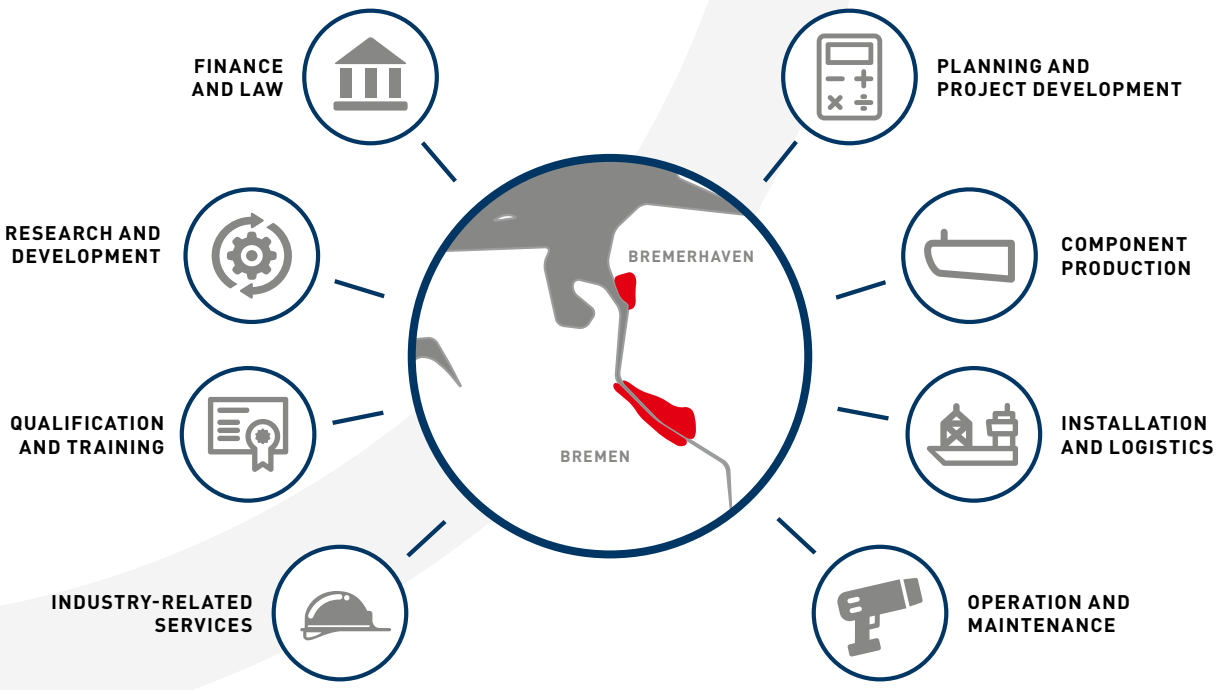
Engineering offices specializing in wind power in the state of Bremen profit from the immediate contact with manufacturers and project developers. Local wind experts and consultants are available for the planning and realization. Furthermore, the wind power industry has developed a reliable network of regional suppliers in Bremen and Bremerhaven.

A network of industry partners

Located in Bremerhaven, the Wind Energy Agency (WAB) is the leading enterprise network for wind power in Northwest Germany and the point of contact for the offshore wind power industry throughout Germany. The association comprises more than 300 companies along the entire value chain. It acts as the point of contact for the partners in the region and helps its members find business partners abroad. WAB organizes working groups and undertakes marketing for the onshore and offshore industry.

"Bremen has been the location of wind power for me for about 25 years. In my view, Bremen is ideal for the wind power industry: Companies from all the key areas of the industry come together here. Like few other cities, Bremen combines personal closeness with life in a major city. This is an extraordinary environment for our employees. A favorable political climate has also accompanied us over the years. And even the meteorological wind conditions here are relatively good."

Dr. Klaus Meier,
Chairman of the Board, wpd AG



Clockwise from the top left: In the company's control room, wpd's experts monitor the wind farms under its supervision. / Deutsche Windtechnik specializes in the maintenance of wind turbines. / LEV TWISTER – An INNOVEN offshore wind farm supply vessel with the Bremerhavenbase port. / Rope Access Solutions – Assistance with installation, maintenance, and experts for rescue concepts. / RTS Wind: a service provider for reputable manufacturers in the wind power industry. / Production of wind turbines at SENVION.

NO FAIRER LAND ...
A FINE PLACE TO LIVE

Bremen
Life in the city of Bremen is characterized by tradition and innovation. Once a trading town and port, and now a modern city filled with the quality of life an urban center has to offer, its residents appreciate the city of short distances. And it's the residents who shape it. The Hanseatic city presents itself like the mentality of its residents: cosmopolitan and welcoming. People here are open to all things new, in the long-established districts and in the Überseestadt district alike. Here, in one of the largest urban development projects in Europe, the old port districts are being revitalized with new residential and office properties. Lively new opportunities are being created in this city characterized by the aerospace and automotive industries, trade and logistics, and maritime services. A city where wind power has established a sound identity for itself.

Bremerhaven
Bremerhaven is the largest city on the German coast of the North Sea, and a maritime city through and through. Once the starting point for emigrants heading anywhere in the world, the atmosphere is still characterized by large ships, harbor ambience, a breath of sea air, and freshly prepared fish. This location for wind power and climate research presents itself, upgraded by countless tourist attractions, with a unique style. The residents of Bremerhaven appreciate the fact that their regional center provides all the essentials of a major city. Quality of life is high, and real estate prices are attractive. In the residential sector in particular, Bremerhaven shows a lot of imagination. The housing market welcomes future residents with interesting new buildings and charming older buildings.

Bottom left: Weser Promenade "Schlachte" in Bremen.
Top: The marketplace in Bremen—UNESCO World Heritage site.
Middle: Sögestraße Bremen: Gateway to the city center.
Top right: Hundreds of thousands of visitors are excited by the maritime events in the seaside town.
Middle right: The German Emigration Center was named the European Museum of the Year in 2007.
Bottom: The skyline of Bremerhaven viewed from the water.

STRONG LOCAL PARTNERS

Ministry of Economic Affairs, Labour and Ports
Free Hanseatic City of Bremen

Bremeninvest

Economic Development Company Ltd. bis

Free Hanseatic City of Bremen
The Senator for Economic Affairs, Labor and Ports
Zweite Schlachtpforte 3
28195 Bremen
Germany
Phone +49 421 361-8808
www.wirtschaft.bremen.de

Your contact:
Dieter Voß
Phone +49 421 361-32175
dieter.voss@wah.bremen.de

Bremeninvest
c/o WFB Wirtschaftsförderung Bremen GmbH
Kontorhaus am Markt
Langenstraße 2–4
28195 Bremen
Germany
Phone +49 421 9600-10
www.wfb-bremen.de

Your contact:
Andreas Gerber
Phone +49 421 9600-123
andreas.gerber@wfb-bremen.de

BIS Bremerhavener Gesellschaft für Investitionsförderung und Stadtentwicklung mbH
Am Alten Hafen 118
27568 Bremerhaven
Germany
Phone +49 471 94646-610
www.bis-bremerhaven.de

Your contact:
Uwe Kiupel
Phone +49 471 94646-330
kiupel@bis-bremerhaven.de

OUR SERVICES

- → Advice on all industrial location issues
- → Assistance with all approval procedures
- → Development of commercial premises, estate brokerage
- → Investment support, promotion of SMEs, promotion of start-ups
- → Funding programs offered by the development bank for Bremen and Bremerhaven (BAB)
- → Procurement of useful contacts
- → Bremeninvest offices located in China, Turkey and Vietnam
- → Cooperation with the German Chambers of Commerce Abroad

Right: "Nordergründe" offshore windfarm.

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Translation: Uta Stareprawo
Photo credits:

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4/5	SENVION Wind Energy Solutions, Jens Meier, Fraunhofer IWES/Martina Buchholz, windexperts Prüfgesellschaft mbH, WFB/Jonas Ginter
6/7	BIS/Scheer, SENVION Wind Energy Solutions
8/9	WFB/Jonas Ginter, BIS, BIS/Scheer, WFB/Christian Ring
10/11	Adwen, DFKI GmbH/Annemarie Popp, Huber Staudt Architekten bda, BIS/Scheer
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14/15	WFB/Jonas Ginter, SENVION Wind Energy Solutions, RTS Wind AG/Stefan Schmidtbauer, Rope Access Solutions GmbH, Innoven, Jens Meier
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As of: 7/2018

This brochure does not claim to be exhaustive, but reflects the diversity of the wind power industry in the federal state of Bremen.

We thank all the companies and institutions involved for their kind support with this project.

Gender notice

Where the text refers to persons, the masculine form is used for reasons of readability.

European Union
Investing in Bremen's Future
European Regional
Development Fund