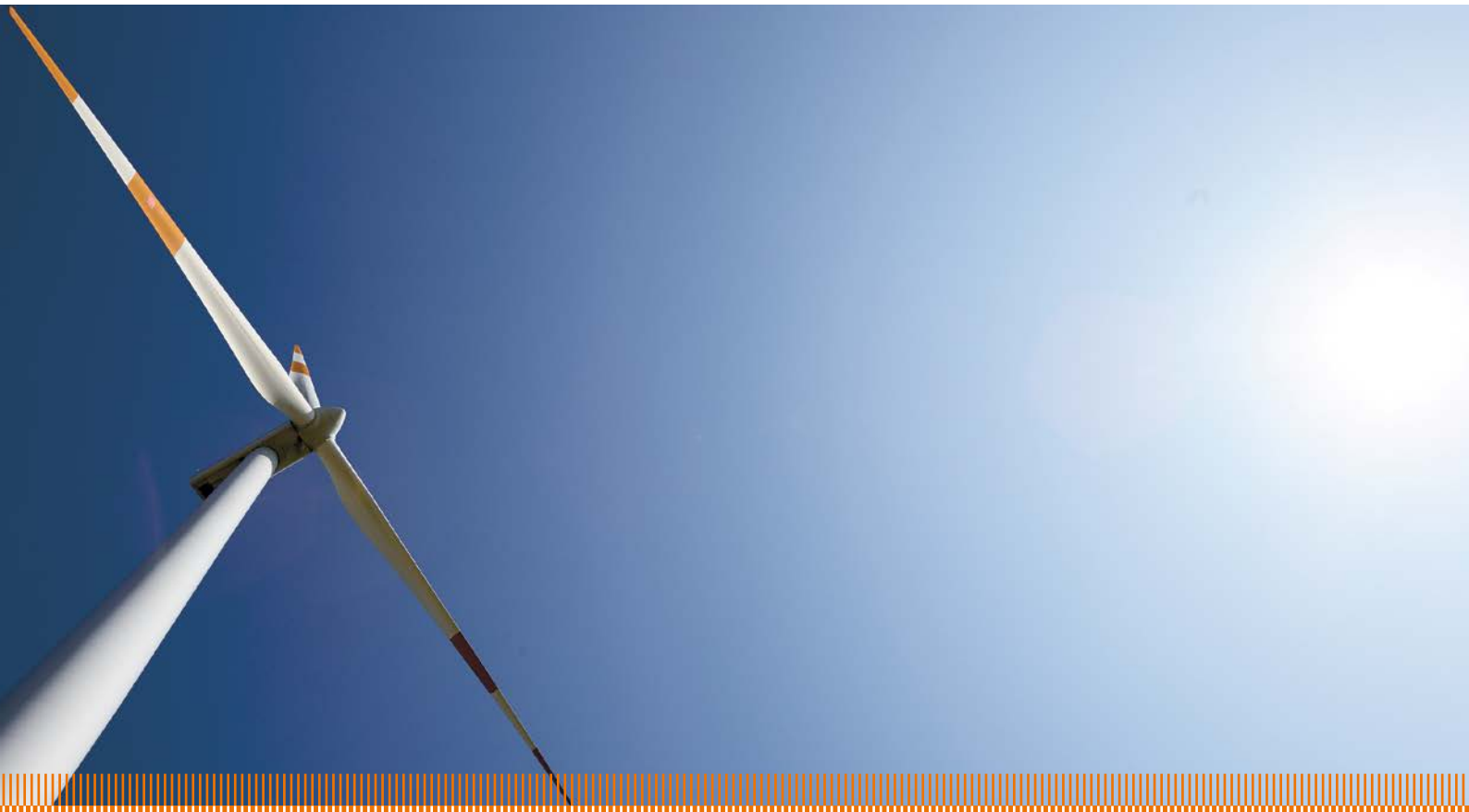
EnergieAgentur.NRW



Business Directory – Wind Energy in NRW 2017 / 2018

EnergieRegion.NRW
Cluster Nordrhein-Westfalen

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Foreword

Dear readers, dear network partners,

North Rhine-Westphalia (NRW) generates and uses more energy than any other federal state in Germany. Renewable energies has become one of the most important drivers of growth, with North Rhine-Westphalia's wind industry alone employing more than 18,500 people. So wind energy is an important economic factor that guarantees employment and provides ground-breaking momentum to the labour market of the future.

With its renowned research and development institutes, the breadth and depth of its energy technology expertise and its well-established supplier sector, North Rhine-Westphalia is an important location for the wind energy industry, not only in Germany but also internationally. There is hardly a wind turbine anywhere in the world that does not rely on parts produced in North Rhine-Westphalia.

North Rhine-Westphalia currently has over 3,400 wind turbines. As a wind energy location where research and industry cooperate closely and create innovative jobs, North Rhine-Westphalia also has a substantial demand for highly skilled labour in areas such as servicing and operation. This is why the Wind Energy Network NRW is also very committed to education and training. We are deliberately positioning ourselves across a broad range of disciplines here because developing young talent begins at school. Our core tasks also include initiating and supporting ground-breaking research projects at universities and colleges because North Rhine-Westphalia is setting standards in the development of wind energy technologies.

In order to maintain and strengthen the capabilities and efficiency of the wind industry in North Rhine-Westphalia, close networking and collaboration between all stakeholders will continue to be indispensable in future. This is what we as the Wind Energy Network NRW see as our job, and we are therefore offering the wind industry in North Rhine-Westphalia a platform for specialists and experts to share thoughts and ideas on a wide range of topics and solutions. We will also continue to provide fresh impetus to key topics for the wind industry and support innovation. This depth and breadth of expertise makes the Wind Energy Network NRW a highly capable partner for all players in the industry.

The diversity and complexity of North Rhine-Westphalia's wind energy industry is also reflected in this Business Directory – Wind Energy in NRW 2017 / 2018, which features over 250 NRW-based companies with various areas of specialization and orientations.

I hope you will find this publication worthwhile reading and look forward to continuing our lively dialogue.

Claudia Bredemann
Head of the Wind Energy Network NRW
of EnergyAgency.NRW

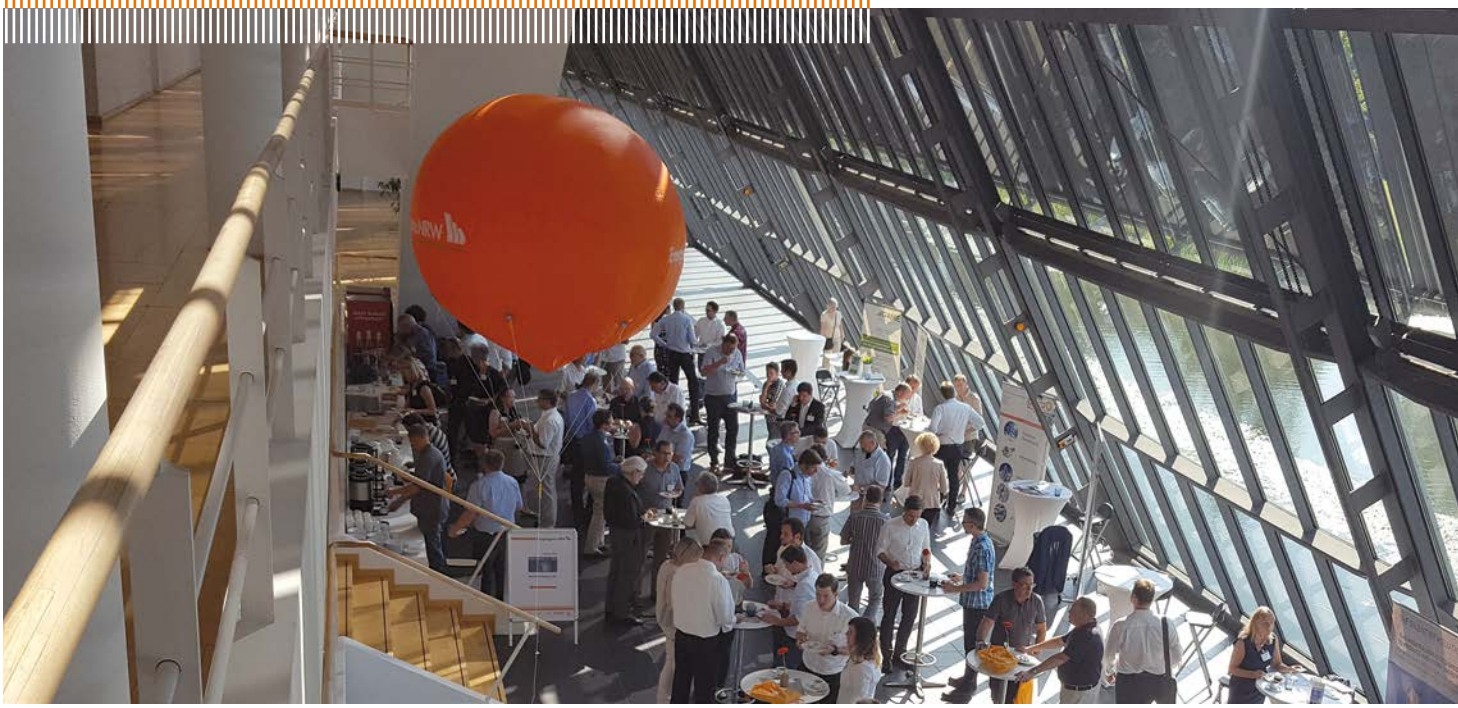
Wind Energy Network NRW

The aim of the Wind Energy Network is to enhance and interconnect the wind energy sector in North Rhine-Westphalia. It offers an interactive platform on which network members along the entire value chain can discuss key topics and solutions. Intensive interaction with stakeholders from business, science and politics allows development potential to be realised and interests to be combined and transformed into innovative technologies and services.

By its appearances and lectures at national and international exhibitions and its delegation trips and collaborations, the network supports the businesses of North Rhine-Westphalia in the development and launch of products and services, allowing North Rhine-Westphalia to continuously strengthen its national and international image as a state that specialises in supplying to the wind industry and engaging in wind research. To highlight and sell the competences of North Rhine-Westphalia as a wind energy region, the network strives to showcase the entire value chain of the wind energy industry. Its provision of broad-based information and education gives a significant impetus to the industry. Publications on key topics, brochures containing background information and technical articles published by the network when the need arises provide a clear framework of information on the subject of wind energy in NRW.

By its numerous events, such as technical conferences, expert forums, workshops and industry days, the Wind Energy Network gives the industry ever more innovative impetus and stimulates discussion. At its annual conference "Wind-Updates.NRW", the network focusses on subjects and issues that are topical within the industry, shines a light on the political background and presents the latest research results and technical developments as well as best practice examples from North Rhine-Westphalia.

At www.energieagentur.nrw/windenergie the network offers a wealth of information including industry updates and news about activities, projects and targets.



Calendar of events in 2017 / 2018

26 October 2017	Windstammtisch NRW (NRW Wind Round Table), Düsseldorf
23/24 November 2017	Windenergietage NRW, Bad Driburg
6–8 February 2018	E-world – energy & water, Messe Essen
19 April 2018	Windenergie-Tagung Haus Düsse, Bad Sassendorf
23–27 April 2018	Hannover Messe
12/13 June 2018	Branchentag Windenergie NRW, Düsseldorf
25–28 September 2018	WindEnergy Hamburg
October 2018	Wind-Updates.NRW 2018 – Annual Conference of the Wind Energy Network NRW
November 2018	Windenergietage NRW, Bad Driburg
Spring & autumn 2018	Windstammtisch NRW (NRW Wind Round Table), Düsseldorf
All year	Regional events in the individual administrative districts

Wind energy in NRW: in focus

Repowering – continued operation – dismantling

The regulations of the German Renewable Energies Act (Erneuerbare-Energien-Gesetzes; EEG) from 2000 mean that from January 2021 the EEG feed-in tariff will come to an end for wind turbines (WTs) connected to the grid in Germany before 1 January 2000. This will apply to around 4,500 megawatts (MW) of existing wind turbine capacity across Germany. In NRW alone, around 800 turbines with a combined capacity of around 440 MW will be affected. Many turbine operators are already considering whether to "repower" their site, continue operating the old plants or dismantle them altogether.

Repowering

North Rhine-Westphalia is one of the pioneering areas of wind energy use: as early as the first half of the 1990s, wind turbines were being built in NRW that usually reach the end of their technical service life after 20 years. Since technology has progressed rapidly in the meantime and modern turbines are not only more powerful but also more efficient and more economical, operators are faced with the question of whether to replace their old turbines with new ones – known as repowering. The attraction is not only the higher energy yield; the further technical development of the turbines also allows existing wind energy concentration zones to be used more effectively. This means that in older wind farms the annual yield can be increased whilst reducing the number of turbines, which can also have a positive effect on the landscape.

Whether a site can actually be repowered often depends upon planning criteria. This is true of both individual turbines and entire wind farms. Older wind turbines are often outside designated concentration zones and greater distances need to be maintained from residential developments for higher turbines, meaning that the erection of new turbines at the same site is not possible.

Continued operation

The continued operation of turbines is sometimes possible as an alternative to repowering. In this case, operators receive only the low trading price instead of the guaranteed rate of remuneration in accordance with the EEG subsidy. This has fallen sharply in recent years and in 2016 was around three cents per kilowatt hour, on average. The EnergyAgency.NRW is supporting the wind industry in its use of the remaining time to develop concepts for existing plants.

In addition to the economic considerations, continued operation also requires evidence that the structural integrity of the wind turbine can be guaranteed. A ruling by the German Institute for Construction Technology (Deutschen Instituts für Bautechnik) stipulates that the plant operator must provide analytic and practical evidence for the extension of service life.

If the continued operation of the wind turbine at the same site is not possible, it can also be sold and rebuilt at another site, where it can be used for its remaining service life.

Dismantling/recycling

A wind turbine generally has a design life of 20 years. If the turbine is not to be further operated after this time, it must be dismantled and the plot returned to its original condition.

The permit for the turbine often includes a dismantling obligation and security for the dismantling costs. In NRW, evidence must be supplied for a security payment of 6.5 percent of the total investment costs by the start of construction at the latest.

During dismantling, the wind turbine is taken apart piece by piece using a crane and transported away. This produces large quantities of concrete from the foundations and steel from the tower and nacelle. Other materials such as glass-reinforced plastic, copper, aluminium, etc. have a relatively low percentage by weight. 80 to 90 percent of the total mass of a turbine can easily be recycled: the concrete can be crushed and used for roadbuilding, for example, and metals can be melted down and reused.

The rotor blades are made of plastic reinforced with glass or carbon fibres. At the end of their service life they are sawn into pieces and can be used as fuel in the cement industry, for example. The glass fibres can replace the silicates needed for the manufacture of cement. Research is underway into separating the valuable carbon fibres from the plastic for reuse. With EEG payments for old turbines expiring, Germany is expecting a maximum of 20,000 tonnes of rotor blades in 2020, and an annual 10,000 to 15,000 tonnes thereafter. These amounts can easily be recycled in the existing plants.

The Wind Energy Network of EnergyAgency.NRW supports research institutes and recycling companies in the development of new materials, procedures and guidelines, in order to guarantee the economically and ecologically sound recycling of components.

Measures to increase acceptance: EnergyDialogue.NRW

EnergyDialogue.NRW, a project of the EnergyAgency. NRW is a platform for dialogue and for initial consultation looking to support the expansion of renewable energies in North-Rhine Westphalia. The aim of EnergyDialogue. NRW is to provide comprehensive information during the planning and realisation of local renewable energy projects. The interdisciplinary team provides particular assistance to communities, companies, associations and citizens by providing technical information, expert advice and goal-oriented mediation in the event of conflicts. All the offerings of EnergyDialogue.NRW are free of charge.

One dialogue format organised and moderated by the team of EnergyDialogue.NRW is the Community Exchange on Wind Energy. This is a platform where community representatives from a region can come together to network and to discuss questions and challenges relating to wind energy.

Furthermore, EnergyDialogue.NRW, together with the Wind Energy Network NRW, also support communities and operators in organising local information exhibitions. At these evets independent experts, planning agencies and turbine operators, as well as the EnergyAgency.NRW, communities and the project developer, can provide information about their subject area. At the exhibition stands, citizens can find out about the individual stages of the planning and approval process and the technology of wind turbines, and get basic information about climate change. There is also space at the exhibitions for citizens' initiatives or nature and species protection associations that are active in this field.

WindDialogue.NRW is a special online offering of the EnergyDialogue.NRW. It provides information about the current status of the planning and realisation of specific wind projects in North Rhine-Westphalia and shows the phase of a project in which the intensive involvement of citizens may be worthwhile or even necessary. WindDialogue.NRW also gives project developers the opportunity to inform the public about wind energy projects that are planned for the future or already underway.
www.energieagentur.nrw/energiedialog

Wind energy research in North Rhine-Westphalia

As the most important energy region in Europe, North Rhine-Westphalia bears a great deal of responsibility for future issues relating to Germany's energy transition ('Energiewende'), and for its success. Just under 30 percent of German electricity is produced in NRW. Work is underway at numerous universities and extramural research institutions in NRW into the central issues of energy and climate to allow the expansion of renewable energies to proceed and independence from fossil fuels to be attained. This way, a number of innovative ideas and pioneering projects are coming into being in North Rhine-Westphalia.

NRW is one of the top regions in the field of energy research. In wind energy, research focuses in particular on new materials, innovative energy systems, more powerful drive technologies and more efficient power transmission.

Further key topics are the fields of wind measurement and forecasting, the mechanical and electrical components of drive trains, power transmission and distribution and grid integration and storage or construction technology and logistics.

Extramural research institutes

With the Centre for Windpower Drives (CWD) at RWTH Aachen University, North Rhine-Westphalia has one of Germany's most renowned research institutes in the field of wind turbine drive systems. The CWD guides and organises the university's interdisciplinary research activities in this field. At the heart of the institution is the 4-megawatt test rig for wind turbines, which allows the drive train of a wind turbine to be loaded with freely adjustable and reproducible loads so that system behaviour can be analysed in detail.

At the Neurather Höhe, south of Grevenbroich, North Rhine-Westphalia boasts another milestone in wind energy research: the inland test field for wind turbines of Windtest Grevenbroich GmbH. Here, prototypes and test turbines can be trialled and measured according to international guidelines. After work has been completed, the turbines are dismantled and replaced by new prototypes. Clients are usually manufacturing companies as the owners of wind turbines. Windtest Grevenbroich GmbH makes the test field available along with its infrastructure, measuring technology and services.

Activities of the Wind Energy Network NRW in support of research

In 2016, the Wind Energy Network published an EA paper entitled "Windenergieanlagen und seismologische Stationen – Übersicht, Hintergrund und Ausblick" (Wind turbines and seismological stations – overview, background and outlook) summarising the current level of knowledge and resulting questions. As part of a series of research projects, the effects of wind turbines on the operation of seismological stations are quantified to secure an appropriate trade-off between the interests in the expansion of wind energy and the reliable operation of the seismological plants as a form of public service and hazard prevention. The Wind Energy Network discusses the subject of seismology further and uses its expertise to provide support.

Every year the Wind Energy Network initiates the Wind Energy Innovation & Research Working Group in NRW with the participation of Project Management Jülich (PTJ). This brings science and industry together to evaluate the current need for research and drives forward future developments in the field of wind energy. In collaboration with the current stakeholders, particularly the supplier industry and the research landscape in NRW, the work of the network provides a framework for combining interests and translating these interests into innovative technologies and services.

!

EA.paper # 6 | July 2016
„Windenergieanlagen und seismologische Stationen – Übersicht, Hintergrund und Ausblick" (Wind turbines and seismological stations – overview, background and outlook)

Wind energy and economy

The key figures from North Rhine-Westphalia are world-class: economically the strongest federal state in Germany in 2016 with a gross domestic product of 670 billion euros, it is home to twelve of the 40 largest trading companies and forms the industrial heartland of Germany with international conglomerates operating side-by-side with small and medium-sized companies.

One of the economically strongest industries in NRW is the renewable energy industry, which has advanced from a niche market to a driver of growth. The latest figures from the Society for Economic Structural Research (Gesellschaft für Wirtschaftliche Strukturforschung; GWS) on the distribution of employment in the German federal states due to the expansion of renewable energies show that 330,000 people were employed directly and indirectly thanks to the expansion of renewable energy in Germany in 2015.

If we now consider the individual "renewables", wind energy has a sustainable effect on employment across Germany. According to a current analysis by the GWS, the onshore and offshore wind industry in Germany provided a total of 143,000 direct and indirect jobs in 2015 and generated a turnover of around 13 billion euros. This market has become a significant economic factor for Germany, safeguarding employment and pointing the way for the labour market of the future.

Jobs created by renewable energy and wind energy in Germany 2015

	Jobs created by renewable energy	Jobs created by wind energy	Including			
			Operation & maintenance		Offshore wind energy	
	2015	2015	2015	Percentage, %	2015	Percentage, %
Lower Saxony	53,200	32,300	6,350	19.7	5,140	15.9
North Rhine-Westphalia	44,030	18,490	3,440	18.6	2,420	13.1
Saxony Anhalt	23,160	13,120	1,890	14.4	570	4.3
Schleswig-Holstein	18,380	12,150	3,760	30.9	2,470	20.3
Bavaria	50,460	11,820	1,780	15.1	1,440	12.2
Baden-Württemberg	31,860	9,490	1,230	13.0	1,150	12.1
Mecklenburg-Vorpommern	14,050	7,520	1,530	20.3	1,150	15.3
Brandenburg	17,350	7,060	2,320	32.9	440	6.2
Hamburg	8,890	6,770	640	9.5	1,480	21.9
Saxony	14,420	5,710	840	14.7	480	8.4
Hesse	16,090	4,870	1,130	23.2	550	11.3
Bremen	4,570	4,220	230	5.5	2,340	55.5
Rhineland-Palatinate	9,980	3,580	1,330	37.2	280	7.8
Berlin	4,560	2,330	300	12.9	280	12.0
Thuringia	9,050	2,310	670	29.0	230	10.0
Saarland	2,250	1,160	160	13.8	80	6.9
Germany	**330,000**	**142,900**	**27,600**	**19.3**	**20,500**	**14.3**

Source: Agentur für Erneuerbare Energien; GWS mbH, Osnabrück, March 2017

Development in North Rhine-Westphalia

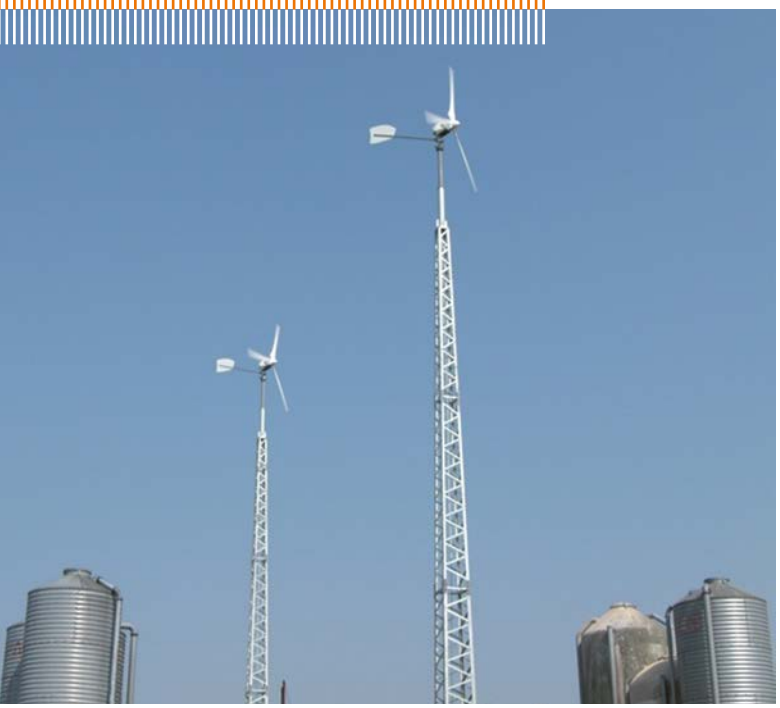
The wind energy industry in North Rhine-Westphalia is characterised by a unique diversity of stakeholders. Throughout the entire value chain, research institutes, component manufacturers and project planning and services companies operate with the aim of further developing the wind industry on a sustainable basis. In North Rhine-Westphalia alone, 18,500 people work in the wind energy sector, putting NRW second place in a national comparison. In total, the number of jobs in the renewable energy sector exceeded 44,000 in North Rhine-Westphalia.

Industry and service

North Rhine-Westphalia is the "Number 1 supplier state" for the onshore and offshore wind industry, with the federal state also playing an important role in international terms: there are hardly any wind turbines anywhere in the world that do not use technology from North Rhine-Westphalia. Drive technology is an area where companies in North Rhine-Westphalia have a particularly high level of competence. The manufacturing industry in NRW is characterised by medium-sized companies producing gearboxes, bearings, generators, transformers, couplings and brakes, as well as sensors and control systems. These specialist companies have developed a broad range of experience over many years.

Wind energy companies are working intensively on technologies and components to increase the reliability and efficiency of turbines. With their unique expertise, many of these companies in North Rhine-Westphalia have developed into world market leaders. Wind energy is thus both a key technology in NRW and a motor for exports. Strong export rates underline the high level of competence and strong reputation of the German wind industry on the global market.

Many NRW companies not only in the industrial sector but also in the service sector have made the move to wind energy and now offer maintenance, service or repair work for the wind industry. The restructuring and further development of the product portfolios of these companies means that North Rhine-Westphalia retains the technical knowledge and expertise of these market segments and ensures that the NRW as an industrial location remains one of the most important economic regions of Europe.



Small wind turbines

The discussion about the consequences and effects of global climate change and the desire by many citizens for independence from the large energy providers are increasing public awareness of small wind turbines (SWTs) as a form of energy generation.

As yet, there is no unified and industry-wide definition of small wind turbines. The Federal Association of Wind Energy (Bundesverband Windenergie; BWE) classifies SWTs as follows based upon capacity: micro WTs with a maximum rated capacity of 5 kilowatts (kW), mini WTs ranging from 5 to 30 kW and medium-sized WTs ranging from 30 to 100 kW. In practice, SWTs in Germany seldom have an output of more than 30 kW.

SWTs can be operated without being connected to the electricity grid and can be part of a stand-alone solution (off-grid). However, they can also be connected to the public electricity system as a grid-connected system with inverter and electricity meter (on-grid). The classic SWT produces electricity mainly for private households, agricultural buildings or for small and medium-sized companies.

When building and installing small wind turbines, the provisions and conditions of the building code (BauGB) and the regional building regulations of North Rhine-Westphalia (BauO NRW) must be observed. SWTs with a total height under 50 metres are classified as structural installations, for which a building permit is required. The exception to this are turbines outside residential and mixed areas with a total height of up to ten metres.

Economic viability and market overview

Small wind turbines are predestined to be private consumption systems. A modern, high-quality turbine at a windy site can generate wind power at below the price level of domestic electricity. Therefore, the more of the wind-generated electricity is consumed by the turbine operator, the greater its economic viability. The measuring stick here is the cost of domestic electricity that can be saved due to each kilowatt hour (kWh) of wind-generated electricity consumed.

Wind-generated electricity fed into the public grid from turbines with capacities of up to 100 kW attracts a statutory feed-in tariff in accordance with the Renewable Energies Act (Erneuerbare-Energien-Gesetz; EEG) 2017. The initial subsidy following the reform of the EEG 2017 was 8.38 cents per kWh. Operators of smallwind turbines with capacities up to and including 50 kW receive the initial subsidy for 20 years. The subsidy includes 0.4 cents/kWh to cover the cost of direct sale. Operators of SWTs who supply their electricity to grid operators under the fixed feed-in tariff therefore receive only a rate of 7.98 cents/kWh. The subsidy is paid to the grid operators.

Although the options for the use of SWTs are diverse, the market in Germany tends to be a niche one. According to the latest market report from the World Wind Energy Association (WWEA), the number of SWTs installed in Germany in 2015 was 17,000. There are around 15 manufacturing companies with market-ready technology in Germany, three of which are based in North Rhine-Westphalia.

Offshore wind energy

In the context of Germany's energy transition, offshore wind energy represents an important building block of Germany's energy and climate policy. For example, according to government targets, 6,500 megawatts (MW) of wind power is to be erected in German waters by 2020 and 15,000 MW by 2030.

In 2016, 156 offshore wind turbines with a combined capacity of 818 MW supplied power into Germany's power grid for the first time. Thus, at the end of 2016, a total of 947 turbines with a combined capacity of 4,108 MW were connected to the grid and generated around 13 terawatt hours (TWh) of electricity for around 3 million households.

In 2017, an amendment to the EEG introduced a compulsory tender process for offshore wind energy. In a first bidding round, which ended on 1 April 2017, 1,500 MW was put out to tender. In total, it was possible to commission four projects in the German North Sea. In 2018 a further 1,500 MW will be put out to tender.

Influence of offshore wind energy on the German economy

According to the latest analysis from the Association for Economic Structural Research (Gesellschaft für Wirtschaftliche Strukturforschung; GWS) on behalf of the Federal Association for Wind Energy (Bundesverbands Windenergie; BWE), VDMA Power Systems and the Offshore Wind Industry Alliance (Offshore-Wind-Industrie-Allianz; OWIA), the offshore wind industry employs 20,500 people in Germany. The figures for the federal states show that wind energy at sea is providing new economic impetus and sales markets for many regions in Germany. This is particularly attractive to manufacturers and suppliers in coastal areas as their location dispenses with the need for costly logistics, but service providers, operators, project planners and investors are also preferring to establish themselves at sites near harbours, giving rise to an economic upturn in the structurally weak coastal regions. Even inland North Rhine-Westphalia, a traditional location for the mechanical engineering industry, has gained a considerable amount of investment and sales potential from wind energy at sea. Companies based in the region produce gearboxes, generators, brakes, bearings or cast components. For example, five of the world's leading suppliers of gearboxes for wind turbines are based in North Rhine-Westphalia.

EEG 2017 – Paradigm shift for wind energy

Rotating wind turbines are now an integral part of Germany's landscape. The rotors turn tirelessly on the horizon and continuously feed electricity into the grid. Whereas 4,346 wind turbines were providing climate-friendly electricity in Germany in the mid-1990s, 27,270 wind turbines across Germany were feeding a good 45,900 megawatts (MW) of energy into the German grid by the end of 2016.

The main driver for the expansion of wind energy and other renewable energies in Germany is the Renewable Energies Act (Erneuerbare-Energien-Gesetz; EEG) created by the government in 2000. It is the central element of Germany's climate protection policy. This act is intended to realise the government's aims of restructuring energy supply and increasing the share of renewables in electricity generation to at least 80 percent by 2050.

Since its implementation in 2000, the EEG has been subject to five amendments. The latest reform, which came into force on 1 January 2017, represented a paradigm shift and brought about the most significant change: the introduction of competitive tenders for wind energy.

Payments determined by tenders

Whereas, in the past operators of wind turbines received a state-determined payment for each kilowatt hour of renewably generated electricity, the level of this subsidy is now determined by tenders on the market. This works as follows: the subsidy goes to the party that demands the least for the operation of their wind turbine.

The aim is to retain the diversity of stakeholders in spite of increased competition – the central trademark of the energy transition. For this reason, citizens' energy companies will for the first time be defined by law and can, under certain circumstances, participate in the bidding rounds (see section "Citizen's wind"). A further aim of the new EEG is to create a closer interlinking of electricity generated and grid capacity.

In parallel with the expansion of renewable energies, the expansion of the grid also needs to be driven forward to prevent overcapacities and grid bottlenecks. For this reason, the expansion of wind energy on land in areas with grid bottlenecks is restricted. This restriction will remain in force until the grid has been sufficiently expanded.

Expansion paths for installed capacity in accordance with the Renewable Energies Act (Erneuerbare-Energien-Gesetz; EEG) 2017

Wind energy on land	Annual gross increase of **2,800 MW** for 2017-2019	Annual gross increase of **2,900 MW** from 2020
Wind energy at sea	Increase in installed capacity to **6,500 MW** in 2020	Increase in installed capacity to **15,000 MW** in 2030
Solar energy	Annual gross increase of **2,500 MW**	
Biomass	Annual gross increase of **150 MW** for 2017-2019	Annual gross increase of **200 MW** for 2020-2022

Source: Bundesministerium für Wirtschaft und Energie (BMWi)

An annual gross increase of 2,800 MW is forecast for wind energy on land in the years 2017 to 2019 and 2,900 MW per year from 2020. The gross increase covers all new turbines, even where they replace old turbines.

Tenders were held (or will be held) in 2017 for 800 megawatts up to 1 May and for 1000 megawatts each up to 1 August and 1 November 2017. From 2018, the period for bid submission ends on the 1st day of the months February, May, August and November, with 900 MW being allocated in each round of bids.

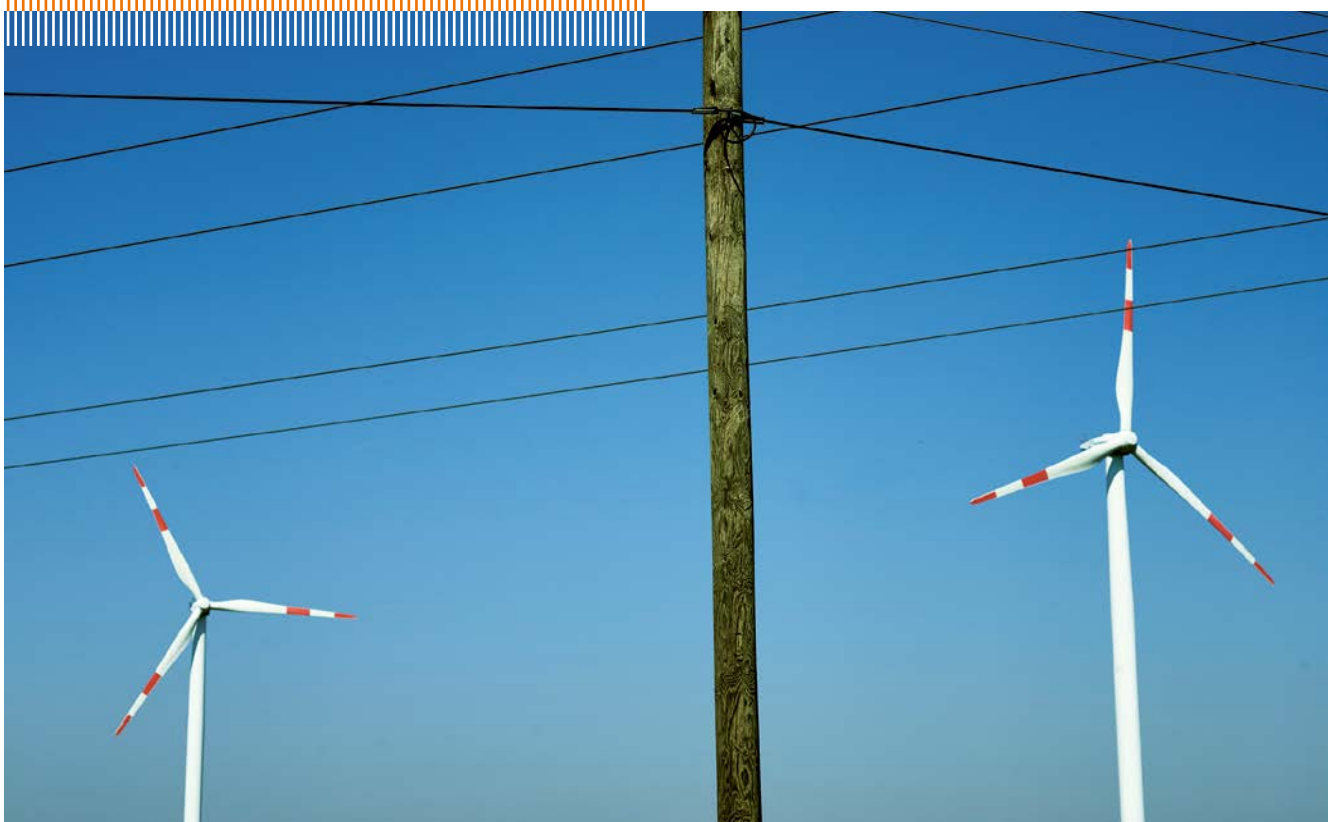
The EA.paper "Das EEG 2017: Die wichtigsten Änderungen" (EEG 2017: the most important changes) from EnergyDialogue.NRW summarises all important changes for wind energy on land.

EA.paper # 8 | October 2016
"Das EEG 2017: Die wichtigsten Änderungen" (EEG 2017: the most important changes)

First round of bids - success for citizens' energy

Up to 2 May 2017, bids can be submitted to the Federal Network Agency (Bundesnetzagentur; BNetzA) as part of the first bidding round. In this round, tenders were invited for subsidies for projects with a total capacity of 800 MW throughout the whole of Germany. However, applications significantly exceeded this amount: 256 bids with a total capacity of 2,137 MW were submitted.

With a 2.7-fold oversubscription, the competitive pressure was significantly greater than expected. This was due in part to the 169 bids from citizens' energy companies, which were allowed to participate in the tender without a permit under the Federal Immission Control Act (Bundesimmissionsschutzgesetz). Almost all citizens' energy projects made use of this option. They have a maximum of four and a half years to realise their projects, two years longer than normal bidders, who also had to produce a permit as part of the tendering procedure.



Citizens' wind

Citizens' energy projects offer the population the opportunity to actively help shape the energy transition in their own area. Citizens participate directly in local energy projects. Citizens' wind projects are crucial for the wind energy industry. They promote local acceptance of wind turbines, increase the diversity of stakeholders and strengthen regional value creation. In NRW the district of Steinfurt is leading the way in support for such projects. Its "Bürgerwindpark-Leitlinien" (Citizens' wind farm guidelines) apply to all new wind power projects in the district launched since 2011.

Since the start of 2017, all wind energy projects in Germany must participate in a tendering procedure if they are to qualify for payments under the Renewable Energies Act (Erneuerbare-Energien-Gesetz; EEG) 2017. The term "Bürgerenergiegesellschaft" (citizens' energy company) was formally defined by law for the first time so that citizens' wind projects could be targeted for specific support. Special rules were laid down in the tendering procedure for this group of stakeholders: amongst other things, in 2017 citizens' energy companies could make a bid in the tendering rounds without submitting a permit for their project in accordance with the Federal Immission Control Act (Bundes-Immissionsschutzgesetz; BImSchG), whereas other bidders had to be in possession of this permit before submitting their bid. The special rules for citizens' energy companies were in fact used by almost all successful bidders in the first tendering round. The privilege of being allowed to bid without a BImSchG permit was therefore suspended for the first two tendering rounds in 2018 because the realisation rate of projects without a BImSchG permit is very uncertain and the reliable expansion of wind energy in the coming years was in question. It thus remains to be seen how high the realisation rate will be for the first tendering rounds and whether the high proportion of citizens' wind projects i n the expansion of wind power can be maintained in the long term.

With its "Plattform Bürgerenergie & Energiegenossenschaften" (Platform for Citizens' Energy & Energy Cooperatives), the EnergyAgency.NRW provides stakeholders an opportunity to network, share experience and collaborate.
www.energieagentur.nrw/buergerenergie

Figures, data, facts
Wind energy at a glance

Installed wind capacity on 31.12.2016

Worldwide

Capacity
487,000 MW

EU

Capacity
145,000 MW

Germany

Capacity
50,018 MW
(45,910 MW Onshore,
4,108 MW Offshore)

Source: GWEC

Number
27,270

Onshore-WTs in Germany

Number
947

Offshore-WTs in Germany
(4,108 MW)

Source: Deutsche Windguard

Increase in wind capacity in 2016

China 23,370 MW 1

Worldwide

Capacity
54,642 MW

EU

Capacity
12,491 MW

Germany

Capacity
5,443 MW
(4,625 MW Onshore,
818 MW Offshore)

Source: GWEC

Number
1,624

Onshore-WTs in Germany

Number
156

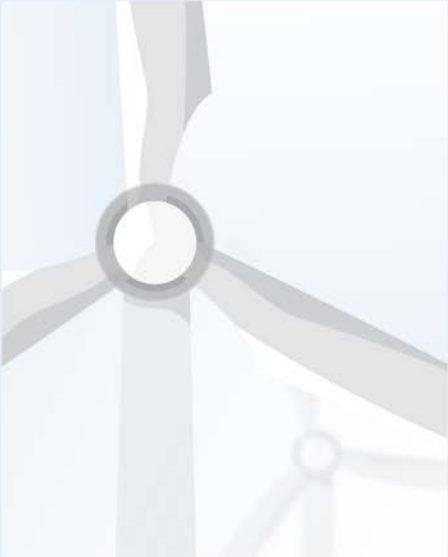
Offshore-WTs in Germany

Source: Deutsche Windguard

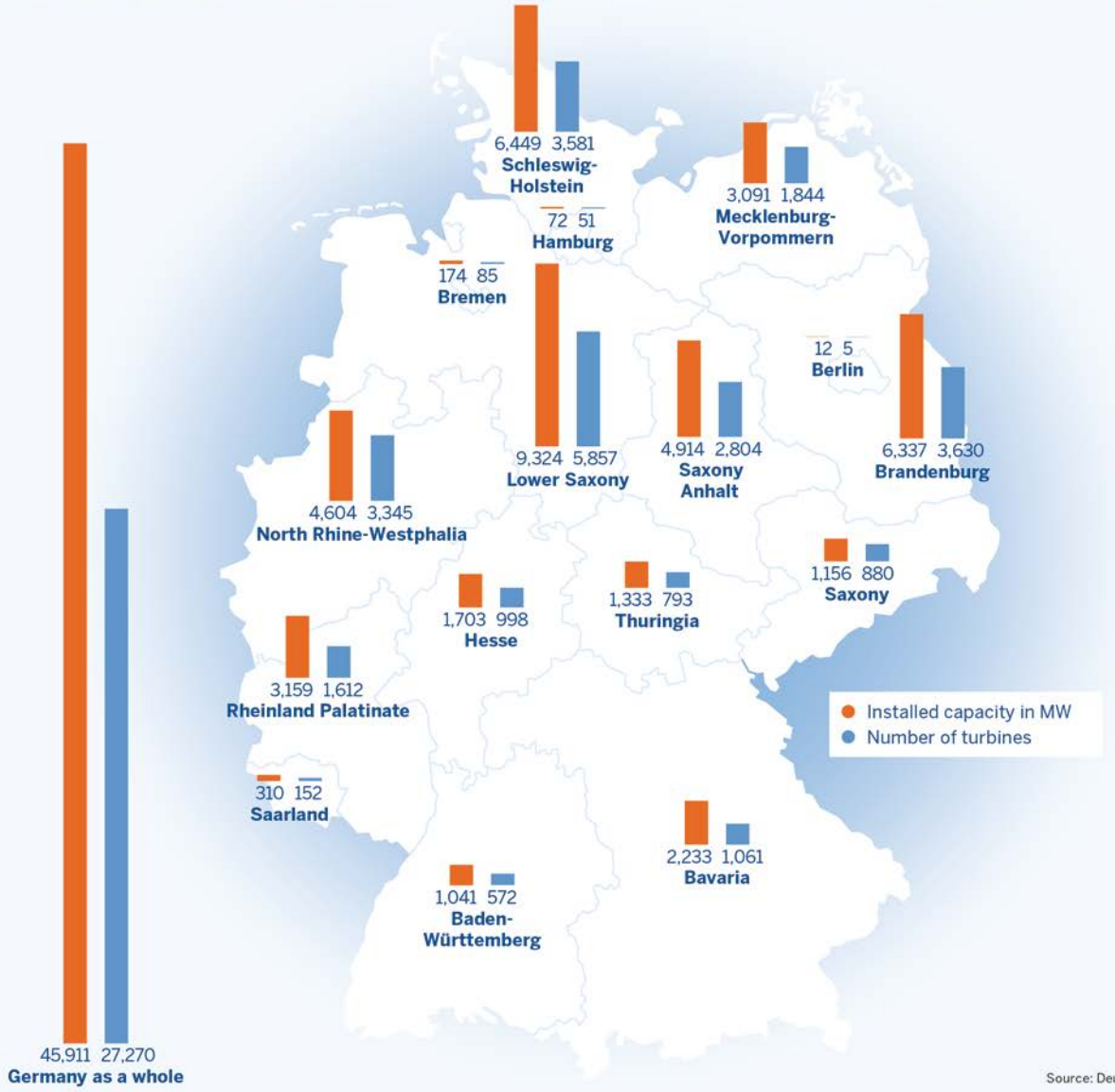
Wind energy in NRW 2016/2017

Total installed capacity in NRW	**4,906 MW**
Number of wind turbines in NRW	**3,447**
Newly installed capacity in NRW	**564 MW**
New WTs in NRW	**211**
NRW's share of Germany's gross increase	**12.2 percent**
NRW's ranking in terms of increase in wind capacity in national comparison	**3rd place**
Number of jobs in wind industry in NRW	**18,500**
Netzwerk Windenergie NRW	**more than 2,000 members**

Source: Deutsche Windguard



Installed capacity (in MW) and number of turbines in 2016 broken down by federal state

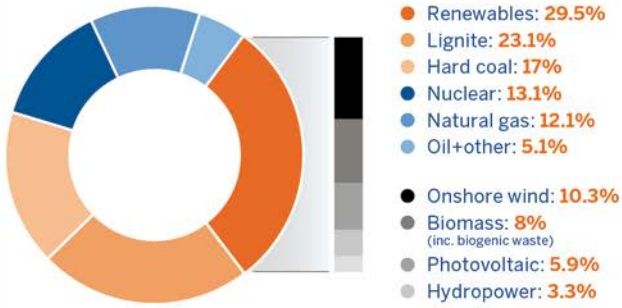


Source: Deutsche Windguard

Percentage share of installed wind capacity in MW 2016 – top 10 countries worldwide

Source: GWEC

Gross electricity generation 2015 in Germany by fuel



Source: Agora

Company profiles

Deutsche Kreditbank AG (DKB)

At home in the industry, well-connected locally

Deutsche Kreditbank AG (DKB), which has its headquarters in Berlin, was established in 1990 and has been represented in Düsseldorf/NRW since 2016. It is currently one of the top 20 banks in Germany with 3,300 employees and a balance sheet total of 76.5 billion euros. Its offerings lead the market and are characterised by fair conditions. The DKB looks after more than 3.5 million customers who can use the latest technologies to carry out their banking transactions conveniently and securely online. In-house industry experts look after business customers personally at the branch.

The DKB places great value on entrepreneurial and sustainable trading: it therefore uses over 80 percent of its balance sheet total for credit, e.g. for the construction of homes suitable for old people and families, energy-efficient buildings, outpatient and inpatient health facilities and construction projects in schools and nurseries. DKB ensures the competitiveness of domestic agriculture by its investment in production conditions. Since 1996 it has financed numerous renewable energy projects in the fields of wind, solar and hydro. With a credit portfolio of around 10 billion euros, the Deutsche Kreditbank AG is one of the largest financial backers of renewable energies in Germany. It looks after 4,900 business customers in North Rhine-Westphalia. It has financed 150 wind, photovoltaic and biogas systems in the state with a total capacity of 270 megawatts and issued loans with a total value of more than 5.8 billion euros. Around 411,000 of its private customers come from NRW.

Jörg-Uwe Fischer
Head of the Renewable Energies
Centre of Competence

Enser Versicherungskontor GmbH

Security in the event of damage and faults

Enser Versicherungskontor GmbH (EVK) is one of the leading insurance brokers in the field of renewable energy technology. Since 1996, EVK has been bringing a spirit of innovation to the insuring of systems for wind energy, photovoltaics, storage technology, hydropower, biomass and geothermal power. 30 employees look after more than 10,000 systems across the whole of Europe. Its client base ranges from the first wind power operators, through municipal companies, to investment companies. For EVK, the focus is always on the customer and the customer's interests – right through the entire duration of the contract and in particular in the event of a claim. The in-house claims engineer ensures that claims are handled competently and rapidly.

EVK has good market relationships with all reputable and specialist insurance companies. This means that, in addition to classic insurance such as liability, machinery, electronics or business interruption insurance, the company is also able to offer consultancy and quotations for specific insurance concepts such as Directors and Officers insurance (D&O) or Cyber. Another specialist field is the insurance of old wind turbines. Renewable energies are more than just a field of business to Enser Versicherungskontor. The specialist insurance broker operates wind turbines and photovoltaic systems itself and has a "green" electric charging point at its company headquarters. This expertise as an operator is reflected in EVK's own cover concepts, which are optimally tailored to the risks to be insured.

enveco GmbH

Consultancy and assessment for the approval procedure from under one roof

enveco GmbH is an independent consultancy and assessment agency from Münster specialising in wind energy. For more than 20 years, an interdisciplinary team has covered an ambitious remit. The company offers all the assessments required for the approval process from under one roof so that projects can be realised in reliably, efficiently and quickly. Due to its extensive experience in the production of assessments in fields such as immission protection and ecology, enveco GmbH is frequently in demand for more complex situations. Enveco provides support during the optimisation of existing wind farms to make the operating phase more economical.

In addition, enveco GmbH is also active in the field of urban development planning and supports communities in the creation of potential assessments and land-use plans. The company also has its sights firmly upon the future of renewable energies and is working on flexible storage concepts.

The work of enveco GmbH is characterised by personal consultancy and mentoring during the project process. Its portfolio of customers includes electricity suppliers, project planners, citizens' wind companies and numerous farmers.

F. W. Brökelmann Aluminiumwerk GmbH & Co. KG

System solutions for Germany's energy transition

F. W. Brökelmann Aluminium is part of the Knauf Interfer group of companies and one of the top-performing aluminium processors in Germany.

F. W. Brökelmann Aluminium offers a broad portfolio ranging from extruded profiles through machined parts to components and assemblies. The machining, assembly and manufacture of its ready-to-fit components is largely automated. The manufacturing depth depends upon the requirements, resources a nd logistical strategies of the client in question.

The mix of materials determines their subsequent use. For example, aluminium profiles are combined with aluminium die casting, polyamide and magnesium to satisfy the stringent requirements relating to materials, technology and sustainability that apply in high-performance wind turbines.

Gesellschaft für angewandte Marktforschung in der Energiewirtschaft (G.A.M.E.) mbH

A breath of fresh air to current market data

Today's energy industry is characterised by change. This increases the need for well-founded information on market potential, energy use and trends, particularly in the renewable energy sector. G.A.M.E. is a market research institute that specialises in collating and analysing the latest data and studies for energy providers, system operators, project planners, consultancies and the public sector. Various data products are available for the wind industry.

The G.A.M.E. Database of Onshore Wind Farms 2017 is made up of around 1,500 entries on wind farms in Germany with installed capacities from 5 MWe, including operator data. The database lists technical infrastructure features of each wind farm such as installed capacity, year of commissioning and number of turbines and provides information on make and model of turbines along with their hub height, rotor diameter and generator type. Wind farms are also assigned to their local distribution network operator and control zone based upon their location.

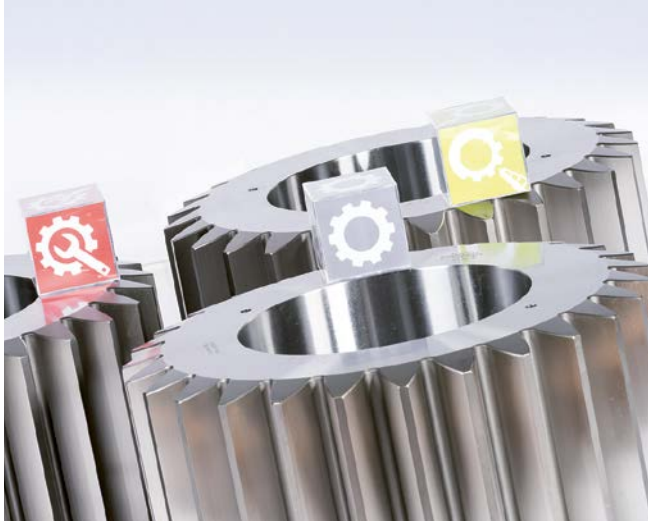
Every month, continuous market monitoring by G.A.M.E. KMM Wind highlights newly approved onshore wind turbines, along with the wind farm they belong to, including information on the owner or investor. G.A.M.E. also provides the address and contact details for the turbines, as well as listing the immediate parent company. In all products, the focus is on the market-oriented usability of the research results for the customer's project.

Hans Scharpegge GmbH

Quality – tooth by tooth

Hans Scharpegge GmbH is an international manufacturer of high-precision, ground gears and pinion shafts for sectors including the wind industry. For almost 60 years, the company – a family business, now in its third generation – has been manufacturing gear components of all sizes at its site in Dortmund.

Its international customer base means that the company's gears and pinion shafts, which are used in applications such as wind turbines, gearboxes, machines, pumps, ships, rolling mills, crane systems and cement and sugar mills, are setting the whole world in motion. The product range of Hans Scharpegge GmbH includes the complete manufacture of gears with internal and external teeth and pinion shafts with diameters ranging from 100 to 3,000 millimetres, express repairs such as the regrinding of the teeth of gears and pinion shafts, express refabrication following damage, and the provision of individual manufacturing technologies on loan. "Quality – tooth by tooth" is a company philosophy that the traditional company upholds based on decades of experience and competence in the gear industry. With its modern fleet of machinery, impressive manufacturing depth and qualified specialist staff, Hans Scharpegge GmbH creates solutions for its customers every single day. They would love to do this for you too!



Hexion GmbH

Manufacturer of specialist epoxy resins and adhesives for large rotor blades for wind turbines

Hexion is one of the world's leading companies in the field of specialist chemicals and tools. The company leads the market in the development and production of duroplastic resins. It has more than 4,300 employees at 60 sites throughout the world and supplies to customers from a wide variety of industries around the globe. Hexion stands for innovation and value-oriented working. Hexion's products can be found in every field of modern life, including wind energy, oil extraction, architecture, air travel, marine applications, the electrical industry, furniture production and construction, and car and vehicle production. Hexion GmbH drives value creation in a reliable, ethically justifiable and sustainable manner.

In the field of wind energy, Hexion manufactures specialist epoxy resins and adhesives for large rotor blades for wind turbines. Hexion has been working closely with the manufacturers of rotor blades since 1978, when the first fibre-reinforced rotor blades were developed. The GL-certified products are characterised by excellent fatigue strength, and permit efficient production with reduced repair and cycle times. The company offers resin systems for all types of rotor blade application, including the resin infusion procedure, manual lamination, adhesive resin use and tool preparation.

REA GmbH Management

Joint action. Regional cooperation. Forward-looking planning.

Citizens' energy companies are models of success for Germany's energy transition, particularly in the wind energy sector. REA GmbH is strongly committed to the involvement of local citizens and allows them to play a role in the planning of wind energy projects and to get involved financially. The result: local citizens are involved in every REA wind farm.

In addition to citizen involvement based on financial and cooperative participation, REA's local value creation concept also includes cooperation with regional energy providers and communities to achieve collaborative and tailored wind energy planning that enjoys local acceptance.

REA has been using this concept in its role as a project planner and operator of wind energy and photovoltaic systems for almost 20 years now. The engineering company from Düren is highly committed to the expansion of renewables in its region. All REA projects extend from the development phase, through realisation, to the many years of system operation. As a full service provider in the wind energy industry, REA takes on tasks such as project planning and implementation, the award and supervision of construction contracts for energy systems, management and optimisation, the repowering of old plants and the creation of models for financing and for member consultation.

Veolia

Innovative disposal solutions for the wind energy industry

As an international environmental service provider and disposal partner for trade and industry, Veolia offers environmentally friendly solutions for the recycling of wind turbines. Its range of services covers the entire disposal chain up to the crushing and disposal of plant components such as foundations, towers, generators and rotor blades.

The recycling of valuable components and the disposal of hazardous wastes are also part of its portfolio. Veolia's mobile rotor blade saw permits integrated disposal on site: from the crushing of rotor blades in the wind farm to recycling. This saves companies the expensive and logistically complex heavy transport of blades that are no longer usable. Work is performed autonomously on the site of the wind farm without any residue being left; the existing crane parking area for the dismantled turbine suffices for the work area. The water used for the cooling of the saws and for dust suppression is brought onto the site and recycled. Veolia is committed to certified disposal safety with a high level of flexibility. This includes central disposal management by regional service stations across the whole of Germany from under one roof, and including monitoring and reporting on all services performed. In the field of production, too, Veolia is an experienced disposal partner that is at your side to perform internal waste management as well as factory disposal, facility management and winter service.

ZF Industrieantriebe Witten GmbH

Manufacturer of gearboxes in the multi-megawatt class

ZF Industrieantriebe Witten GmbH, established in 1884 as Lohmann & Stolterfoht GmbH, develops, produces and sells large gearboxes both for industrial applications and for wind energy. It was one of the suppliers to the pioneering companies of the wind energy industry and, with around 850 employees, is now the world's leading manufacturer of gearboxes for wind turbines of eight megawatts and above.

A significant factor in the company's success is its partnership-based and trusting collaboration with leading manufacturers in the wind energy industry, which is characterised by innovative, high-quality and economical solutions for the global market. Based on the ZF management system, the expertise of selected suppliers and efficient processes for the entire product-creation sequence, extremely high product and service quality is guaranteed.

Thanks to its decades of experience in the production of gearboxes for wind turbines, Witten has now developed into a European service centre with global responsibility for the servicing of wind turbine gearboxes in the ZF group. This service covers maintenance, repair, spare parts supply and upgrades not only for ZF's own gearboxes, but also for all third-party makes that are available on the market. In addition to the in-house maintenance services, ZF Industrieantriebe Witten GmbH also offers field service for onshore and offshore turbines all over the world.

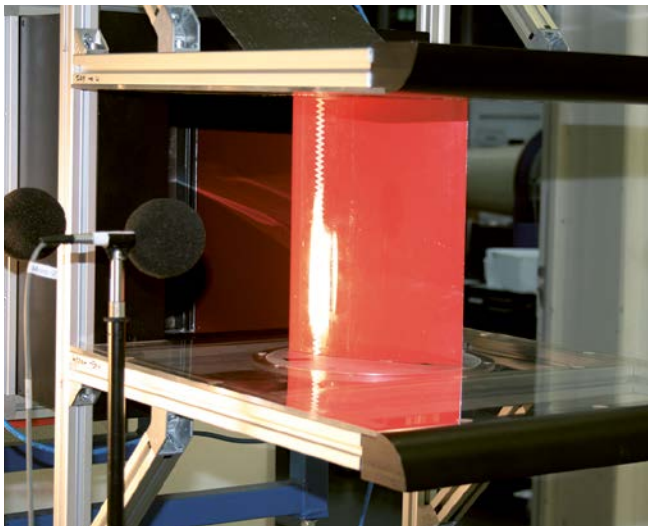
University Siegen
Rotor blade acoustics

Chair for fluid mechanics and turbomachinery, Professor Thomas Carolus

At the chair for fluid mechanics and turbomachinery of the University of Siegen, intensive work is underway on the reduction of flow-induced noise in turbomachines. In recent years, wind turbines have come to the fore, not least because these machines are expected to make a decisive contribution to the generation of renewable electricity, both nationally and internationally. Despite considerable progress they are often regarded as sources of unacceptable environmental noise.

Since November 2015, research has been underway in the "RENEW" project (RENEW = development of a quiet rotor blade to increase energy yield and optimise the earnings potential of wind power areas) into the development of a quiet rotor blade for large wind turbines. This project has been supported by the Federal Ministry for Economic Affairs and Energy (BMWi) and is taking place in collaboration with Senvion in Hamburg. The main source of noise in modern wind turbines is the rear edge of the blade. The turbulent flow generates pressure fluctuations in its boundary layer that are radiated in a characteristic pattern as noise. An important goal of RENEW is to use structural measures to minimise the turbulence of the flow in the vicinity of the rear edge, as well as the noise emission itself. To achieve this, flow simulations with an extremely high temporal and spatial resolution and an integral noise field calculation are produced in a high-performance computer cluster. The experiments are supplemented by pilot projects in various aero-acoustic wind tunnels, which also permit noise source location using the phased-microphone technique or an acoustic concave mirror.

A small wind turbine stands on the roof of a university building for a further research project. Wind speed, wind direction, energy yield, noise emission and the forces on the rotor blades are continuously recorded. The project brings together researchers from a wide range of disciplines at the University of Siegen, in particular to improve small turbines, but also to develop and trial methods for the optimisation of large wind turbines.



Directory of companies (by categories)

Research and development

Bergische Universität Wuppertal
Lehrstuhl für Elektrische Energy supplystechnik
Rainer-Gruenter-Straße 21, 42119 Wuppertal, Tel.: +49 (0) 202 439 19 76
www.eev.uni-wuppertal.de, zdrallek@uni-wuppertal.de

Center for Wind Power Drives (CWD) der RWTH Aachen
Campus-Boulevard 61, 52047 Aachen, Tel.: +49 (0) 241 809 08 85
www.cwd.rwth-aachen.de, georg.jacobs@cwd.rwth-aachen.de

Gesellschaft für angewandte Marktforschung in der Energiewirtschaft mbH (G.A.M.E.)
Am Campus 2 (Grips III), 48565 Steinfurt, Tel.: +49 (0) 2551 864 93 80
www.energiemarkt-forschung.de, info@energiemarkt-forschung.net

Hochschule Bonn-Rhein-Sieg
Grantham-Allee 20, 53757 Sankt Augustin, Tel.: +49 (0) 2241 86 53 00
www.fb03.h-bonn-rhein-sieg.de, katharina.seuser@h-brs.de

ie3 Institut für Energiesysteme, Energiewirtschaft und Energieeffizienz
Emil-Figge-Straße 70, 44227 Dortmund, Tel.: +49 (0) 231 755 23 96
www.ie3.e-technik.tu-dortmund.de, ie3.etit@tu-dortmund.de

Internationales Wirtschaftsforum Regenerative Energien (IWR)
Soester Straße 13, 48155 Münster, Tel.: +49 (0) 251 23 94 60
www.iwr-institut.de, info@iwr-institut.de

KLOSS INNOVATIONSBÜRO
Auf dem Jäger 3 B, 44892 Bochum, Tel.: +49 (0) 234 921 04 63
www.innovationen-kloss.de, mail@innovationen-kloss.de

Universität Siegen
Paul-Bonatz-Straße 9 – 11, 57068 Siegen, Tel.: +49 (0) 271 740 23 86
www.uni-siegen.de/fb11/iftsm, thomas.carolus@uni-siegen.de

Windwise GmbH
Hafenweg 46 – 48, 48155 Münster, Tel.: +49 (0) 251 590 66 70
www.windwise.eu, info@windwise.eu

Manufacturers of wind turbines

Drössler GmbH Umwelttechnik
Marienhütte 6, 57080 Siegen, Tel.: +49 (0) 271 318 91 57
www.droessler-umwelttechnik.de, vertrieb-ventur@droessler.de

GE Wind Energy GmbH
Holsterfeld 16, 48499 Salzbergen, Tel.: +49 (0) 5971 98 00
www.ge-renewable-energy.com, detlef.neeland@ge.com

Kenersys Europe GmbH
Albersloher Weg 10, 48155 Münster, Tel.: +49 (0) 251 21 09 90
www.kenersys.com, info@kenersys.com

NEUHÄUSER Windtec GmbH
Scharnhorststraße 11 – 16, 44532 Lünen, Tel.: +49 (0) 2306 94 90
www.neuhaeuser.com, contact@neuhaeuser.com

Nordex Energy GmbH
Centroallee 263a, 46047 Oberhausen, Tel.: +49 (0) 40 300 30 294 0
www.nordex-online.com, salesgermany@nordex-online.com

superwind GmbH
Am Rankewerk 2 – 4, 50321 Brühl, Tel.: +49 (0) 2232 57 73 57
www.superwind.com, power@superwind.com

Vestas Deutschland GmbH
Niederlassung Osnabrück, Eduard-Pestel-Straße 2, 49080 Osnabrück, Tel.: +49 (0) 541 33 53 20
www.vestas.de, vestas-centraleurope@vestas.com

Suppliers of large components

EUROPIPE GmbH
Pilgerstraße 2, 45473 Mülheim an der Ruhr, Tel.: +49 (0) 208 97 60
www.europipe.com, europipe@europipe.com

Gräbener Maschinentechnik GmbH & Co. KG
Am Heller 1, 57250 Netphen-Werthenbach, Tel.: +49 (0) 2737 98 92 00
www.graebener-maschinentechnik.de, graebmasch@graebener-group.com

Suppliers of large components

Max Bögl Wind AG
Stolberger Straße 20, 50933 Köln, Tel.: +49 (0) 221 98 544 81 37 77
www.max-boegl.de, wind@max-boegl.de

Modellbau Nachtigall GmbH
Holtkamp 3, 46414 Rhede, Tel.: +49 (0) 2872 98 06 51
www.modell-formenbau.de, modellbau-gmbh@t-online.de

Oevermann Hochbau GmbH
Robert-Bosch-Straße 7 – 9, 48153 Münster, Tel.: +49 (0) 251 760 10
www.oevermann.com, huelsmann.n@oevermann.com

RWE Power AG
Frechener Straße 12, 50226 Frechen, Tel.: +49 (0) 2234 93 56 97 10
www.rwe-technikzentrum.de, daniel.keller@rwe.com

Siegthalerfabrik GmbH
Siegtalstraße 32 – 34, 57080 Siegen, Tel.: +49 (0) 271 35 90 80
www.siegthaler.de, info@siegthaler.de

Siempelkamp Giesserei GmbH
Siempelkampstraße 45, 47803 Krefeld, Tel.: +49 (0) 2151 89 42 01
www.siempelkamp.com, giesserei@siempelkamp.com

SLF Oberflächentechnik GmbH
Grevener Landstraße 22 – 24, 48268 Greven, Tel.: +49 (0) 2575 97 19 30
www.slf.eu, info@slf.eu

thyssenkrupp Rothe Erde GmbH
Tremoniastraße 5 – 11, 44137 Dortmund, Tel.: +49 (0) 231 18 60
www.thyssenkrupp-rotheerde.com, rotheerde@thyssenkrupp.com

ThyssenKrupp Steel Europe AG – Geschäftseinheit Grobblech
Mannesmannstraße Tor 9, 47259 Duisburg, Tel.: +49 (0) 203 527 56 27
grobblech.thyssenkrupp-steel-europe.com, info.plate@thyssenkrupp.com

Ventur GmbH
Marienhütte 6, 57080 Siegen, Tel.: +49 (0) 271 318 92 90
www.droessler-ventur.de, ventur@droessler.de

Suppliers of mechanical components

3M Deutschland GmbH
Carl-Schurz-Straße 1, 41460 Neuss, Tel.: +49 (0) 2131 14 41 40
www.mmm.com/wind, 3M-Wind@mmm.com

AS Tech Industrie- und Spannhydraulik GmbH
Leopold-Hoesch-Straße 5 – 7, 52511 Geilenkirchen, Tel.: +49 (0) 2451 48 20 20
www.astech-hydraulik.com, info@astech-hydraulik.com

Atlas Copco Tools Central Europe GmbH
Langemarckstraße 35, 45141 Essen, Tel.: +49 (0) 201 217 70
www.atlascopco.com, tools.de@de.atlascopco.com

August Friedberg GmbH
Achternbergstraße 38a, 45884 Gelsenkirchen, Tel.: +49 (0) 209 913 20
www.august-friedberg.com, info@august-friedberg.com

BRAUER Maschinentechnik AG
Raiffeisenring 25, 46395 Bocholt, Tel.: +49 (0) 2871 70 33
www.brauer-getriebe.de, info@brauer-getriebe.de

CENTA Antriebe Kirschey GmbH
Bergische Straße 7, 42781 Haan, Tel.: +49 (0) 2129 91 20
www.centa.info, centa@centa.info

DELIMON GmbH
Arminstraße 15, 40227 Düsseldorf, Tel.: +49 (0) 211 777 40
www.bijurdelimon.com, kontakt@bijurdelimon.com

Dorstener Antriebstechnik GmbH
Hüttenstraße 1, 46284 Dorsten, Tel.: +49 (0) 2362 670
www.zollern.de, zba@zollern.de

Eickhoff Antriebstechnik GmbH
Am Eickhoffpark 1, 44789 Bochum, Tel.: +49 (0) 234 97 50
www.eickhoff-bochum.de, mweber@eickhoff-bochum.de

EM Brake Systems AG
Zur Brinke 14, 33758 Schloß Holte-Stukenbrock, Tel.: +49 (0) 5207 99 16 10
www.emb-systems.com, info@emb-systems.com

Suppliers of mechanical components

FIXATOR
Konrad-Adenauer-Ufer 71, 50668 Köln, Tel.: +49 (0) 221 64 30 89 62
www.fixator.de, info@fixator.de

Fuchs Schraubenwerk GmbH
Bismarckstraße 24, 57076 Siegen, Tel.: +49 (0) 271 409 50
www.fuchs-schrauben.de, info@fuchs-schrauben.de

F. W. Brökelmann Aluminiumwerk GmbH & Co. KG
Oesterweg 14, 59469 Ense, Tel.: + 49 2938 808-0
www.broekelmann.com, info@broekelmann.com

GEDORE Tool Center GmbH & Co. KG
Remscheider Straße 149, 42899 Remscheid, Tel.: +49 (0) 2191 59 69 00
www.gedore.com, gtc@gedore.com

Hans Scharpegge GmbH
Oberste-Wilms-Straße 9, 44309 Dortmund, Tel.: +49 (0) 231 51 69 80
www.scharpegge.de, sales@scharpegge.de

Henkel AG & Co. KGaA
Henkelstraße 67, 40191 Düsseldorf, Tel.: +49 (0) 211 79 70
www.henkel.de, info@henkel.com

Hexion GmbH
Gennaer Straße 2 – 4, 58642 Iserlohn, Tel.: +49 (0) 2374 9 254 67
www.hexion.com, michael.stahl@hexion.com

Jungeblodt GmbH
Belecker Landstraße 19, 59581 Warstein, Tel.: +49 (0) 2902 89 00
www.jungeblodt.de, info@jungeblodt.de

KTR Kupplungstechnik GmbH
Rodder Damm 170, 48432 Rheine, Tel.: +49 (0) 5971 79 80
www.ktr.com, mail@ktr.com

Laumann GmbH & Co. KG
Rodder Straße 42, 48477 Hörstel-Bevergern, Tel.: +49 (0) 5459 801 90
www.h-laumann.de, info@h-laumann.de

Suppliers of mechanical components

Lincoln GmbH
Neuenhausplatz 7, 40699 Erkrath, Tel.: +49 (0) 211 209 96 20
www.lincolnindustrial.de, lincoln.CCE@skf.com

MBH Maschinenbau & Blechtechnik GmbH
Zeppelinstraße 7, 49479 Ibbenbüren, Tel.: +49 (0) 5459 9 30 90
www.mbh-hassink.de, info@mbh-hassink.de

Moventas GmbH
Otto-Hahn-Straße 55, 42369 Wuppertal, Tel.: +49 (0) 202 241 40
www.moventas.com, wind-service@moventas.com

PLARAD Maschinenfabrik Wagner GmbH & CO. KG
Birrenbachshöhe 17, 53804 Much, Tel.: +49 (0) 2245 620
www.plarad.de, info@plarad.de

SAERTEX GmbH
Brochterbecker Damm 52, 48369 Saerbeck, Tel.: +49 (0) 257 490 20
www.saertex.com/de, info@saertex.com

Siepmann-Werke GmbH & Co. KG
Emil-Siepmann-Straße 28, 59581 Warstein-Belecke, Tel.: +49 (0) 2902 762 01
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www.tractel.com, info.greifzug@tractel.com

Vulkan Kupplungs- und Getriebebau Bernhard Hackforth GmbH & Co. KG
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Walter Stauffenberg GmbH & Co. KG
Im Ehrenfeld 4, 58791 Werdohl, Tel.: +49 (0) 2392 91 60
www.stauff.com, sales@stauff.com

WALTHER-PRÄZISION, Carl Kurt Walther GmbH & Co. KG
Westfalenstraße 2, 42781 Haan, Tel.: +49 (0) 2129 56 70
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Suppliers of mechanical components

Wheelabrator Group GmbH
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www.noricangroup.com, kontakt@wheelabratorgroup.de

Winergy Group (Siemens AG)
Am Industriepark 2, 46562 Voerde, Tel.: +49 (0) 2871 924
www.winergy-group.com, info@winergy-group.com

ZF Industrieantriebe Witten GmbH
Mannesmannstraße 29, 58455 Witten, Tel.: +49 (0) 2302 87 73 57
www.zf.com, info.iw@zf.com

Suppliers of electrical components

ABB AG Transformatoren
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DMT GmbH & Co.KG
Am Technologiepark 1, 45307 Essen, Tel.: +49 (0) 201 172 16 47
www.dmt-group.com, stefan.stoecker@dmt-group.com

Other services

Dörken MKS-Systeme GmbH & Co. KG
Wetterstraße 58, 58313 Herdecke, Tel.: +49 (0) 2330 6324 3
www.doerken-mks.de, mks@doerken.de

EFTAS Fernerkundung Technologietransfer GmbH
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ELE-Scholven-Wind GmbH
Rüttenscheider Straße 1 – 3, 45128 Essen, Tel.: +49 (0) 2064 60 81 01
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EPLAN Software & Service GmbH & Co. KG
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EurA AG
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EuroWind GmbH
Robert-Perthel-Straße 19, 50739 Köln, Tel.: +49 (0) 221 57 95 60 09
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Gewi Planung und Vertrieb GmbH & Co. KG
Sperlingsweg 9, 44534 Lünen, Tel.: +49 (0) 4841 77 09 60
www.gewi-husum.de, info@gewi-husum.de

Hagedorn Unternehmensgruppe
Werner-von-Siemens-Straße 18, 33334 Gütersloh, Tel.: +49 (0) 5241 50 05 10
www.ug-hagedorn.de, info@ug-hagedorn.de

Hansa Luftbild AG
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KISTERS AG
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www.kisters.de, info@kisters.de

Other services

Lenné3D GmbH
Turnerstraße 27, 33602 Bielefeld, Tel.: +49 (0) 521 94 93 73 23
www.lenne3d.com, info@lenne3d.com

MAIBACH VuS GmbH
Am Bahnhof 7, 46342 Velen, Tel.: +49 (0) 2863 38 18 71
www.bauwatchbausicherung.de, info@maibach-vus.de

Manfred Schleuter Elektrotechnikermeister
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melius-energie GmbH
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OK! Security GmbH
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REMONDIS Olpe GmbH
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SchwebeFlug
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STEAG Energy Services GmbH
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www.totalims.de, gsartory@gmx.de

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Veolia Umweltservice West GmbH
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Windkauf GmbH
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www.windkauf.com, info@windkauf.com

windtest grevenbroich gmbh
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ZENIT GmbH
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Other services

Zetcon Ingenieure GmbH
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Associations and public institutions

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www.f07.fh-koeln.de/einrichtungen/iet/labore/erneuerbare_energien, ingo.stadler@fh-koeln.de

Fachhochschule Münster
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www.fh-muenster.de/fb4/personen/vennemann/vennemann_peter.php, vennemann@fh-muenster.de

Landesverband Erneuerbare Energien NRW e.V.
Corneliusstraße 18, 40215 Düsseldorf, Tel.: +49 (0) 211 93 67 60 60
www.lee-nrw.de, info@lee-nrw.de

Landwirtschaftskammer NRW
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www.landwirtschaftskammer.de, theodor.remmersmann@lwk.nrw.de

N·E·ST Neue Energie Steinfurt GmbH
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Netzwerk WindWest
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www.wind-west.de, yassine.mokdad@wind-west.de

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Ruhr-Universität Bochum, Institut für Energietechnik
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www.lee.rub.de, lee@lee.rub.de

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VGB PowerTech e.V.
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BEW Bildungszentrum für die Ver- und Entsorgungswirtschaft GmbH
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Haus der Technik
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KRAFTWERKSSCHULE E.V.
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Training

ZIES – Zentrum für innovative Energiesysteme
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www.energiewende-macht-schule.de, ems.zies@hs-duesseldorf.de

Small wind turbines

BRAUN Windturbinen GmbH
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www.braun-windturbinen.com, info@braun-windturbinen.com

con-SEPT GmbH
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www.con-sept.com, info@con-sept.com

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www.klein-windkraftanlagen.com, mail@klein-windkraftanlagen.com

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www.nheolis.de, info@nheolis.de

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