



RENEWABLE ENERGIES

Rostock – Energy transition pioneer
and competence center for wind energy

BECAUSE

WIND

AND

WATER

ARE ROSTOCK'S

FUTURE

City center:
 54° 05' 20" North latitude
 12° 08' 24" East longitude



DATA & FACTS

Renewable energies in Germany



24

billion euros turnover in 2022 from operating renewable energy systems

58,4

percent of gross electricity generation comes from renewable energies



387.000

jobs in Germany

Renewable energies in Mecklenburg-Vorpommern



1.859

onshore wind turbines with an output of 3,761 MW



about 14.000 employees work in the renewable energy sector



278

offshore wind turbines with an output of 1,535 MW off the coast of Mecklenburg-Vorpommern

5

offshore wind farms in operation

Renewable energies in Rostock



annual

Future Conference "Wind & Maritime" - the wind energy sector networks with the maritime industry

2

ROSTOCK'S HEAT STORAGE PLANT

million kWh storage capacity

45

million liters of hot water are stored in the 55-meter-high tower

Key sector at the Rostock location

The Hanseatic and university city of Rostock bundles various expertise in the field of renewable energies.

Find out more at:
www.rostock-business.com



PRODUCTION

Production of onshore wind turbines and offshore monopiles



WIND FARM SERVICE

Technical and commercial management services



PROJECT DEVELOPMENT

Planning of onshore and offshore wind farms



PRODUCTION OF HYDROGEN

Development of the Rostock energy port



POWER TO HEAT

Heat storage plant of the energy supplier Stadtwerke Rostock

Networks & Cluster: Drivers for a green future in Rostock



WINDENERGY NETWORK E. V.

The WindEnergy Network e. V. is the leading business network for wind energy in the north-east region with more than 100 member companies. The network has been active since 2002 and provides a platform for the entire value chain of the industry. Its focus is on actively networking companies, pooling information, representing interests at state and federal level to further develop the framework conditions for the energy transition and presenting the network at trade fairs and events to strengthen its members. The aim is to expand the industrial base and regional value creation in the future-oriented renewable energy sector. The thematic focus is on onshore and offshore wind energy, maritime technologies in connection with offshore wind and the development of green hydrogen.

ENERGY STEERING COMMITTEE

The Energy Steering Committee of the Rostock region is a central committee that steers and supports the development in the region. The aim is to establish the region as a center for the generation, use and transmission of renewable energies. The steering committee meets on a monthly basis and coordinates important infrastructure and industrial projects in the energy sector, including the use of hydrogen.

With a focus on the creation of added value in the region and the utilization of existing potential, the steering committee plays a central role in the energy industry transformation of the region. The administrations of the city and the district work closely together, forward-looking projects such as the "HyTechHafen Rostock" and the integration into the federal hydrogen of the federal government. The steering committee promotes cooperation, communication and coordination, to successfully shape the energy transition in the region.

DIE ROSTOCKER WASSERSTOFFINITIATIVE

ROSTOCK HYDROGEN INITIATIVE

The vision: In 2035, Rostock region will be climate-neutral and a green hydrogen centre. The Rostock Hydrogen Initiative is a regional network that aims to establish the Rostock region as an innovative and competitive hydrogen region along the entire value chain. The stakeholders from business, politics, research and society develop innovative approaches and initiate and support projects for a holistic, sustainable transformation towards climate neutrality by 2035. With unique locational advantages for the production of hydrogen from regionally generated renewable energy sources and diverse projects along the entire value chain, Rostock region offers numerous opportunities for the establishment and expansion of a competitive hydrogen economy with a focus on sector coupling and storage technologies for volatile energies.



ENERGIEBÜNDNIS ROSTOCK E. V. – NETWORK FOR THE ENERGY TRANSITION IN ROSTOCK

The Rostock Energy Alliance was founded in 2016. The association aims at considering the energy transition in the city as a cross-sectional task and to intensively advance it through an intensive exchange between involved stakeholders and targeted projects. The top priority is to reduce the share of fossil fuels in electricity generation in favour of renewable sources and to increase energy efficiency in order to reduce energy consumption. By 2030, the annual CO2 emission per capita are to be reduced to 2.5 tons or less. "Regional energy generation from renewable sources, combined with energy savings and increased energy efficiency, will not only reduce CO2 emissions, but also pave the way for regional value creation and employment. The energy transition is a task for the entire urban society and the region. All companies, institutions and social groups are called upon to join the alliance."



View of the Hydrogen Applications Centre of the Fraunhofer IGP

Research institutes in Rostock: Paving the way for renewable energies

The research institutes in Rostock are driving innovation in the field of renewable energies. From the chair of Wind Energy Technology at the University of Rostock and the Fraunhofer IGP with its projects on the hydrogen economy to the Leibniz Institute for Catalysis and the IWEN Energy Institute - they all significantly contribute to a sustainable energy future. Together, they are focussing on practical research and cooperation with industry in order to develop and implement environmentally friendly technologies.

UNIVERSITY OF ROSTOCK CHAIR FOR WIND ENERGY TECHNOLOGY

The chair of Wind Energy Technology was established at the university in 2014. It was supported as an endowed chair by the company Nordex in the initial phase and subsequently stabilised. The chair is based at the Faculty of Mechanical Engineering and Marine Technology at the University of Rostock.

The chair offers a comprehensive programme with a total of six teaching modules. These include introductory courses for Bachelor's and Master's students as well as specialised courses from various areas of wind energy technology.

The main aim of teaching is to provide students with a sound overview of wind turbine technology as well as practical insights into engineering tasks in the wind industry.

Research at the chair focuses on various topics, with the main emphasis on offshore wind energy. Numerous projects, both in basic research and in co-operation with industrial companies, are concerned with this area. Other key areas of research include the grid integration of wind turbines and the modelling and simulation of these turbines.

FRAUNHOFER INSTITUTE FOR LARGE STRUCTURES IN PRODUCTION TECHNOLOGY IGP

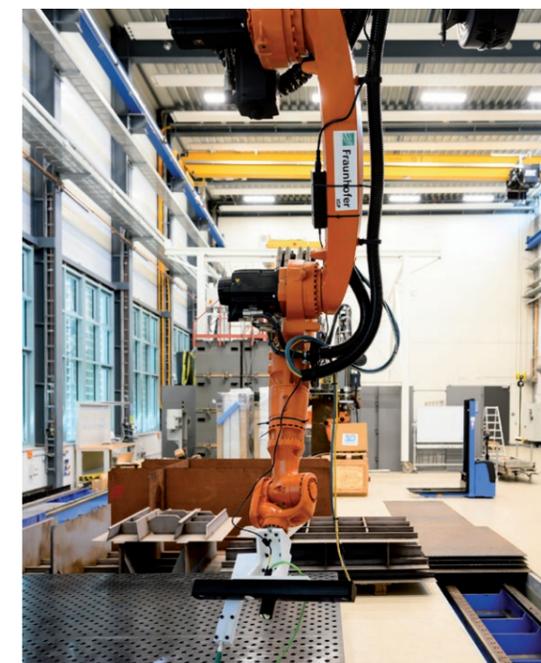
Research at the Fraunhofer Institute for Large Structures in Production Engineering IGP in Rostock focusses on the production and manufacture of large structures. On the basis of applied research, concepts for product and process innovations are developed and realised for many future industries such as shipbuilding and steel construction, energy and environmental technology, rail and commercial vehicle construction as well as mechanical and plant engineering as part of research and development projects with our cooperation partners.

Since 2005, over 4000 m² of laboratory and office space have been created at the Rostock site in four construction phases in order to be able to offer industry customised services for engineering tasks. The Research Fab Hydrogen MV is a merger of the Fraunhofer Institute for Large Structures in Production Technology IGP, the Leibniz Institute for Catalysis (LIKAT) and the Leibniz Institute for Plasma Science and Technology (INP) Greifswald. This pooling of expertise enables the development of holistic and application-oriented solutions for the transformation towards a climate-neutral hydrogen economy. The Hydrogen Research Factory MV will consist of three cooperating areas, each of which will be under the responsibility of one of the participating institutes.

One area is the Hydrogen Application Centre of the Fraunhofer Institute IGP with the large engine test field, which can be used to develop and test suitable engine technology for the sustainable industrial use of PtX fuels, particularly in maritime applications. In addition to the testing of hydrogen-based fuels and the design of alternative drive systems, the evaluation and classification of fuels from green electricity and the provision of open-type test bench capacity for external parties are further key topics.



Fraunhofer IGP in Rostock



Research area of the Fraunhofer IGP

The research institutes in Rostock are key players in the field of renewable energies. The University of Rostock, in particular the chair of Wind Energy Technology, and the Fraunhofer IGP are making a significant contribution to establishing Rostock as a leading location for sustainable energy solutions.



Laboratory work at the Leibniz Institute for Catalysis



Leibniz Institute for Catalysis (LIKAT Rostock)



Hydrogen tank and wind turbine
right: Wind-PV combined project in the Rostock freight center

LEIBNIZ-INSTITUT FÜR KATALYSE E. V.

The Leibniz Institute for Catalysis (LIKAT Rostock) is concerned with the acceleration of material conversions (catalysis) as a science. Catalysis is a key technology for sustainable processes that inherently enables resource and energy efficiency. Catalysts control and accelerate chemical and biochemical processes.

They increase yields and avoid by-products by enabling starting materials to react specifically and selectively at the molecular level. Today, over 80% of all chemical products in our daily lives are produced with the help of catalytic processes. In addition to their use in chemistry, catalysts are increasingly being used in the life sciences, energy supply and climate and environmental protection.

The spectrum of research work at LIKAT ranges from the identification of suitable catalyst materials, their production and kinetic and mechanistic studies to the development and optimization of industrially relevant processes and their transfer to pilot scale. Increasing the efficiency and production of the respective conversion steps of PtX processes is a particular focus of LIKAT's Catalysis2Scale transfer pilot plant.

IWEN ENERGY INSTITUTE GMBH

As an affiliated institute of the University of Rostock, IWEN stands for research, development and technology transfer in the field of renewable energies. As a young research institute for energy technology and renewable energies, IWEN combines a start-up mentality with decades of experience. More than 25 years of experience in the field of renewable energies, especially onshore and offshore wind energy technology, and almost 10 years of experience in the hydrogen sector make IWEN a specialist in this field.

The institute is set up as a non-profit limited company: all results from research, development and innovation are made available to the public. The advantages of such an institute lie in its regional roots and independent expertise in the expansion and conversion of wind energy use in Mecklenburg-Vorpommern.





Companies: Pioneers of renewable energies in Rostock

The companies in Rostock, led by global players and specialized SMEs, are key drivers of the green energy transition. They develop and produce key technologies for onshore and offshore wind turbines as well as innovative solutions for energy storage and integration. Through their research and development, they significantly contribute to implementing sustainable energy concepts and driving forward the regional and global energy transition.

NORDEX ENERGY SE & CO. KG

The Nordex Group works in the heart of the "green" transformation of the energy sector. After merging with Acciona Windpower in 2016, the Nordex Group has become a global player and one of the largest manufacturers of wind turbines in the world. The company supplies wind turbines for clean power generation to make meeting the global energy demand with 100% renewable energy a reality.

The development, manufacture, project development and maintenance of onshore wind turbines have been the core competencies and passion of the Nordex Group and its more than 9,900 employees worldwide for over 35 years.

More than 1,000 employees work at the Rostock site - the majority in the production of wind turbines. The highly efficient wind turbines economically generate electricity at locations with a wide range of geographical and climatic conditions.



View of production at the Rostock site

The comprehensive product portfolio offers high-performance turbines for markets with limited space, as well as for regions with limited grid capacity, which are geared towards the continuous reduction of electricity generation costs.

EEW SPECIAL PIPE CONSTRUCTIONS GMBH

Since the founding of EEW Special Pipe Constructions GmbH (EEW SPC) in 2008, the EEW Group has significantly contributed to expanding the global offshore wind energy industry. With the production of more than 2,200 monopiles, which serve as foundation piles for offshore wind turbines, EEW SPC, located directly in the seaport of Rostock, has been able to establish its market leadership.

In the future, offshore wind farms will be installed in increasingly deeper waters. For this reason, monopiles with an impressive diameter of up to 12 meters are manufactured in modern production facilities by 1,000 employees. The Rostock site located on the German Baltic coast is ideal as it offers direct access to the quay. This ensures smooth transportation of the monopiles to their destination on the high seas.



Production in the seaport of Rostock



Company headquarters of SEAR GmbH in Rostock

SEAR GMBH

With around 300 employees, the SEAR Group installs complex electrotechnical systems, supplies automation and production control systems and provides planning and engineering services. In the context of the energy transition, the company focuses on the transmission and distribution of renewable energies, on securing critical infrastructures and plant security as well as on digitalization and automation. The area of energy transmission/distribution essentially comprises the construction of air and gas-insulated switchgear (substations), the construction of so-called FACTS systems for reactive/active power control and systems for high-voltage direct current transmission (HVDC for short). The portfolio also includes highly specialized services such as the installation of high-voltage cables up to 245 kV and the upgrading and oil filling of large transformers.

The SEAR Group also plans the entire range of electrical engineering, from concept studies to implementation and workshop planning, and carries out installation and commissioning. The company supports the area of plant security as an electrical engineering service provider for control and instrumentation technology and also provides extensive expertise in the business field of securing critical infrastructures, e.g. in terms of self-sufficiency and holistic property security. In automation and digitalization, the company also offers innovative software solutions for production and process management, including the associated automation and I&C hardware.

SOHERTZ TRANSMISSION GMBH

50Hertz is building a new operational site in Rostock-Warnemünde as a gateway to the Baltic Sea. Since 2025, the grid operator has been concentrating its activities in the field of offshore wind energy at this location.



Future 50Hertz branch: Rostock Offshore Quarter

With the completion of an interim site and the planned construction of the "Rostock Offshore Quarter" on the shipyard basin area directly at the quayside, up to 180 people will be working in various functional areas of 50Hertz's offshore operations by 2028. From here, the service and maintenance of the grid and the offshore substations will be carried out.



Combination project in the Rostock freight center

WIND-PROJEKT INGENIEUR- UND PROJEKT ENTWICKLUNGSGESELLSCHAFT MBH

The company is exemplary for more than ten companies in the field of renewable energy project development that operate from Rostock. WIND-projekt plans, implements and operates renewable energy plants (especially wind and solar energy) as well as innovative energy storage systems. WIND-projekt has also been one of the pioneers of green hydrogen in Mecklenburg-Vorpommern for more than ten years. The company integrates pioneering ideas, processes and technologies into its projects. This allows to sustainably combine the electricity, heating and mobility sectors and promote a holistic energy supply. Together with municipalities, partners and research institutes, WIND-projekt develops sustainable energy concepts based on renewable energies.



Offshore wind farm projects in the German Baltic Sea and Grid Connection

- | | | |
|--|---|--|
| <p>① ROSTOCK WEST / NATIONAL OFFSHORE TEST FIELD
in planning</p> <hr/> <p>② BREITLING
in operation
operator: Wind-projekt
total output: 2,5 MW</p> <hr/> <p>③ ENBW BALTIC 1
in operation
operator: EnBW
total output: 48,3 MW</p> <hr/> <p>④ GENNAKER
approved
operator: Skyborn Renewables
total output: 945 MW</p> <hr/> <p>⑤ RESERVED AREA HIDDENSEE
in planning
total output: about 160 MW</p> | <p>⑥ ENBW BALTIC 2
in operation
operator: EnBW
total output: 288 MW</p> <hr/> <p>⑦ ARCADIS OST 1
in operation
operator: Parkwind
total output: 257 MW</p> <hr/> <p>⑧ BALTIC EAGLE
in execution
operator: Iberdrola
total output: 476 MW</p> <hr/> <p>⑨ ARKONA
in operation
operator: RWE / Equinor / Credit Suisse
total output: 385 MW</p> <hr/> <p>⑩ WIKINGER
in operation
operator: Iberdrola
total output: 350 MW</p> | <p>⑪ WINDANKER
in planning
operator: Iberdrola
total output: 308 MW</p> <hr/> <p>⑫ 0-2.2
awarded
operator: TotalEnergies
total output: 1.000 MW</p> <hr/> <p>A SERVICESTATION BARHÖFT
Service point Barhöft
for EnBW Baltic 1</p> <hr/> <p>B MUKRAN PORT
Service stations for Arcadis Ost 1,
Arkona, Baltic Eagle and Wikinger</p> |
|--|---|--|



above: Visualization of the offshore platform of NEPTUN SMULDERS Engineering | left: Rostock seaport

Setting off into the future: Rostock as an innovation centre for renewable energies

As the No. 1 business location in north-east Germany, the Hanseatic and University City of Rostock offers all prerequisites for being successful as a renewable energy company. Rostock seaport is the interface to the Baltic Sea region as a growth region. The University of Rostock is a research partner and educates engineering specialists. Rostock as a city by the sea combined with the cultural and natural environment offers excellent quality of life for employees, today and in the future.

With the new offshore wind energy expansion targets of 30 GW by 2030 and 70 GW by 2045 in Germany, this sector in particular has a new growth perspective to take off further. Other planned projects such as Gen-naker and the planned national offshore test field off Rostock in the German Baltic Sea offer additional potential. This will be accompanied by a further expansion of operation & maintenance activities in the seaports.

There is a growing need for new technologies and innovative automation concepts in this area. In the area of onshore wind energy, Mecklenburg-Vorpommern has the potential to generate 5 GW of green electricity with around 1,000 wind turbines thanks to the projects currently in the planning and approval process.

The existing green electricity on a gigawatt scale is the basis for regionally implementing the national targets for the development of a hydrogen economy,

particularly for industry and maritime mobility. The seaport of Rostock is to be expanded as an energy port for the import and export as well as the production of green hydrogen and ammonia.

In combination with a planned pipeline infrastructure project from Rostock, Germany's chemical and steel industries in particular will be supplied with green hydrogen. The planned establishment of NEPTUN SMULDERS Engineering - a merger of the long-established NEPTUN WERFT shipyard in Rostock-Warnemünde and the international steel construction company Smulders - for the joint design and construction of offshore converter platforms is an important component in implementing the energy transition and an opportunity for new value creation and jobs. These developments exemplify the growth potential in the field of renewable energies in the Hanseatic and University City of Rostock.



IMPRINT

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