

German Wind Power

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Windindustry
in Germany

HUSUM WIND

The pioneering B2B wind fair in Germany presents technology for tomorrow's green energy system

Workers from abroad

What brings them to Germany and how companies can ease their start

Augmented Reality

How the new technology is already in use in the German wind industry

Including contacts to
German experts



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Mirko Moser-Abt
Head of European Affairs at the German
Wind Energy Association (BWE)

Don't meddle with markets.

Europe needs a robust electricity market design to meet its renewable energy expansion targets. However, the current discussions and proposals from Brussels and Strasbourg regarding market reforms after last year's energy crises caused by Russia's intervention in Ukraine may be heading in the wrong direction.

Uncoordinated government interventions in the electricity market in 2022 have hindered progress on various fronts. The current focus on two-sided contracts for difference as the sole support scheme for renewable energy expansion, along with the implementation of revenue caps, could further fragment the market and discourage investments. European policymakers must consider market dynamics and not solely prioritize consumer protection if they intend to maintain low prices. Ultimately, consumers will bear the entire cost of the energy system, including grids, flexibility, storage: costs that may rise if electricity generators lack incentives to sufficiently optimize themselves within the electricity market framework, as it is being discussed now. Governments should therefore let the energy markets a bit more freely.



Martin Schneider
Editor-in-chief at German
Wind Power Magazine

New challenges, new solutions

The shortage of skilled workers is growing in the German wind industry, especially since the sector has been booming again for several years. A number of articles and interviews therefore provide tips and tricks on how the industry can be more attractive for women and for experts from abroad. They also provide advice for anyone considering moving to Germany to work in the wind industry here.

In our presentation of innovative projects, you will get interesting insights into new methods of cable transportation, about digital ecosystems in the sector, sensors to detect vibrations at the wind power plant and monitoring of wind turbine drivetrains and many more.

I hope that you, the reader, will continue to find new insights and helpful information. And perhaps we'll see each other in person at the big HUSUM WIND fair. This new issue of German Wind Power Magazine begins with a report about it. I wish you pleasant reading.





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HUSUM WIND – Transforming Energy

The pioneering B2B wind fair in Germany: 600+ exhibitors present the technology for tomorrow's green energy system.



HUSUM WIND – as cradle of the wind industry, it first took place in 1989 and developed into the industry's leading fair. © MHC ©Martin Ziemer

HUSUM WIND 2023 is the leading technology trade fair for wind and renewable energy in the German market. It is hosted at the heart of Germany's largest wind park network between the shores of North and Baltic Sea. At HUSUM WIND, 600+ exhibitors from Germany and abroad present product innovations and technology in the growing renewable energy market from 12 – 15 September. Patron of HUSUM WIND is Germany's Federal Minister for Economic Affairs and Climate Action Robert Habeck: "We want to become independent of fossil energies, especially

of Russian imports. This requires large amounts of wind power and a strong wind economy that generates, stores, supplies and refines it. HUSUM WIND will show where we are already technologically." He will open the technology trade fair and visit the exhibition together with state government representatives and industry associations on the first day of HUSUM WIND.

"HUSUM WIND was the first trade fair focussing solely on wind energy. The special Husum spirit, which has been there since the beginning, is still very present and we have always been in the front row of the wind trade fairs", says Michael Lohmann, Managing Director of Messe Husum & Congress. For over 30 years, the trade fair has been the home of pioneers in the wind industry. Since then, it has continued to grow and extend the range of products, topics and technologies.

Wind – Transforming Energy

Wind tech has always been at the core of the applied technology-driven trade fair. Onshore and offshore wind energy is the most impor-

tant source of renewable energy in Germany and already cover around 25 percent of the total electricity demand. This makes Germany the leader in Europe in this segment and the country plans further massive investments. At HUSUM WIND, national and international experts across the entire value chain will meet, ranging from project planning and design, financing and insurance, production, turbine transport and erection with special ships, as well as grid connection, to the operation and maintenance of onshore and offshore wind farms. The fair is best known for its "HUSUM WIND spirit" – a very personal atmosphere and numerous networking opportunities.



The HUSUM WIND spirit – a very personal atmosphere and excellent networking opportunities. © MHC ©Martin Ziemer



Green Hydrogen

Northern Germany is pioneering in building up a green hydrogen economy. Here, numerous pilot projects are being realised with surplus wind power, set up to establish a regional hydrogen economy on an industrial scale in Schleswig-Holstein. HUSUM WIND is nestled in this strong wind energy region with excellent geological storage conditions and innovative companies looking to actively shape the future and make a substantial contribution to achieving climate protection goals. With the Hydrogen Area in Hall 5 and an associated forum programme, HUSUM WIND offers a unique platform for players from the green hydrogen and the wind industry.

Digitalisation and IT Transformation

The special topic of HUSUM WIND 2023 is digitalisation and IT transformation for the energy transition. In Hall 1, a special area is dedicated to trending technologies like artificial intelligence (AI), IT security, smart services and blockchain. Digital technologies have developed rapidly in recent years. They are a key to an intelligent, renewable energy system and enable the development of promising products, services and business models.

HUSUM WIND cooperates with BLOCKCHANCE, organiser of the largest blockchain conference in Germany, to set up this year's special platform in Hall 1 for cutting-edge digital technologies and their applications in the renewable energy sector. With the Digital+ Area, HUSUM WIND offers the wind industry and digital tech companies a unique space for intensive networking and the ideal setting to meet experts, first movers and decision-makers in the field. The Digital+ Expert Forum is just one of the highlights accompanying the trade fair.



Digitalisation and IT transformation are a special fair topic of HUSUM WIND 2023. © MHC ©Martin Ziemer

Transforming Energy

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> Hydrogen

> Digitalisation

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Special event programme: From "Industry meets Renewables" to WINDCareer

On 11 Sept., the two-day "Industry meets Renewables" conference starts as part of the of HUSUM WIND. Renowned speakers discuss the complexity of the transformation process of the energy system and look at solutions and opportunities for Germany as a business location. Furthermore, HUSUM WIND offers expert talks like the Digital+ Expert Forum, networking events and, a highlight, the WIND-Career job fair for professionals and young talents. Michael Lohmann, Managing Director of Messe Husum & Congress, emphasizes: "Recruiting skilled employees has become a pressing concern in all industries. The job platform WINDCareer offers a unique opportunity for companies and professionals to meet and match up."

Author

Anika Samoil
Head of Marketing,
HUSUM WIND

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What began as Germany's first wind fair and meeting point for the international wind industry in Husum in 1989, has evolved into a platform for all segments in the field of renewable energy for the German market, and has assumed a leading role. 600+ exhibitors and 15.000 visitors from 55 nations are expected at the HUSUM WIND edition 2023.

[Click here to see the full program on our website.](#)
We look forward to seeing you at HUSUM WIND!



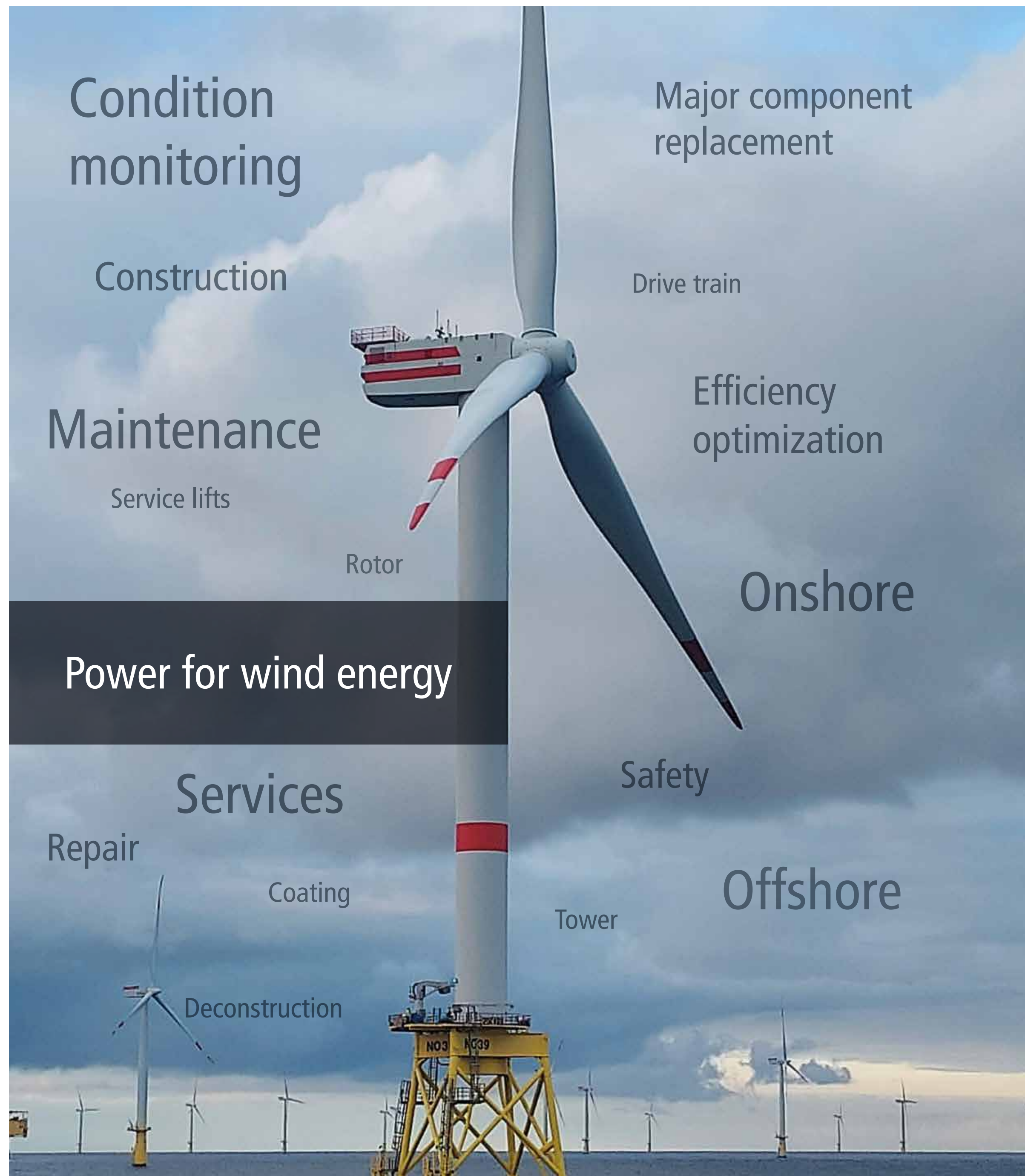
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HUSUM WIND 2023 offers a special event programme, amongst others the "Industry meets Renewables" conference. © MHC ®Martin Ziemer



As the must-attend event 2023, HUSUM WIND attracts trade visitors from all sectors of the industry. © MHC ®Martin Ziemer



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Language is the key

Cross-border talents: skilled workers from abroad are bringing a breath of fresh air to Germany

We can no longer do without skilled workers from abroad; the staff shortage in Germany is too great. In this article, we highlight the experiences and stories of international professionals who have had the courage to relocate to Germany to work in the wind energy sector. Everybody I spoke to for this article agreed that it is almost impossible to gain a foothold in the German wind industry without being able to speak German.

In search of skilled workers

I am on the search for skilled workers in the German wind energy sector who relocated here from abroad. I was curious to know why they chose Germany; what advice they may have for other professionals who are considering coming here, and how their employers helped them to gain a foothold here.

The Federal Government is on the search for skilled workers to significantly accelerate the expansion of the wind energy sector. Yet, according to the Federal Ministry for Economic Affairs and Climate Action, there are currently more than 100,000 unfilled vacancies so there is an enormous demand for qualified personnel. The solution? Recruitment from abroad.

A bumpy start

I speak to Juan Hernán, an industrial engineer who works at Energiequelle and moved to Germany from Spain 20 years ago. His first employer had assured him that he wouldn't even need to speak German. It quickly became clear that this was a bit optimistic, as he was working in North Friesland, a rural region in north-west Germany, where English is not at all common in people's daily lives.

Juan was supported by friends and colleagues, but not so much by the company. Integration in a new country is a real challenge and is only possible with socialization, perhaps by joining leisure activities after work. Juan pointed out that in Germany it is easier to meet people in an "organized" way through sports clubs or church communities. Taking new foreign employees by the hand and helping them to take their first steps in the country does not cost employers anything and facilitates faster integration.



Juan Hernán © private



Pierre Duchalais © private



The goal is to learn German

Pierre Duchalais, who relocated to Cologne from France in 2017, had a similar experience. "The big city was probably not helpful when it came to learning the language," he told me. The reason being that Cologne is not far from the French border and there is a sizeable expat French community there, among whom he spent his after-work leisure time for many years: work in English; downtime in French. Pierre spent the first three years living in a bubble, he himself getting in the way of his goal of learning German, which was the very reason he relocated to Germany in the first place, as many companies operating in the French wind energy sector come from the neighbouring country, and Pierre believes that being able to speak German would improve his career prospects. He doesn't consider himself a language ace, so he needs to communicate and go about his daily life in German.

Switching to energiequelle and moving to the smaller town of Bremen helped, because he had to learn German for his social life. He asked his new colleagues not to speak to him in English and

now, after just two years, I can hold a conversation with him entirely in German. His advice to other skilled workers considering relocating to Germany is to think carefully about what they want to get out of their stay. If all they want to do is gain some short-term experience in the wind energy sector, then choosing a company in a major city with a cosmopolitan ambience would be a good choice. If, on the other hand, they want to migrate to Germany on a long-term basis, then it would be better to move to a smaller town where many wind energy sector companies, particularly small to medium-sized enterprises, are located.

Companies should understand that the newly recruited employee is building a new life for himself. They can provide active support in this process.

Cultural differences...

Eugene Chang, who first came to Germany from Taiwan to do his master's degree in business studies, is able to tell me a thing or two about a German work culture that initially seemed foreign to him. He is currently living in Hamburg and works

for Ørsted. In Asia, he says, work and private relationships usually overlap. Going out for a beer after work to talk about work, ongoing projects, and upcoming tasks, is very common, which is not the case in Germany, where work colleagues tend to go straight home and keep the private and professional spheres separate. Whilst Eugene thinks this is good in principle – he sees it as part of the



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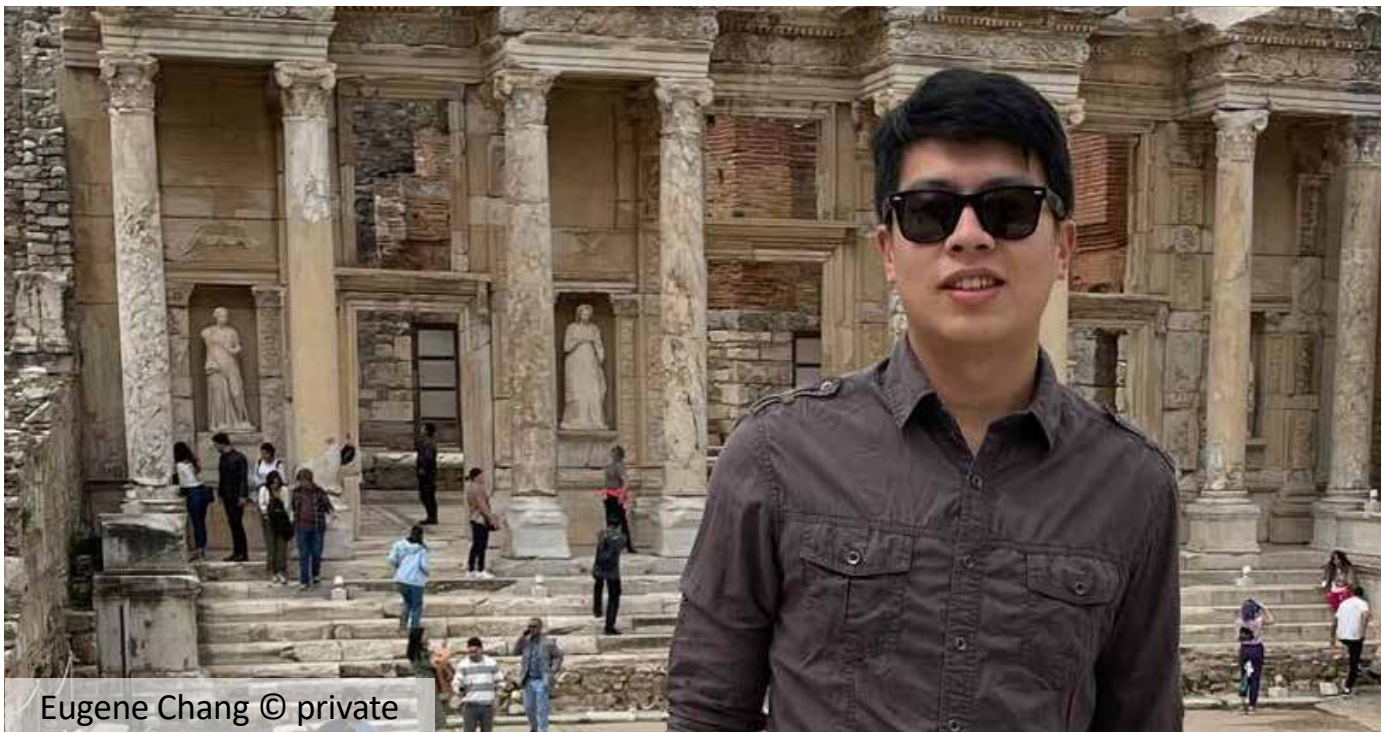
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more efficient and focused way many Germans work – it did make it more difficult to make new friends.

This is why his advice to other skilled workers who are considering relocating to Germany is to network with people who lived there already before coming to Germany. The housing market in Germany is extremely strained, especially in the larger cities, where affordable housing has become scarce in recent years. Eugene had to learn that applying for a new apartment is almost like applying for a job, including disclosing of your employer, your salary and your credit score. An acquaintance helped him with the search and application pro-



cess. International exchange, he says, is important and, in his experience, companies such as Ørsted, which operate on a more international level, are actively promoting it.

... and bureaucratic hurdles

Kennie Roy came from India to do a master's degree in renewable energies and now works at Prokon eG. One of the things he mentioned, with a groan, when I asked him about the difficulties involved in emigrating, was the bureaucratic hurdles. He felt overwhelmed by the number of letters from the authorities he received in the post. As these are rarely accompanied by an English translation, getting anywhere without knowing German is near impossible. He had already learned some German in India but had to start all over again once he got here. However, he says, he could always ask his colleagues at Prokon for help if he was in doubt; they were really friendly and he always felt welcome. Anyway, he added, proactive networking is very important. Roy explained that he got his first job in Germany through the company career webpage. Online platforms, such as LinkedIn, Stepstone, and Monster, he says, were a

good place to start both in Germany and in India, even though, networking personally and via social platforms were just as important. Companies in India would often go to universities in an attempt to attract new employees, a practice, which is less common in Germany, where one has to proactively visit job fairs oneself.



Why Germany?

Everyone I interviewed told me that they received a very friendly and open welcome in the workplace. Unfortunately, the same is not always the case outside of work, and some of them talked about racist incidents. Foreigners are expected to learn German quickly.



Many of them also mentioned the extremely high quality of life in Germany. Germany has a lot to offer if one approaches it with an open mind: the infrastructure, plenty of undisturbed nature, and opportunities for personal development.

There are many job opportunities in the wind energy sector. In many areas, we can no longer afford to wait for a new generation to be trained in the field of renewable energies; skilled workers are needed now, which makes the German market interesting for skilled workers and master's students from abroad (more on the topic of studying here as a foreigner in one of the interviews following this article). And many companies, be they large or small, are also looking for skilled staff abroad.

Author

Martin Schneider
Editor-in-chief at German
Wind Power Magazine



If you are interested in working in Germany, you can find helpful links in our last issue, page 19: <https://www.windindustry-in-germany.com/german-wind-power-magazine/issue/04-2022>

What companies can do:

- Visit international/digital job fairs, even outside of the wind industry
- Offer help with bureaucracy, not only job-related
- Provide active support
- Take account of families, research contact persons if necessary and offer assistance
- Once the person has taken up the job: provide support with finding accommodation and leisure activities, e.g. via team members
- Encourage personal interactions within the company



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3 questions for 3 people we find interesting

In the following interviews, three skilled workers who relocated to Germany talk about their arrival here, what it's like to live here, and how one can get a foothold in the renewable energy sector.

Juan Hernan

leads an international team

[Read article](#)

Alexis Manuel Sánchez Feijóo

came into the wind energy sector from another field

[Read article](#)

Abhishek Sanyal

is currently doing his master's degree in wind energy

[Read article](#)

The interviews were conducted by Martin Schneider.

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Juan Hernan, International Project Manager

Juan found a new home in Germany and now works for Energiequelle in Bremen, where he is responsible for the international department.



Photo © private

How did you find your initial arrival in Germany?

In my experience, newcomers to Germany find it very difficult to mix with the locals. Chatting with com-

plete strangers in bars is normal in Spain, but not here. It is very difficult to meet new people, which is a pity, because the better integrated you are, the more willing you are to stay in the long run.

You relocated from Spain to Germany with your wife and young daughter. What effect did that have on the move?

The effect was big. I already had some knowledge of the language, but my wife had a harder time adapting. She couldn't start look-

ing for a job until she had at least some command of German, after which she started an internship. In Spain, it is not common for women to study after the age of 30, so they often have no choice but to become housewives. Gender equality is much more advanced in Germany than in the Spain we left twenty years ago. We thought it would also be an advantage for our two daughters.

What were some of the small differences that you experienced?

In Spain people greet each other with kisses on the cheeks, while in Germany they are more distant avoiding physical contact, especially since the Covid-19 pandemic. Of course, there is also the famous German punctuality: being late here is frowned upon, whereas in Spain

there is more tolerance. And the clothes: at the beginning I dressed formally and over time I had to relax my attire.



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Patent US 11,397,371 US 11,435,650



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Alexis Manuel Sánchez Feijóo, Technician

Having originally trained as a photographer, Alexis first worked as a caretaker and cleaner after moving to Germany, but now works as a technician at PEPER Energy.



Photo © private

How did you get into wind energy sector?

As a career changer. I'm from Ecuador where I worked as a photographer. But I've always been interested in the wind energy sector: you might say it's in my blood: my surname is Sánchez, like Sancho Panza, the companion of Don Quixote (who famously "tilted at windmills"). My old company in Germany offered me the chance to retrain. I've been in the industry for three years now, cleaning wind turbines, swapping out cables and batteries and generally taking care of all the other technical things that come up.

What made your arrival in Germany easier?

My wife, who I met in Ecuador, is a German citizen. When she was pregnant, we decided to have the baby there. We relocated and from then on I was more or less obliged to learn the new language. Many companies have vacancies to fill but speaking German is essential for working here. So many misunderstandings can arise if you don't speak the language. Not all Germans, or Ecuadorians for that matter, speak English, so it's better just to learn German.

Do you like living in Germany?

There are so many technologies in Germany, which I think is great. I also have a drone licence, for example, and I did my truck driver's licence here as well as completing a course in wind turbine lifts. There are so many excit-

ing innovations. Wind turbines are also widespread in Ecuador, but the technology is not yet as advanced.

I think Germany is a wonderful country. Of course, just like everywhere else, there are also some not so nice people here. But the country has given me everything I wanted.



© private



Abhishek Sanyal, master's student studying wind energy engineering

Because there were no wind energy courses in India, Abhishek looked for a master's degree programme abroad and found one at the Flensburg University of Applied Sciences.



Photo © private

What gave you the idea of studying in Germany?

I come from the northeast of India, where I studied electrical engineering. Although the wind energy sector is a growing industry in India, there are no university courses on the subject. But I wanted to specialise in it and realised that I would have to move abroad to do so.

I chose Germany because the universities here don't charge tuition fees. I'm from a middle-class background and couldn't have afforded the expensive English universities. University courses in Germany are often also taught in English, but it's worth switching to

the German-language courses because they're not as oversubscribed – that's assuming you understand the language, of course.

What was it like getting started at a German university?

I switched to the master's degree programme and getting my bachelor's degree recognised was pretty easy. The university administration staff have had a lot of practice in dealing with international students. I also found accommodation through the university. It's a bit easier in Flensburg because it's a small town. There's a housing shortage in the big cities, where waiting times can be longer than a year or you're on your own.

What should foreign students, who are considering coming to Germany, take into account?

You can save the money of a recruiting agency in your home country by applying directly to the university: it's not difficult at all. If you change to a master's degree, you should ensure that your previous credits match the course requirements. The master's degree should match the bachelor's degree; India is more flexible than Germany in that respect. The International Offices are always happy to help with any questions. It is also very helpful to learn at least a bit of German before coming here.



Industry News

Women in the wind energy sector "Visibility is crucial"

We asked four "Women of Windpower" what companies could do to make the industry more attractive to women.

160 metres above ground, on a platform with no guardrails, a free fall to the left and right and the wind whistling in your ears. Fear of heights? Not Finja Neumann. For her, the view from the nacelle means one thing above all: freedom.

Neumann is a service technician for Vestas, whose everyday job is to inspect, repair, and maintain wind turbines. Most of her work is done in the nacelle. She only really has to climb on top of it when the lighting systems needs to be repaired or when there's a problem with the wind vane. But the view from up there and that feeling of freedom are simply too tempting, so she likes to climb the ladder up through the roof hatch just for a short break.

There is a distinct under-representation of women in the renewable energy sector. In 2019 twice as many men as women were employed there. Until now, more precise figures have not been recorded

for Germany; all we know is how many women have made it into management as of 2022: a meagre 6 per cent.

At the same time, there is an urgent need for human resources in order to bring about the energy transition. According to one study, a workforce of almost 440,000 will be needed by 2030, so there is a huge demand for talented people. What needs to be done to entice more women to work for companies such as Vestas, Nordex and the like?

"The number of female employees is much higher in Norwegian and Finnish companies."

Finja Neumann, Vestas



Not a question of physical strength

Neumann likes to use specific examples to illustrate the fact that, for many years, there were no plans to employ female service technicians: until just two years ago, for example, the company she now works for only provided workwear in men's sizes and there were no separate changing rooms or showers for women. But her experience in Norway and Finland, where she also worked as a member of a secondment team, shows that things can be different. "The number of female employees is much higher in Norwegian and Finnish companies," she says, "but they also have gender-specific showers and changing rooms. I even used an all-female sauna there once."



A need for female role models

The lack of role models was a reason for Nelly Kirsch to decide against studying mechanical engineering, although she is now sure that she would have done well. Kirsch studied energy economics in Darmstadt and is now a project manager with Lanthan Safe Sky in Freiburg, responsible for installing the same firing systems that Neumann maintain. "I'd like to see many more women having the courage to study technical subjects," says Kirsch: "That's the only way we're going to see change." When considering a job opportunity, the proportion of women in the company is an important criterion for her. In her experience, the working conditions are usually better and the company more successful where there are female managers.

"Visibility is crucial"

Hanne May, head of the Communications Department at the German Energy Agency and one of the co-founders of the women of wind energy network, is only too aware that there is still a long way to go before women will play a greater role in the wind energy sector. The network opened up to other renewable energy sources in 2020,



when it changed its name to women of new energies (see info box). Not long ago, May was invited to the Handelsblatt's Energy Summit, which is one of the most important events in the energy sector. "Some 90 per cent of the attendees were older men," she says, yet "progressive" gender roles should really be part of the industry's "DNA". "Supporters of progress in energy policy should also be in favour of parity," she says. She sees a clear path to achieving this goal: Visibility is crucial, so it's important to publicise the diversity that already exists within the wind energy sector.



Achieving a balance between work and family life

The whole world is talking about work-life balance, which represents a core challenge for companies and employees alike. "We all have different needs and our lives consist of work and our private activities," says Anne Scheibe, who used to be a research assistant at the Potsdam Institute for Climate Research where she studied flooding events in coastal regions. Everyone in a team should have the opportunity to balance these two needs. "The organisational structures where I used to work were not optimal in this respect."



Anne Scheibe © private

Finja Neumann, the woman who likes nothing better than to sit on top of a wind turbine, had a long and tortuous journey into the renewable energy sector. Despite her childhood passion for repairing

video recorders and record players, the apprenticeship she hoped to get as a mechatronics technician didn't work out right away; years went by before she landed a job with Vestas, her dream company. Her efforts back then were pioneering, and the company now employs a large number of female service technicians, which convinces her that: "we're now on the right track."

For companies to attract more women, they need to:

- Pay attention to everyday behaviour (can women have their say in meetings? Who makes decisions? Is it always a woman taking minutes?);
- Promote and support competent women;
- Set and review measurable diversity targets;
- Focus on diversity in public relations activities;
- Establish an independent office to investigate behaviour that amounts to sexual assault.

Women have been networking in the Women of new Energies association since 2011 with a view to providing mutual support for personal and professional development in the renewable energies sector. An important part of the work they do is a mentoring programme for young female professionals or female students. [To learn more, please visit womenofnewenergies.wildapricot.org](https://womenofnewenergies.wildapricot.org)

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Tilman Eicke
Ahnen & Enkel, agency for
communications





The Russian invasion of Ukraine

"The first truly global energy crisis"

Neither governments nor citizens will ever forget this crisis, says Heymi Bahar, lead author of the latest IEA report on renewable energy sources.



Interview with
Heymi Bahar

Renewable Energy Division at the International
Energy Agency (IEA)

Mr Bahar, there is a lot of momentum in the renewable energy sector right now. You

are forecasting that by 2027, the installed capacity will be 85 per cent higher than it has been during the past five years, amounting, according to your estimates, to 2.4 million megawatts. To what extent is this boom the result of the Russian invasion of Ukraine?

In response to Russia's invasion of Ukraine, Europe, and the United States of America, in particular, have adopted a new policy. In addition, many emerging and developing countries are heavily dependent on fossil fuel imports, so a highly volatile energy market is

a major concern for them. This explains their new goal of energy security. Most of the additional installed capacity comes from countries that already had climate plans in place. Following the Russian invasion, these countries now want to achieve their targets much more rapidly. Originally, we had not been anticipating these installed capacity figures until well after 2027.

"Most of the additional installed capacity comes from countries that already had climate plans in place."





The LNG shuttle vessel Coral Furcata has been transporting liquefied natural gas to the industrial port of Lubmin since January 2023. © Paul-Langrock.de

The IEA is talking in terms of the "first truly global energy crisis"; how does it differ from previous energy crises?

The energy crises that followed other wars or, for example, the oil crisis of 1974 only impacted certain segments of the energy system. Now we have high oil prices, high gas

prices, and high electricity prices – that's what's new. Not only that, but the world has never been so interconnected through trade, which means that this crisis is global and more far-reaching in terms of its impact on developing countries, emerging economies, and first-world countries.

How are developing countries affected?

There are some oil producers in sub-Saharan Africa, but most countries are importers and the high energy prices result in a massive increase in energy subsidies. And, unlike the situation in Europe, high subsidy spending has a significant negative impact on the macroeconomic environment in these countries.

The situation in terms of high energy prices and renewable energies is ambivalent: whilst it's true that renewable energy policies are being pushed, we are seeing a simultaneous boom in coal and fracked gas. What will the long-term impact of the Russian invasion be?

The IEA is advising extreme caution when making long-term investments in oil and gas infrastructure because the energy crisis will put a greater focus on climate change and the energy transition. Governments understand that this crisis is affecting the poorest and the richest consumers at the same time. The three

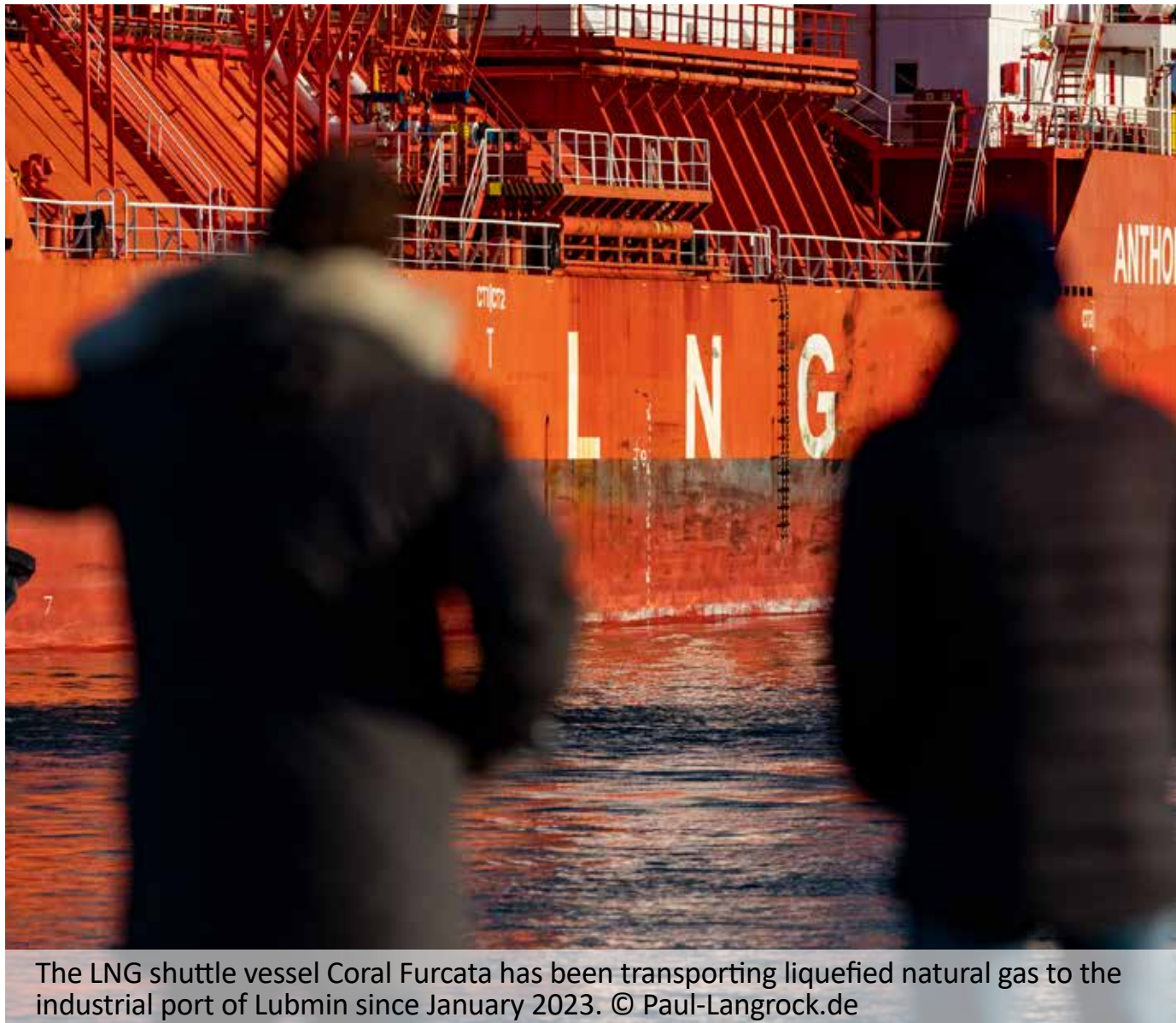


"One of the biggest challenges faced by wind energy producers is their low profitability, which will lead to a short-term lack of innovation capacity."

most important relevant factors – the economy, energy security, and climate change – are all currently pointing to the use of renewable energy sources. I don't think that governments and the general public will ever forget this crisis and will always remember the importance of energy security. It really underscores the case for the use of renewable energy sources.

You're predicting a tripling of the global market for "mass-produced clean energy technologies" to \$650 billion over the next five years: where would you expect to see the greatest growth?

I think it's important to link energy security with supply chains and production. The world is currently following the same path as China went down 20 years ago and some, notably countries such as the United States and India,



The LNG shuttle vessel Coral Furcata has been transporting liquefied natural gas to the industrial port of Lubmin since January 2023. © Paul-Langrock.de



Rotor blade production in Nantong: wind turbine production in China is technologically advanced and significantly cheaper. © picture alliance/dpa/MAXPPP



Solar energy can close the energy gap because it is becoming cheaper. With a bifacial solar power plant, it can also be combined with agricultural use. © Paul-Langrock.de



"When it comes to economic competition, Chinese wind turbines are significantly cheaper."

want a more diversified and local supply chain based on renewable energy, which is currently the cheapest energy production option. We are moving towards a more electrified world, and Covid-19 has taught countries where the weak links in their supply chains are.

Your extremely positive forecasts don't seem to factor in the possibility of a trade war, especially between China and the West.

Author

Marcus Franken
Ahnen & Enkel, agency for communications



The question of a potential trade war has always been in the air: 15 years ago, China developed an industrial policy and took the lead in the solar industry from the USA and Europe. Both regions simply had a limited policy strategy for solar energy production but are now reintroducing the relevant policies, which I think is good for competition: we need this policy to bring about the transition to clean energy. By definition, concentrating a large amount of technology production or the production of a specific product in a single country represents a vulnerability and we see that changing.

Apart from the USA, China, and Europe, which region has surprised you?
India. India's road has been a bumpy one over the past five years, but the country has an incredible potential coupled with extremely ambitious goals not the least of which is about harnessing solar energy, because they have the resources and because solar power plants are easier to build. However, the overproduction of electricity during daylight hours

is a major challenge for India, which is why the Indian government is currently focusing on wind energy and has reformed its system of granting concessions via auction to ensure that wind power companies benefit sufficiently from the auctions and are able to earn sustainable profits, which, in turn, will encourage investment over the next five years.

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The German Wind Energy Association goes international! New projects launched with Ukraine, Brazil and Kenya

In an effort to drive the transition to renewable energy, the German Wind Energy Association establishes partnerships, aiming to enhance associational services and exchange knowledge for the advancement of renewable energy technologies.

The German Wind Energy Association (Bundesverband WindEnergie e.V. or BWE) is one of the world's largest associations in the renewables sector with some 20,000 members. The BWE advises political decision makers and is expanding wind power in Germany. We are a member of the German Renewable Energy Federation (Bundesverband Erneuerbare Energie e. V. or BEE), which promotes all renewable energies across the board.

In December, the BEE acquired a funding for the so called "Business Scout Fund" project to promote the "international dialogue among Renewable Energie associations around global energy transition". The project's main objectives are to strengthen the Renewable Energie Industry associations (capacity building) in the partner countries Ukraine, Brazil, and Kenya, as well as exchanging experiences and learnings. A special focus lies on associational core services, such as

political lobbying, market analysis and strategic communication, since these tools are – not only in Germany – indispensable for achieving a faster expansion of Renewable Energies. Besides BEE as the umbrella organization and BWE as the wind energy association, the German Solar (BSW) and Biogas association (FvB) are also involved in the project. Between February and April, we invited one delegation from each country with at least one representative of each association (wind, Solar, biogas and umbrella organization) to get to know each other and identify common topics of interest. While BEE organized the delegation's program frame including meetings with representatives of the ministry of foreign affairs, the ministry of economy and climate protection and other institutions, the wind, solar and biogas association conducted individual 1:1 workshops with the representative of their Ukrainian/Brazilian/Kenyan counterparts.



Signing of the MoU between Ukraine and Germany at BETD 2023 with representatives of BEE, FvB, BSW and BWE.



Representatives from the Ukrainian and German wind energy association signing the MoU



In a second step, we will start with the implementation phase in May/June, where concrete measures and agreements to improve associational services and cooperation will be discussed and implemented. We thereby hope to create a win-win situation for both the German and the partner organisation, as well as the member companies and the RE industry in general.

If you are interested in a cooperation with the BWE, please do not hesitate to contact us. Main contact person at the German Wind Energy Association for international projects is Roman Rudnik: r.rudnik@wind-energie.de

Author

Roman Rudnik
Advisor on Communication and International Projects at the German Wind Energy Association (BWE)



"We need to strengthen the cooperation between renewable energy associations worldwide. Many countries are already on the way to transition to more renewable energies; lobbying, market analysis and networking are the key to help them succeed."

Roman Rudnik, BWE
Advisor on Communication and International Projects



BSF group photo with the Brazilian delegation



BSF-reception of the Kenyan delegation



Hermann Albers with Wangari Muchiri, representative for GWEC and the Kenyan wind working group KEREK.



Get to know the German wind industry

On the following pages, German companies from the wind industry present their latest and most innovative products and services.

Pure efficiency: Cable drum transportation with Goldhofer

The energy transition involves serious financial and logistical challenges – not least for the heavy haulage industry.

The energy transition, i.e. the transformation of energy generation from fossil fuels to sustainable and socio-ecologically compatible alternatives, is an ambitious project for many national economies. Bigger, more powerful, more efficient is the motto! These constantly growing demands are not only pushing the infrastructure, the legislation and the components themselves to their limits; in the field of heavy haulage, too, increasingly efficient solutions are needed to transport more and more larger and heavier loads to their destinations.

Goldhofer has always seen itself as a pioneer for innovative and sustainable transportation solutions and has developed the revolutionary FTV 300 wind turbine blade lifter. The company is now using the third generation of this efficient transportation solution, the FTV 850. Tower adapters and the BLADES steerable trailing dolly complete

Goldhofer's specialized portfolio for the transportation of wind turbine components.

Whereas the main emphasis has so far been on the development and upgrading of renewable energy plants, the focus is now shifting to downstream processes. New transmission lines and grids need to be built. The energy generated is being fed into increasingly intelligent networks





4+6 Heavy-duty combination in use with the new cable drum vessel bridge © Goldhofer

for transmission to the end consumer. The construction of these smart grids is a major feat of logistics: The backbone of the new electricity highways is in the form of cables approx. 150 mm in diameter and up to two kilometers long, and they are transported to the site for laying between the transmission joint bays on huge cable drums.

The cable drums currently used for this purpose are three to five meters long and over four meters in diameter and weigh between 30 and 50 tons. They allow for cable lengths of about 1 km. Larger cable drums will be of great importance in future projects. The German government, e.g., plans to transport energy from the windy north to the less windy south with the new SuedLink and

SuedOst-Link cable connections. For such large projects, cable drums with a length of approximately eight to twelve meters and weighing up to 100 t need to be transported. They are the key to cable lengths of up to two kilometers. Unreeling and pulling in the cables is a particular challenge, as this task can rarely be performed as part of the actual transport in a single operation using existing solutions. This means significantly higher costs for transportation and the unreeling equipment plus the relevant permits.

In cooperation with Energieanlagen Ramonat GmbH, Goldhofer has therefore developed a broad portfolio of solutions for transporting cable drums of different weights and sizes. "We have collaborated with Ramonat, who have so much experience of the market, to develop a system that not only consistently meets the needs of our customers with regard to transportation but also takes into account the special challenges of the unreeling process," says Robert Steinhauser Vice President Sales & Service Transport Technology at Goldhofer. This makes it possible to act as sole



provider on the market for all projects, with an enormous increase in efficiency.

The cable drum is transported on a special vessel deck in a Goldhofer heavy-duty (4+6) or (5+7) modular combination. The solution developed has two particular advantages: Easily mounted hydraulic support legs allow the bridge to be raised to loading area height under full load so that the module combination can be moved under it. This significantly reduces overall length for the last mile for increased maneuverability on all types of construction sites, especially in combination with self-propelled modules.

In addition, the system includes integrated unreeling equipment with synchronized drive for jerk-free operation at the destination. Goldhofer's new

cable drum bridges are lighter and shorter than previous comparable systems. According to the customer Stefan Ramonat, the new solution offers easier handling, high manoeuvrability and cable unreeling is much easier. The cross-section of the bridge has been optimized to allow the cable drum to hug the ground for the lowest possible overall travel height, corresponding to the flange diameter. 100-ton drums can be transported on a (4+6) combination without exceeding the maximum axle load of 12 tons.

Another advantage of this system is that it can also be applied to existing transport systems. To keep the initial investment low, the unwinder can also be retrofitted to an existing Goldhofer vessel bridge. Finally, Goldhofer has already started on development work for cable drums of lower weights and sizes involving installation of the unreeling equipment on low-bed vessel bridges. The result will again be maximum economic efficiency.

Contact
Florian Bischofberger
Communications, Goldhofer AG
Phone: +49 151 176 176 88



For the last mile, the cable drum in the vessel bridge can also be loaded on the plateau © Goldhofer



Imagefilm of Goldhofer

Digital ecosystems will transform entire sectors

An ecosystem is characterized by collaborations to connect diverse value creation stages and industry representatives. The partners add real value to the platform's users through their comprehensive services and data.

Digital ecosystems are set to change all major sectors in a variety of ways. Experts assume that in about ten years' time, more than 50 % of global wealth will be generated on such platforms. Those companies which simply take note of these developments without actively questioning their own corporate strategy run the risk of being overtaken by the new reality in the near future and of losing market share.

A digital ecosystem ...

- addresses the real needs of potential consumers,
- generates added value which could formerly not be achieved without the IT ecosystem service,
- provides benefits for both providers and consumers,
- offers added value for all partners participating in the ecosystem service.

The overall benefit of a digital ecosystem therefore results from combining a digital mediating platform with a large number of partners, all participating in the digital ecosystem for their mutual benefit, thus leading to networking effects through interaction on the platform.

In about 10 years, more than 50 % of global wealth will be generated on online platforms.

wind-turbine.com – the digital ecosystem for the wind energy sector

In 2011, internet entrepreneur and IT-platform economist Bernd Weidmann launched the marketplace for used wind turbines and established it as the world's leading market platform in this sector, among other things by buying up a competitor in 2016. Since 2021, he has been con-

sistently developing this market platform into a digital ecosystem with the help of other partners from the wind energy sector. Using an interactive wind turbine map and a directory of turbine operators, he is making it easier for many market stakeholders in Germany and around the world to conduct research on all wind turbines and operators in Germany. These tools were followed by "PPA Pricer", a tool for determining the detailed, site-specific current PPA price, developed in cooperation with PEXAPARK, and another tool for identifying free areas where turbines could possibly be built, developed together with CAELI Wind.



How much is a wind turbine worth?

What happens to wind turbines when they have reached the end of their planned lifetime? Some can still be operated economically, while re-powering may be worthwhile for others. For a third group, it may make more economic sense to sell them on the second-hand market – provided that the operating company can find a buyer. This is not the only challenge facing operators, however, for no operator wants to sell his services or assets below their market value.

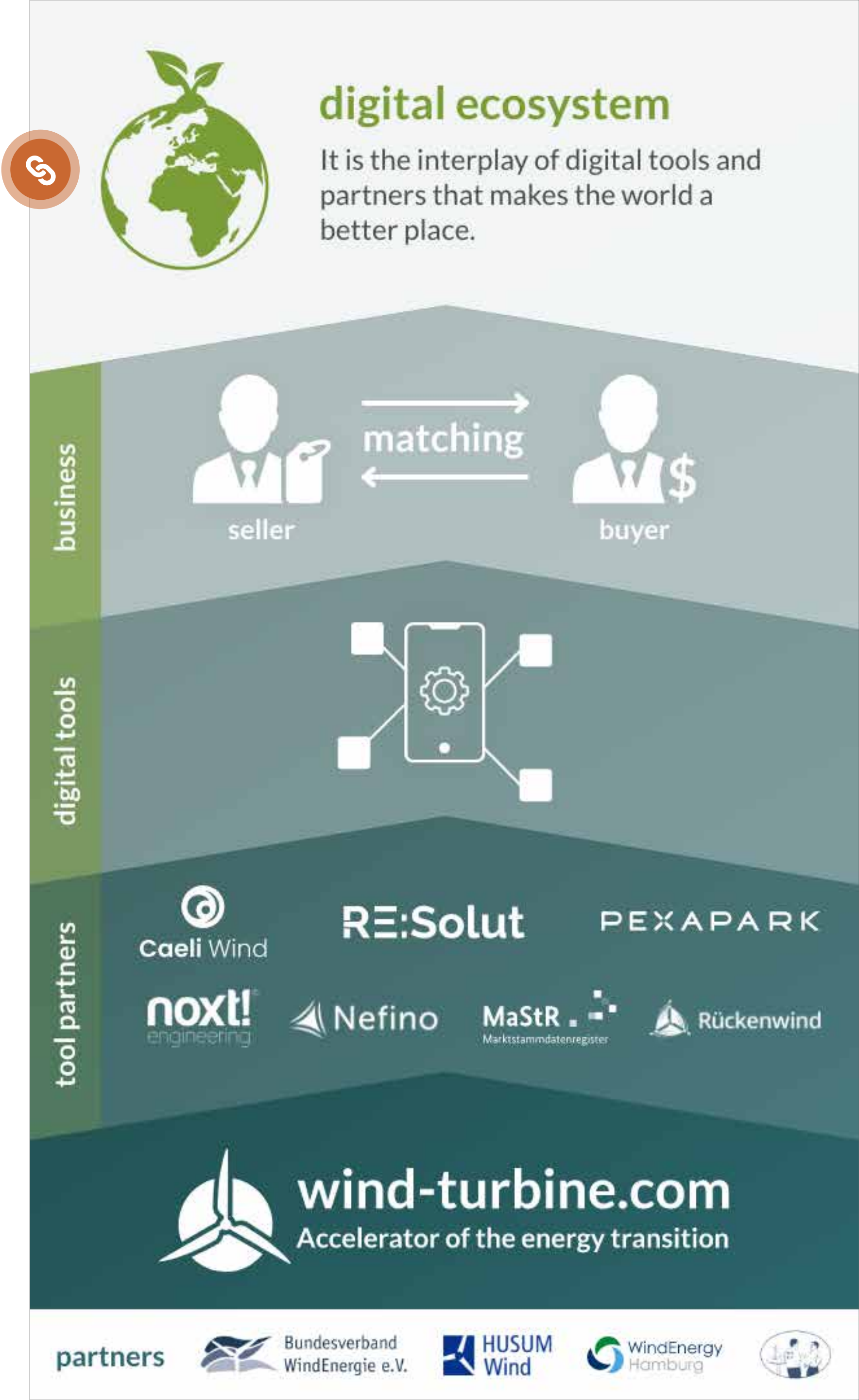
A plea for more transparency

Obviously, it is not as easy to determine the realistic price of a used wind turbine as it is to estimate the value of a used car or real estate. The market environment is affected by a variety of factors, starting from the supply and demand ratio, right down to political decisions and the future price of electrical energy. Last but not least, the price that can be achieved on the second-hand market will be determined by the model and the technical condition of the turbine. One thing is certain, however: a lot of operators would prefer to face the

question of what to do with their used turbines sooner rather than later.

Several surveying and appraisal companies are currently involved in determining how many of the 12,000 turbines – of approximately 30,000 in Germany – are in a condition which allows them to be kept in operation, how many turbines should be repowered and how many should be dismantled. Surveying companies include, for instance, IDASWIND GmbH and RE:Solut GmbH which is devoting its efforts to appraising and selling wind turbines. Marco Scharobe, CEO of both companies, is the partner dealing with the new wind turbine value-determination tool in the wind-turbine.com IT ecosystem.

This tool is useful for determining a realistic sale price and assessing the potential for continuation of operation. Not only turbine operators, but also potential buyers and service companies all around the world can use this calculation tool and participate actively in market developments.

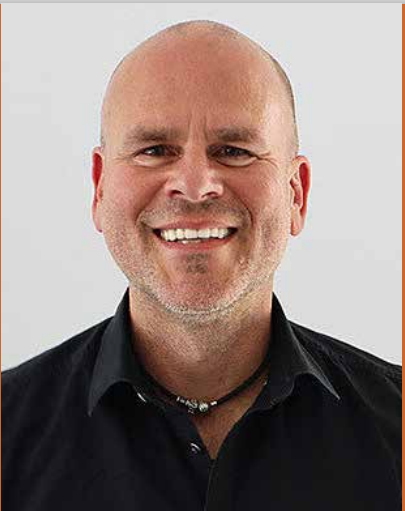




The purpose of the platform is to model the entire process: from the evaluation of assets right through to full digital transaction, including full security for buyers, sellers and service companies. Here too, established partners and specialists are providing support in order to make such applications feasible.

Contact

Bernd Weidmann
CEO of wind-turbine.com
Phone: +49 6051 9711 16



The user determines the value of his wind turbine online © wind-turbine.com

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Marco Scharobe RESOLUT GMBH

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Exploit the full potential of renewable energy

Wind power plants are crucial to today's sustainable energy-management strategies. Sensors from SICK play a vital role in ensuring wind power plants work efficiently – even under very challenging climate conditions.

Sensors optimize efficiency of wind power plants

Wind power plants harness wind to generate kinetic energy. To operate at optimum efficiency, the rotor blades in each unit of the power plant have to adjust to the wind's strength. Sensors carry out this function: They finely adjust individual components to effectively exploit the available wind and generate a maximum amount of energy. But these sensors must be highly durable and able to adapt to the changing ambient conditions at the top of a wind tower. After all, replacing a sensor at such great heights is no easy task and very expensive.

SICK sensor solutions for adjusting pitch, controlling yaw, and monitoring speed

SICK absolute encoders with magnetic scanning adjust the pitch of rotor blades by tracking wind direction and setting the wind turbine's nacelle in the optimum position. These adjustments also prevent strong winds from causing malfunctions that result in downtimes. Durable, maintenance-free SICK incremental encoders measure, control, and monitor the rotor speed of each unit while remaining highly resistant to weather conditions and electrical influences. SICK sensors feature magnetic scanning, rugged housing with an enclosure rating of IP67, and strong shock and vibration resistance to meet the demands of both on- and offshore wind power plants.

More than 100,000 SICK encoders have been installed in pitch-controlled wind power plants to oversee pitch adjustment, yaw control, and speed monitoring – a clear demonstration of the expertise SICK has developed from its decades-long work in this sector.





New DAX® linear encoders for monitoring hydraulic systems



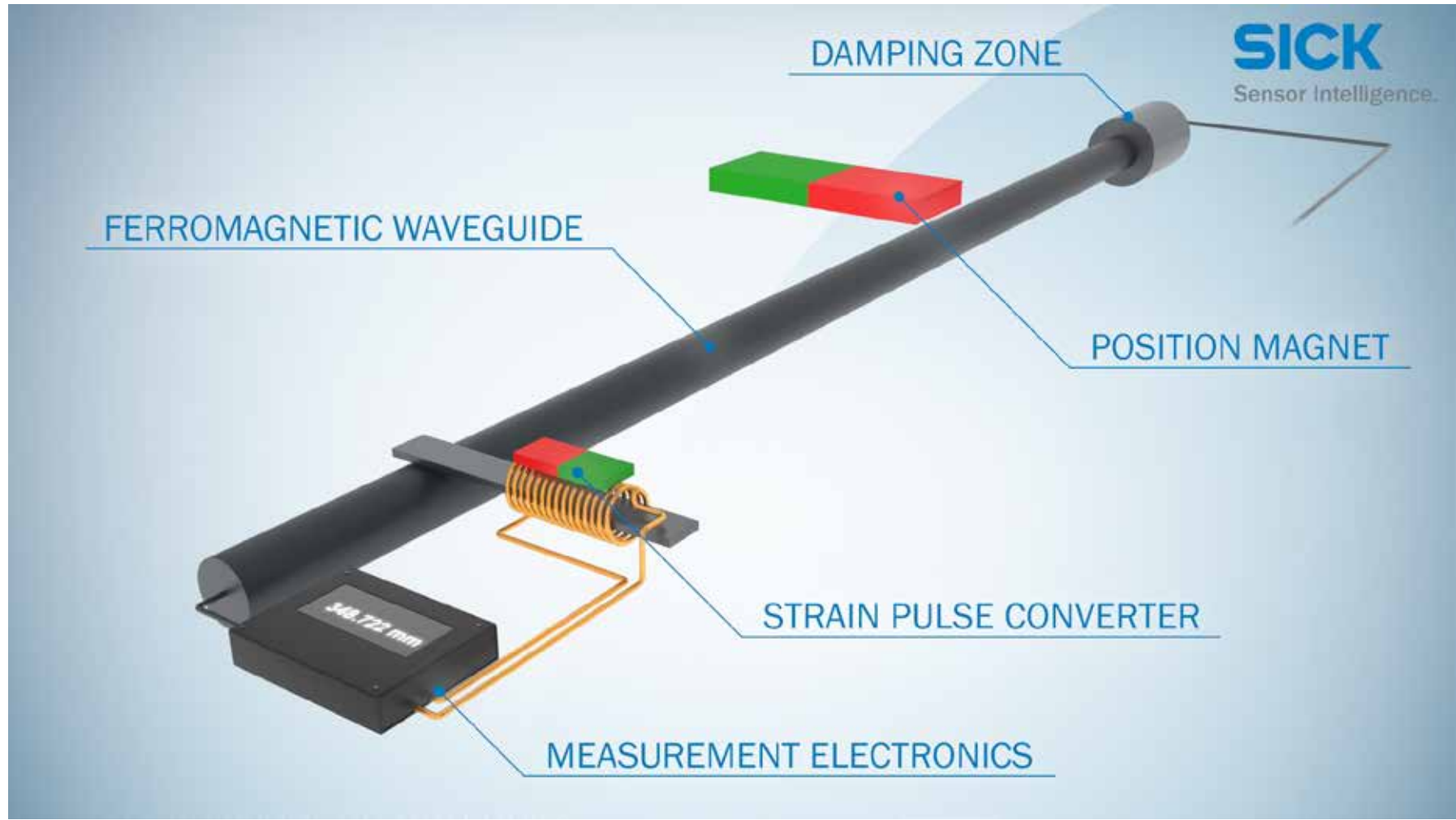
Linear encoders from the DAX® product family are suited for determining the absolute position of piston rods in hydraulic cylinders as well as linear movements in industrial plants. Thanks to its use of magnetostrictive technology, the encoder has no wear and therefore requires no maintenance.

When maintenance work is carried out on a wind power plant unit, a hydraulic system mechanically locks the rotor blades. DAX® linear encoders monitor the hydraulic system, protecting the unit and the maintenance personnel.

To increase efficiency in wind power plants, a hydraulic system adjusts the angle of each unit's rotor blades to the wind speed. As this adjustment takes place, DAX® linear encoders monitor the piston position of the cylinders in the hydraulic system. If the wind speed changes, the system readjusts the rotor blades accordingly.

Condition-monitoring sensors for vibration, shock, and temperature monitoring

Vibration diagnostics has proved the most effective method for checking machinery health over the years and forms the basis for condition monitoring and predictive maintenance. Condition monitoring of rotating machine equipment detects imbalances, wear, misalignment, cavitation, mechanical irregularity, friction, gear or bearing faults, and overheating.



Magnetostrictive technology from SICK

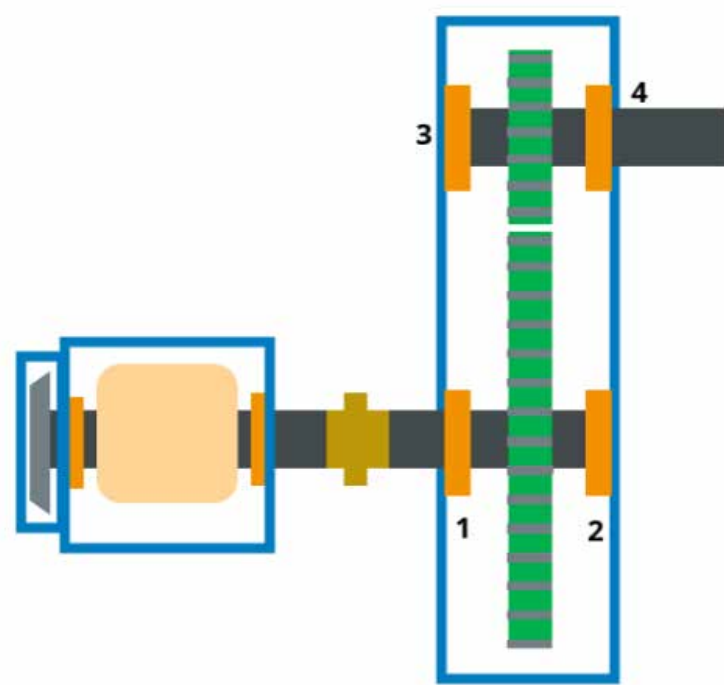
The function principle of a vibration sensor

The function principle of a vibration sensor is based on the micro-electrical mechanical system (MEMS). A MEMS accelerometer can be used to determine movement, shock, or vibration involving the object it is attached to, converting what is detected into electronic signals.

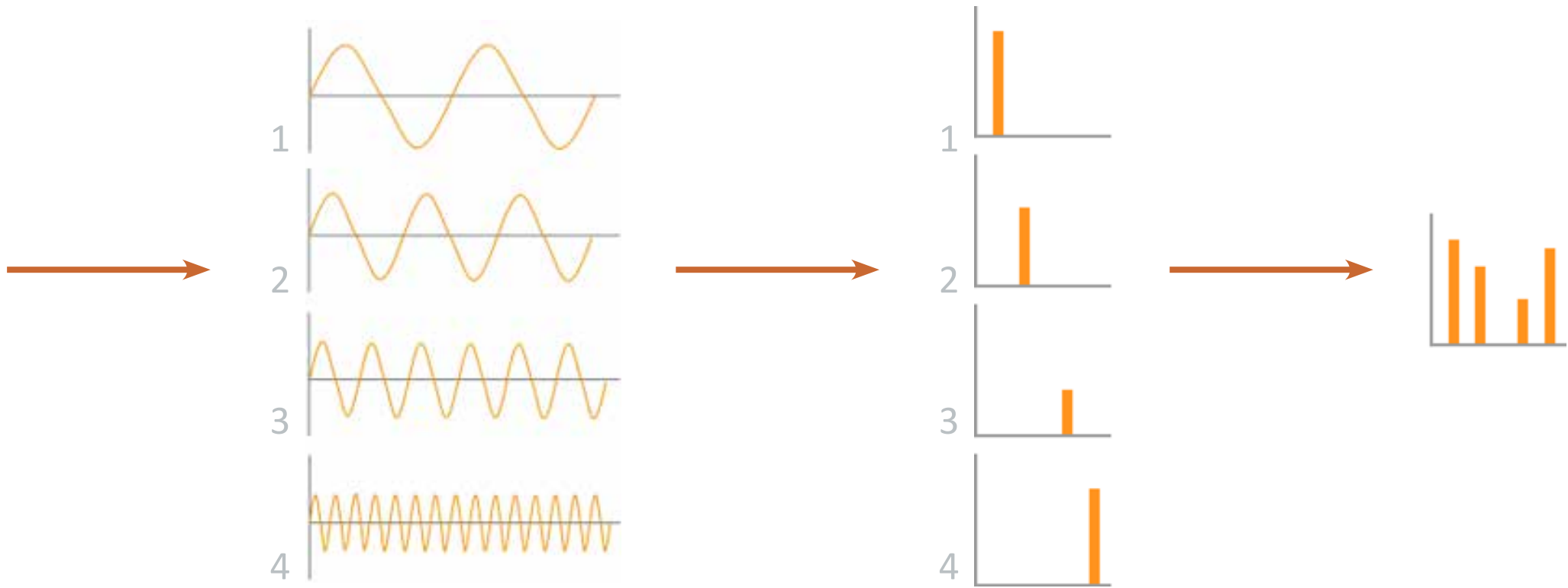
The capacitive function principle uses a capacitor comprising a fixed electrode and a flexibly mounted electrode (proof mass) that can freely



move. As the gaps between the electrodes change as a result of vibration, the capacitance of the MEMS chip changes in direct proportion to the vibration. Breaking down a complex vibration signal into its simple components isolates the frequency of each component to better understand what is causing the vibration.



A machine consists of components rotating at different speeds.



The components generate vibrations with different amplitudes and frequencies.

In frequency domain, the vibration signal is decomposed into the amplitudes and frequencies of each component.

The SICK sensor solution

The condition-monitoring sensor Multi Physics Box makes it possible to monitor deviations compared with the initial set points of a wind power plant unit over the time. Gear wear, broken bolts, shaft imbalances, and the like trigger different kinds of vibrations and abnormalities. If the Multi Physics Box is connected to a cloud-based remote control and data-monitoring system, the plant operator will receive information immediately about the specific problem – for example, a broken bolt or the need to evaluate the long-term wear of the gear boxes – and can plan mechanical services on demand.



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Flender GmbH

Winergy monitors Wind Turbine Drivetrains with CMaS Evolution

How to widen Wind Turbine Profitability: Winergy's CMaS Evolution ensures long-term profitability through the 360° Holistic Service Approach.



Wind turbines that fail due to unforeseen faults cause high costs for wind turbine operators and owners. This leads to a negative impact on the overall profitability of each turbine.

Predictive maintenance planning is elementary: monitoring of the plants and timely detection of failures as well as anomalies in operation that can lead to damage are essential to achieve a low LCOE (Levelized Cost of Electricity).

As the only manufacturer on the market, Winergy is the expert for complete wind turbine drivetrain systems and combines the system competence of gearboxes, generators, couplings, and digital services under one roof. With CMaS Evolution, Winergy offers a completely holistic service as an end-to-end solution that can be adapted to individual needs. Succeeding the original Moventas CMaS, which was launched back in 2006.

The holistic CMaS Evolution service is hardware-independent and can connect already available condition monitoring hardware without changing the existing infrastructure. In addition, CMaS systems, of which 7500 units have already been sold on the market, are monitored online. Through the unique predictive maintenance approach, necessary repairs can be planned quickly and carried out directly with suitable spare parts from the manufacturer. As part of the CMaS service, Winergy



ensures that the required spare parts are available at the right time. CMaS also offers a local contact person in your region.

As a further innovation, the CMaS service can optionally be expanded with SCADA data from the turbine and additional sensors, such as a gearbox-integrated torque sensor. Due to this, hidden uprate and downrate potentials in wind farm can be detected and made usable. In addition to permanent condition monitoring, there is also the option of mobile measurements with CMaS Evolution Portable devices to determine the current condition of the turbine, including recommendations for action from Winergy experts.

All this is complemented by a secure web-based customer portal in which data is made directly available, analyses and prescriptive recommendations from diagnostic engineers who validate and evaluate the measurement data with in-house manufacturer expertise.

Many turbine manufacturers, operators as well as owners of wind turbines all over the world are among Winergy's customers. Through the acquisition of the Finnish gearbox manufacturer Moventas, Winergy has expanded its service portfolio into a real multibrand service. This offers the advantage of being able to obtain Winergy's services from a single source, independent of the manufacturer.

The driver for continuous improvement and innovation of wind turbines is the levelized cost of electricity. These determines the profitability and competitiveness of a wind turbine. The function of the drivetrain of a wind turbine, which converts the mechanical force of the wind into electrical energy, is essential. The engineers at Winergy design complex, innovative and reliable systems with a very high power density. Not only the

design, but also the operation, maintenance and monitoring of the systems guarantees to keep the LCOE at a low level.

An investment in CMaS Evolution ensures reliable success and long-term profitability of turbines.

"We create a value for our customers and support them along the whole process from determine the current condition assets over failure prediction to planning, ordering of spare parts and repairs."

Sven Kiebusch
Head of Product Management
Digitalization & Wind CMS

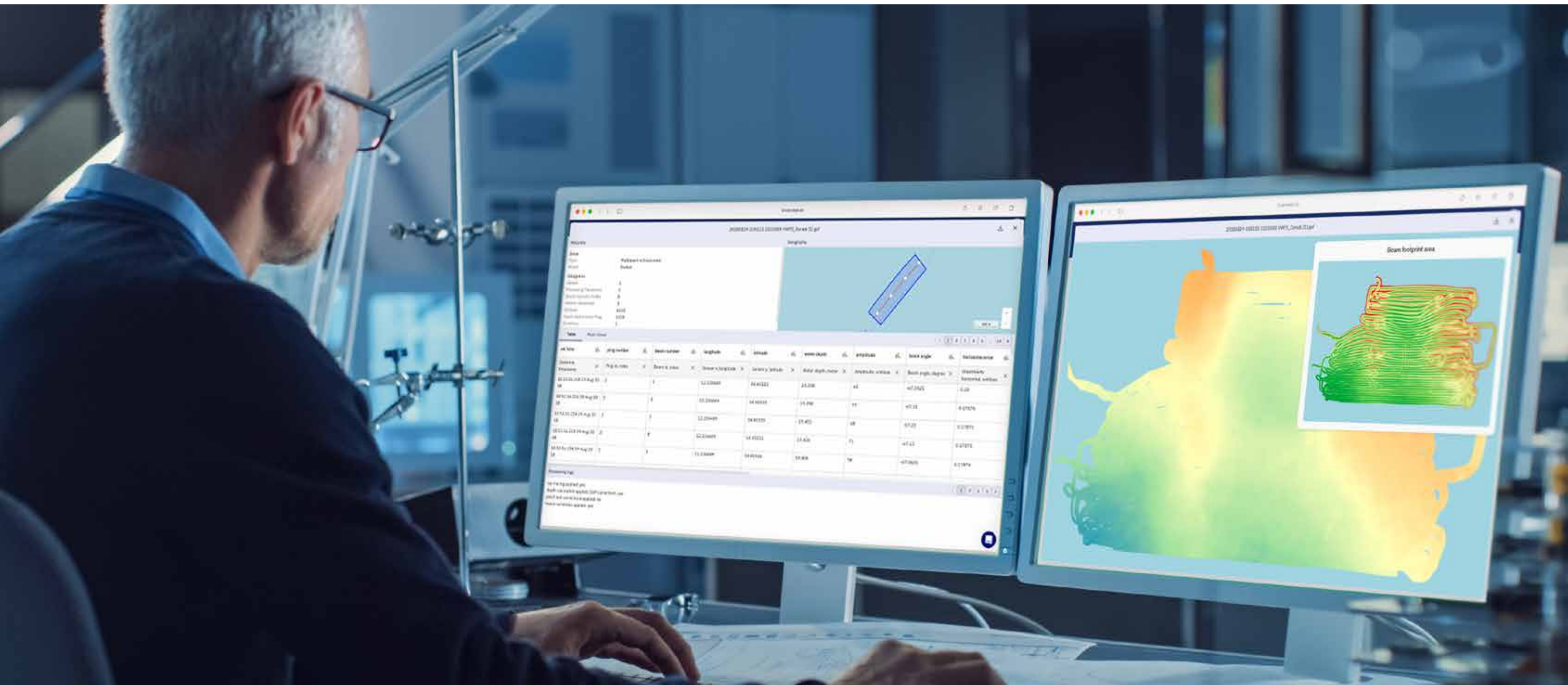
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Digitalisation drives more effective marine data management

Through ‘Offshore 2.0’, a new generation of technology start-ups is building a maritime industry for the data age with efficient digitalisation of data unlocking lower costs and empowering operators.



In April 2022, the German cabinet passed an amendment to the Renewable Energy Sources Act that aims to almost double the share of renewables in the nation's gross electricity consumption, while ensuring that 80 percent of their electricity is climate-friendly by 2030. German wind farms in the North and Baltic Seas now have

a 7.7 gigawatts (GW) capacity. The amendment calls for at least 30 GW. By 2045, an installed capacity of 70 GW is expected.

Stakeholders are cautious. Although German wind turbines installed in 2022 did generate 18 percent more electricity compared to 2021, the industry

has been in the doldrums since 2018, when half as many wind turbines were built compared to the previous year. New capacity fell from 6.5 GW in 2018 to a mere 352 megawatts in 2022.

The causes were mostly political in nature, including reductions in subsidies and tendering areas, bureaucratic hurdles, and electricity grid challenges. This led to bankruptcies that eliminated thousands of skilled jobs so the government's ambitious targets depend on an industry that has almost dissolved.

A cloud platform for the oceans

Most offshore data is shared, the exchange is cumbersome, largely because of proprietary formats and antiquated systems. TrueOcean, An innovative startup from Kiel is addressing this challenge with its industry-specific cloud platform for data storage, management and sharing for approved internal and external stakeholders.

The aim is to make marine survey data available on a single platform, without licensing expensive, format-specific software for each user or stake-



holder. Non-industry cloud platforms are uneconomical, because no standard format for sensor data exists and maritime customers must download their data to local systems for each processing step in order to use proprietary software.

Dealing with maritime data content is also unwieldy. To maintain an error-free and uniform database, experts must manually reconcile and prepare raw and metadata. Such processes have not been automated, until now.

The platform converts raw sensor data into open-source format, which eliminates the need for format-specific software and allows for the automation of quality control processes. It also automates data refinement and simplifies subsequent analysis.

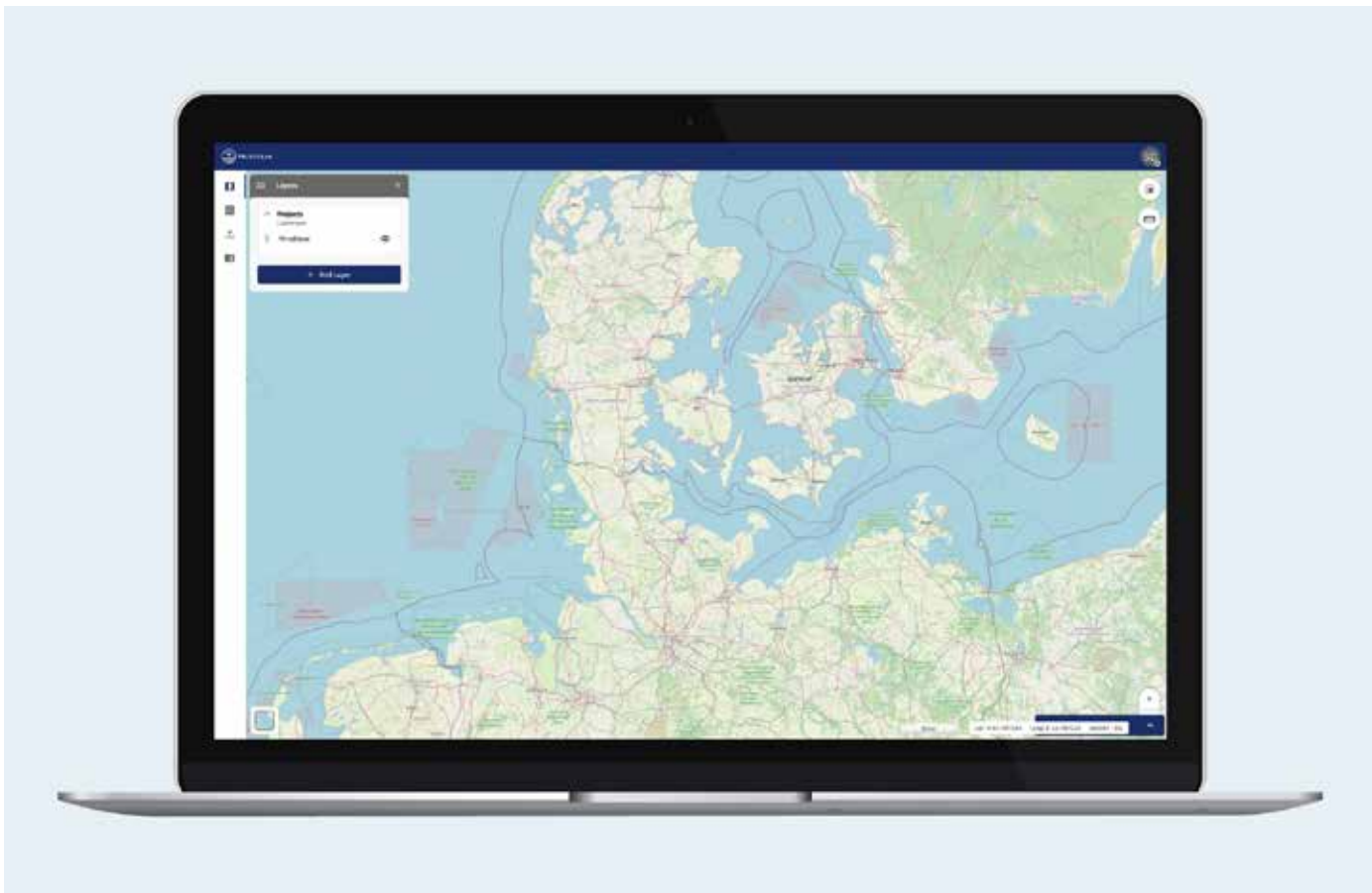
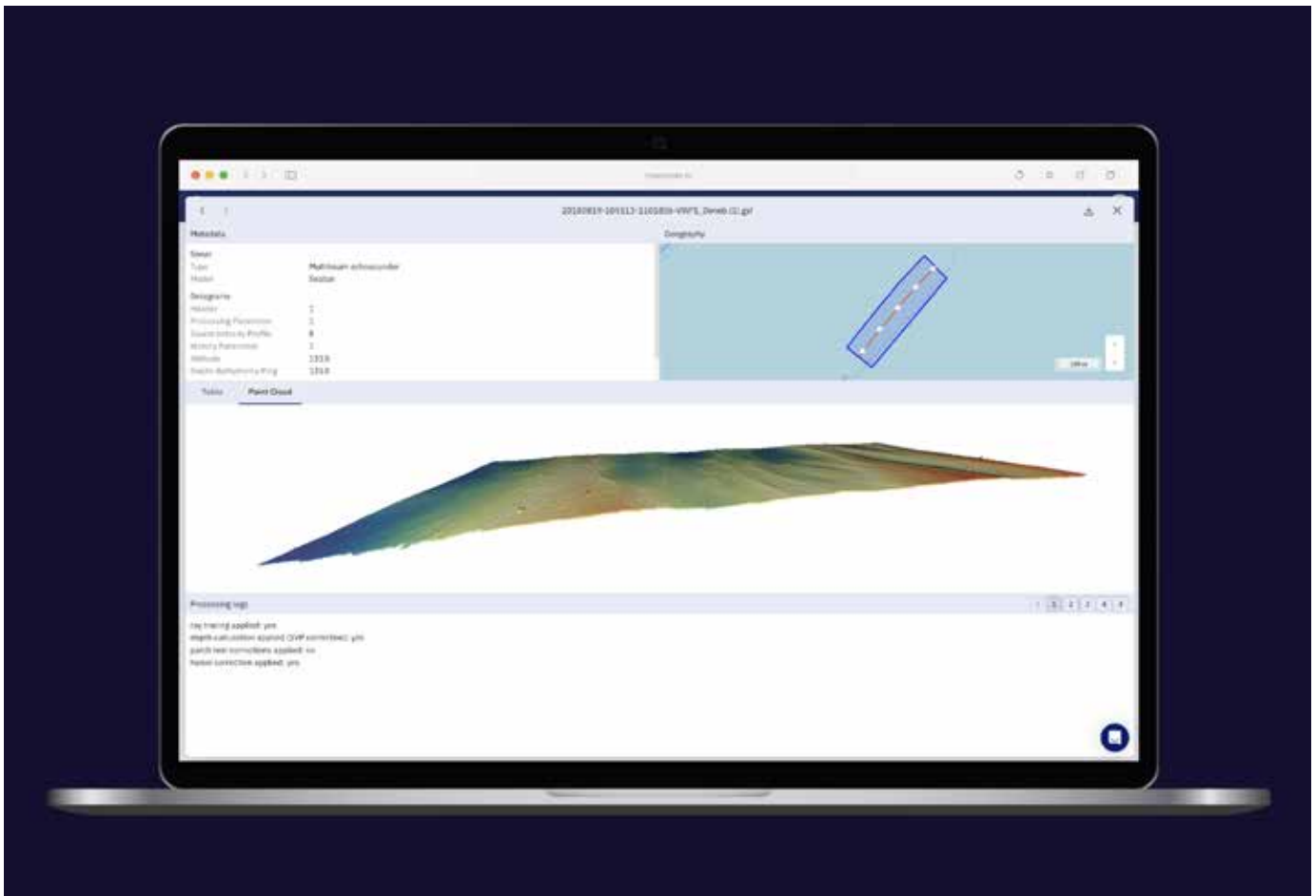
TrueOcean plans to offer specialised applications for analysing data directly on its platform. Customers will book analysis modules as software-as-a-service, e.g., generic statistics modules and complex AI-based procedures that become more powerful as data volume and quality grows.

Oceans as a data space

TrueOcean's cloud is embedded in the future European data ecosystem, Gaia-X, which will enable companies to combine cloud services and exchange data securely and sovereignly, in accordance with European rules and data protection standards. Gaia-X provides transparency and comparability, such as the data location, external accessibility, permitted use by third parties, certification level, or the applicable legal framework.

TrueOcean customers can connect external clouds and data sources to the platform without compromising data sovereignty and usability, while Gaia-X compatibility brings cooperation opportunities.

Europe's largest cloud provider, IONOS SE, is a Gaia-X founding member. The company from Montabaur also supplies the physical infrastructure for the TrueOcean cloud. Rainer Sträter, who manages the cloud business at IONOS SE, played a major role in setting Gaia-X standards. He wants to improve the economic efficiency of digital processes through industry-wide data rooms.





"Without common rules, a company has to define the exchange of data, its use and conformity with applicable data protection rules bilaterally in a contract with each individual cooperation partner," he says. "This creates an insane amount of work and drives up the costs of digital cooperation. Gaia-X creates a unique, universally valid framework for the entire EU."

Making marine data a product

Gaia-X data spaces are organised along themes, value chains, and sectors. Pilot projects for maritime data run under the name Smart Maritime Sensor Data Space X, aka Marispace-X. Founding members include IONOS, TrueOcean, and north.io

Author
Frithjof Hennemann
CEO, TrueOcean



"We want to make maritime data usable, refine it partly already on site, i.e., underwater and at sea, and link it securely with data from other sources," says Jann Wendt, initiator of Marispace-X.

"We are looking at the management of underwater data for offshore wind farms, the data-based and AI-supported search for old munitions in the North Sea and Baltic Sea, the optimised cultivation of seagrass meadows as a natural CO2 store, and even the Internet of Underwater Things (IoUT)."

Marispace-X creates the conditions for sharing data in a sovereign manner, while marine survey and renewable energy companies talk to each other and learn together how their data can be utilised.

Dr. Kurt Sandkuhl, Chair of Business Informatics at the Univ. of Rostock, sees this ecosystem as a prerequisite for digital business models to develop on a broad scale. He says, "Silicon Valley relies heavily on monopolies when it comes to creating value from data. The alternative is an open ecosystem in which data owners share their information and

market it to third parties. This also gives start-ups and SMEs the chance to build digital business models in cooperation with others. Especially in niches like the maritime sector, this approach offers opportunities for innovation."



WEBINAR

25.10.2023 | online

Offshore Substations: Improved electrical design



more information



Ideas from Germany

New technology: No end to growth in sight

Which new turbines will enter the German market in 2023? That was our question to the major wind turbine manufacturers.

Interview with
Felix Rehwald, Corporate Spokesperson
for ENERCON GmbH

What technical innovations will you be introducing?

ENERCON has announced the introduction of the E-175 EP5 in 2024, a top-of-the-range model with a rotor diameter of 175 metres and a rated output of 6 megawatts. Currently still in the development stage, the E-175 EP5 is based on the proven low-maintenance ENERCON Direct Drive concept and will feature an e-nacelle equipped with the latest generation of integrated e-technology, a newly developed permanent magnet generator with increased efficiency for maximum yields, as well as a rotor blade developed by ENERCON.

What gives you the edge over the competition?

The E-175 EP5 represents a new generation of wind turbines that incorporates a huge amount of "ENERCON DNA", such as our proven low-maintenance direct drive system, an efficient synchronous generator, state-of-the-art blade technology, and power electronics. So, we're building on our core skills and technologies that go back to our company's founder, Dr. Aloys Wobben, in which we take great pride. The E-175 EP5 is a contemporary embodiment of our company's development philosophy and means that we can offer our customers distinctive features that differentiate us from the competition.



Interview with
José Luis Blanco, CEO Nordex SE

What technical innovations will you be introducing?

We introduced our latest product, the N175/6.X, in September 2022. Equipped with single-section, newly designed 85.7-metre rotor blades, it is designed to work at low wind speeds with an above-average capacity factor.

How do you outperform the competition?

Our most important development concept is "product evolution" because it minimises technology risks. For example, we were able to exploit our proven Delta4000 architecture to optimise the power curve of this turbine model to cope with low and medium wind conditions. Crucially, it still stands out for the flexible design approach in combination with a variety of operating modes.

When the N149/4.X was launched in 2017, Nordex became the first company to introduce flexible rating as part of its core design philosophy and operating strategy.

Interview with
Christian Essiger, Head of Onshore for Germany, Siemens Gamesa Renewable Energy

What technical innovations will you be introducing?

We're offering a plethora of innovations, from turbine upgrades, resource-saving technologies, and a taller tower to a more secure SCADA system. We presented the SG 7.0-170, a version of the Siemens Gamesa 5.X platform with the highest output, at Wind Energy Hamburg 2022 and plan to start distribution in Germany this year. Our portfolio also includes a new hybrid 185-metre tower for turbines with a rotor diameter of 170 metres (SG 6.6-170 and SG 7.0-170).



The world's first RecycableBlade from Siemens Gamesa was installed at the Kaskasi Offshore Wind Farm in the North Sea in 2022. © Siemens Gamesa

Our RecycableBlade enables us to increase the recyclability of turbine materials to well over 90 per cent, which enables us to meet the demanding recycling quotas, which have been in force in France since the beginning of the year and combine environmental protection with our usual high quality.

How do you outperform the competition?

What we're seeing is that the trend towards hub heights in excess of 170 metres is set to continue. Our turbines and towers are designed in such a way that we can guarantee stability even with very high hub heights, without any limitations.



Interview with
Nils de Baar, President of Vestas
Northern & Central Europe

What technical innovations will you be introducing and how will this affect the achievable output?

The prototype of our new offshore flagship, the V236-15.0 MW, produced electricity for the first time in January 2023. The EnBW wind farm He Dreiht in Germany will be our first global commercial project in which this turbine will be used. Beginning in 2025, our V236-15.0 MW, which combines world-class technology with industry-leading experience,

will be installed as standard and will be capable of producing 80 GWh of electricity per year, which is enough to meet the electricity demand of about 20,000 European households from a single wind turbine and cut the production of CO2 by some 38,000 tonnes per annum.

What gives you the edge over the competition?

We at Vestas pride ourselves on being a solid and reliable partner, with satisfied customers, a robust supply chain, and the capacity to respond to our clients' needs in a rapid and flexible manner. We are able to implement projects in the shortest possible time in spite of the global challenges we are all facing. We are already the market leader in Germany in the onshore sector and have set ourselves the clear goal of achieving the same status in the offshore sector.

Author

Marcus Franken
Ahnen & Enkel, agency for
communications



Rely on it.



Save high costs of repair and bolts exchange with the corrosion protection film for wind turbines RENOLIT CP



2-in-1 solution for a more efficient operation of your wind park

- Flange sealing & corrosion protection
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- 10 years durability
- Environmentally friendly



RENOLIT CP Film structure



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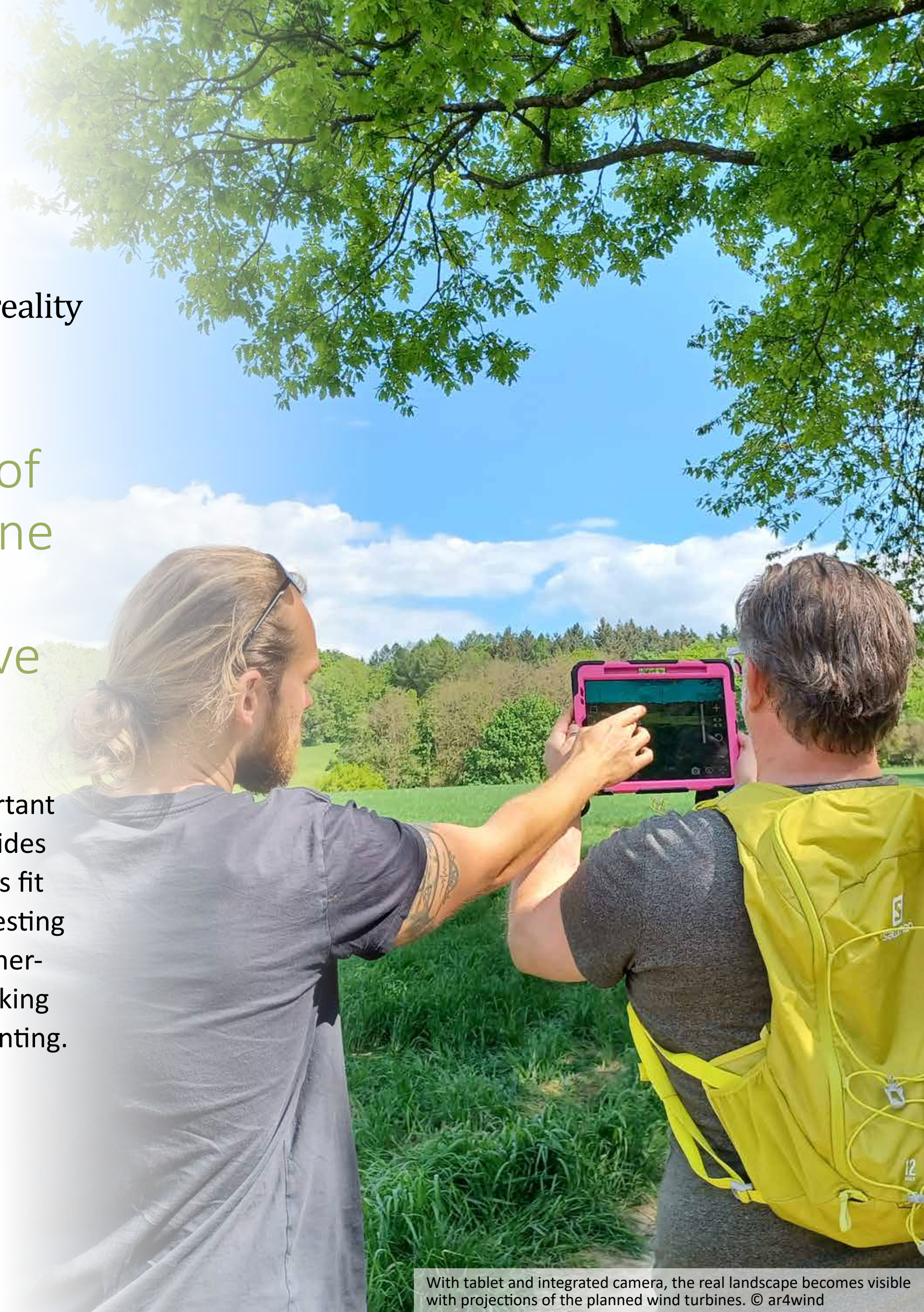
A tailwind from augmented reality

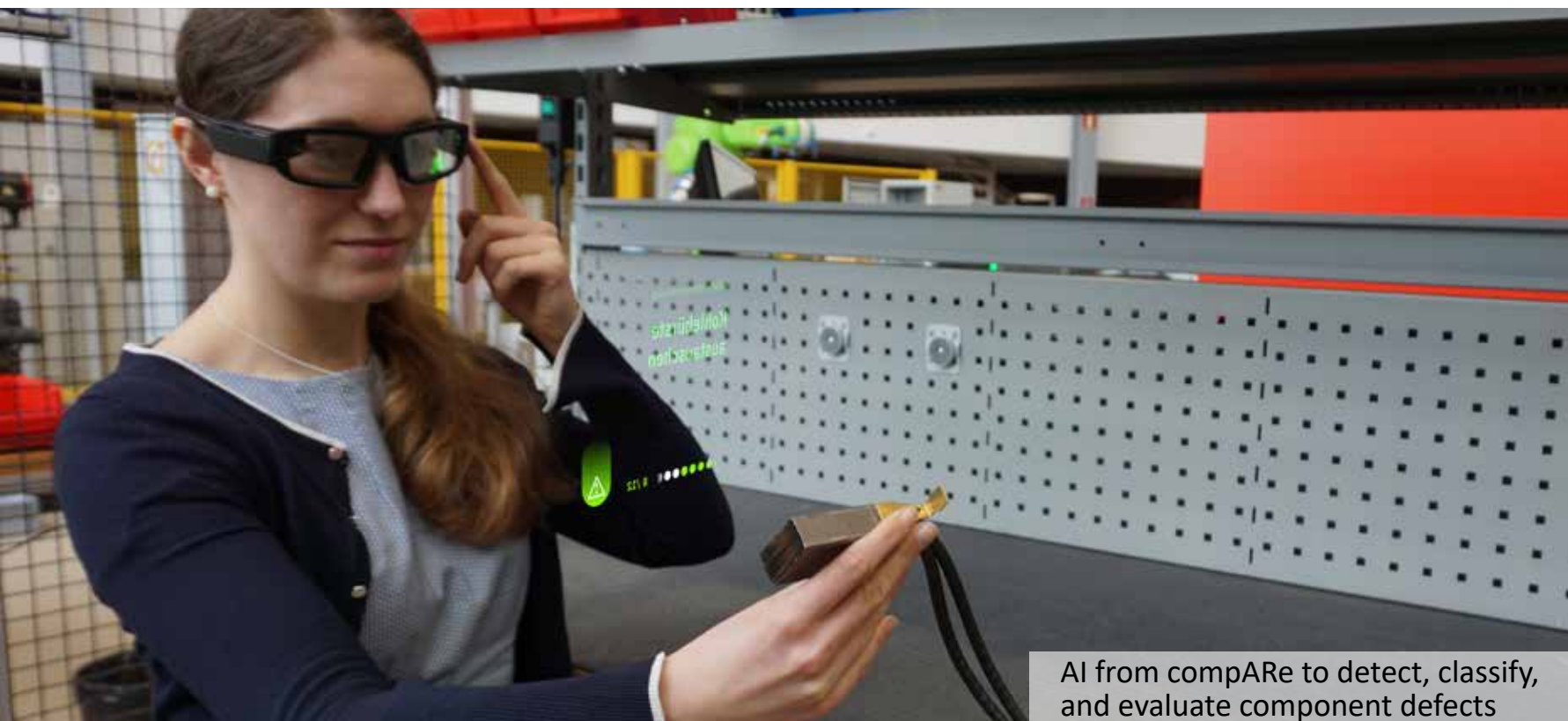
When it comes to the expansion and operation of wind turbine farms, augmented reality is becoming an important tool and has already proven its worth in several areas.

Wind turbines close to a listed castle? That's bound to attract criticism, which is why the project developers and political decision-makers grab their tablets without further ado. They head straight to the scene of the action, using their integrated cameras to view the landscape as it really is or as projected by the ar4wind app. The app projects images of the planned wind turbine, exactly as it would be seen from the respective location. As Bettina Bönisch, a mediator and consultant for ar4wind at the onshore wind energy agency, explains: "Based on the images produced by this augmented reality application, some of the masts have been removed from the planning application, which means that the scenery and historic buildings will no longer be affected."

"The app shows images of the planned wind turbine exactly as it would be seen from the respective location."

Augmented reality (AR) is becoming an important tool in the expansion of wind farms and provides realistic images of how planned wind turbines fit into their surroundings. This is not only interesting for project developers but can also create generate a higher level of public acceptance by making the unknown tangible and therefore less daunting.





Not for the layman

The ar4wind research project will produce its final report in late June 2023, after which the app will be commercialised. Until now, the main users of the app have been project developers who have tested its usefulness in practice. "Whenever 20 or so people head out for a guided tour, they tend to take at least four to five devices with them, which are operated by a competent person," Bönisch explains. "The feedback we've received has been really positive." For now, the application is not intended for use in more extensive settings. "Non-professionals struggling with the operation and calibration could become frustrated and the actual benefit would

take a back seat." Were we to grant free access to the app, we would also have to clarify questions relating to image and data rights. Apart from that "in the same way as anyone could take bad photos even with a good camera, you could also get into mischief with this app." For example, if it is not operated correctly, the ar4wind app could also be used to create impressions, which could distort planning application results or, in the worst case scenario, create fake news.

"The crucial factor in increasing the acceptance of planned wind turbines through the use of AR is the manner in which these presentations and discussions are moderated on site"

Bettina Böhnisch, FA Wind

For now, this limits its use in public participation processes, but it can be helpful to show AR-based video footage recorded during a field trip in the appropriate setting. Other companies, such as BayWa r.e. and EnBW, are also focusing on the use of AR in this area and are developing applications similar to ar4wind. One tool developed by Land-Plan OS, a landscape planner based in Osnabrück, enables the live on-site AR display to be transmitted to viewers connecting in from elsewhere, who can express their ideas in real time and influence the type and position of the visualisation.

Simplifying maintenance

Another important area in which AR can be used, in addition to planning, is to improve the efficiency of wind turbine maintenance as this technology can lead to a reduction in personnel and maintenance costs as well as downtime. Service technicians who visually assess and then document the condition of specific components will be able to use the tool going forward. The Bremer Institut für Produktion und Logistik GmbH (Bremen Institute for Production and Logistics – BIBA) tested the AR Maintenance System many years ago, an applica-



tion that is used for navigation, work instructions, and documentation. As Moritz Quandt, a research assistant at BIBA, explains: "we developed applications for indoor navigation, visualisation, recording and delivering maintenance instructions and activities, recognising object markers, and managing large data volumes. "We are also using artificial intelligence in our current compARe project." AI-based image processing systems are designed to detect, classify, and evaluate component defects that develop over long periods of time.

"AR can be used to reduce maintenance personnel, maintenance costs, and downtime."

Author
Lars Klaatzen
author at medienbüro mitte



Using a drone to inspect the rotors of a wind turbine, for example, may reveal potential defects, some of which may later turn out to be harmless or simply the result of soiling: it is the responsibility of the service technicians to assess potential damage and decide whether not a repair is necessary. Feeding an AI algorithm with this input enables it to learn and assist in decision-making. "However," as Quandt explains, "using these computationally intensive image processing applications on mobile devices is challenging." Another issue involves choosing the right hardware for specific applications. Semi-transparent 3D data

glasses provide visual information about the maintenance process as well as performing essential documentation tasks leaving the service technicians' hands free. On the other hand, smartphones or tablets are better for manual data entry. "It is important to keep an open mind when it comes to hardware," says Quandt: "it has to meet various occupational health and safety standards in practice". It also has to be robust; expensive data goggles, for example, shouldn't break the first time they are dropped. The compARe system will be trialled in good weather conditions in the spring of 2023 and the service technicians will be asked for their feedback, the goal being to have a functioning overall system by the end of the year. AR is thus becoming an important tool in the expansion of wind power.

AR: discovering new worlds
Augmented reality (AR) involves the use of virtual elements, such as texts, videos, and games, to supplement real-world data and images and works by recognising images or patterns via a camera built into data goggles, a smartphone, or a tablet.



From Virtual to Reality: Visualizations are bringing Wind Turbines to Life

The Augmented Reality tool "Passage" from LandPlan supports citizen involvement in wind turbines planning



Interview with
Stefan W. Kauling, CTO
LandPlan OS GmbH

Can you remember when
you yourself used aug-
mented reality for the very
first time?

I used AR for the first time in spring 2018 when I was working on another project together with a colleague: we were developing a test application for garden design which allowed the user to place virtual trees, shrubs and flowers at any desired position.

Suddenly something went click. I'm a qualified landscape gardener and know the difficulty of explaining a 2D plan to a non-professional all too well. With this tool, you can simply say

"Just take a look for yourself, that's what it's going to look like."

Augmented reality is a relatively new technology. What are its benefits for public involvement when planning the installation of wind turbines?

This new way of involving citizens with the aid of AR can be summed up in just four words. Public involvement will be faster because residents can visualise the wind turbine on their tablet screen within just a few minutes. It is more personalised because anyone can use the device in their own garden or living room. Thirdly, it is more descriptive because various perspectives of a situation can be viewed on a mobile phone or tablet. And finally, public involvement can become more cred-

ible because visualisation is possible in the "here and now". For example, in winter when the trees are bare, you will see more of the planned wind turbine from your garden, and in summer you will see much less. Visualisation is adapted continuously and smoothly here.



Video: The tool in use



How can visualisation with the "Passage" LandPlan tool be presented in practice?

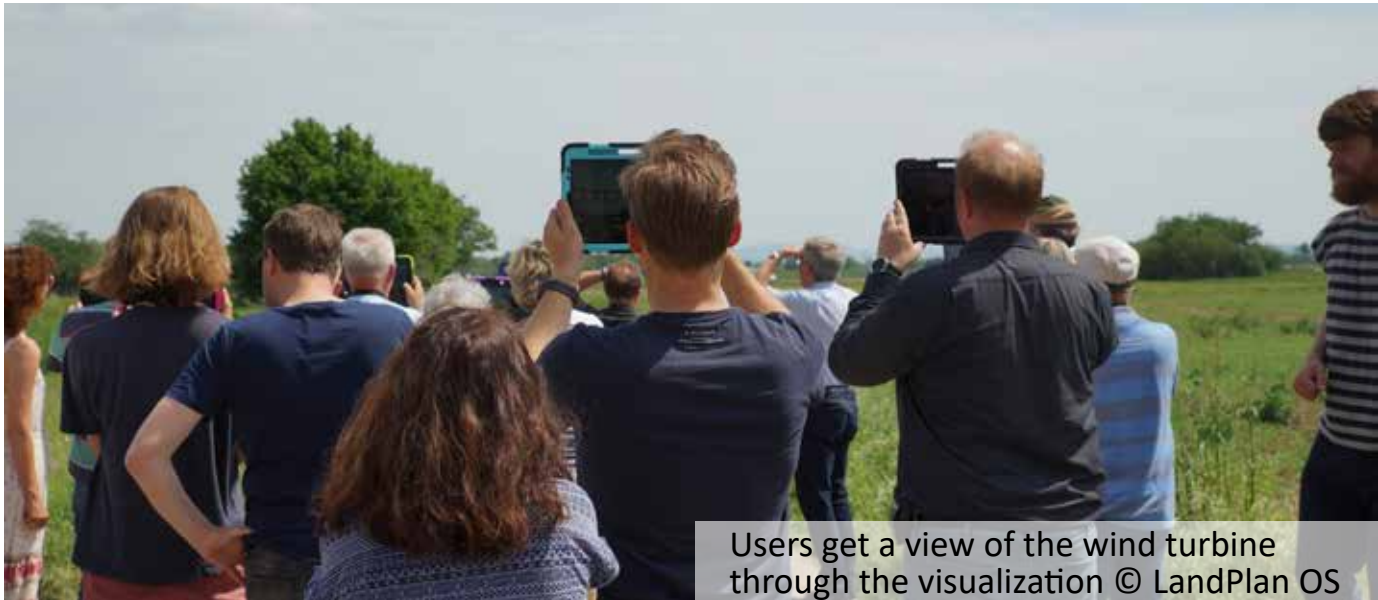
Implementation is simple: In the project management feature, a new project is defined by specifying the project centre point on a map. Then the desired wind turbine model is selected. We always have the latest range of 3D models from all manufacturers available. There are several different ways of setting the location: for instance by clicking on the position on the map, by entering the coordinates or by siting it with GIS software using an internet-assisted geo-service. After this has been done, the user can generate a visualisation at any desired location, stream this live in a video conference or store videos and photos as



finished animation sequences / visualisations for further use.

What advantages does the LandPlan OS tool have over other wind turbine visualisation methods, in your opinion?

In addition to allowing the fast and effortless generation of AR visualisations and having a direct connection to spatial GIS data, "Passage" creates a complete digital twin of the project and the project area. This is created automatically for each project on the basis of the GIS data available for the area. The project's digital twin is a virtual 3D world that is accessible on the PC as soon as the project has been set up. With the aid of this, the user can



check whether the planned wind turbines are visible from certain locations, for instance, and whether it would even make sense to generate AR visualisations on site at the actual location. It is also possible to invite other participants to this virtual world in order to review or check the various aspects of the project together (shadow impact, nocturnal warning lights, access routes etc.) and discuss these directly in the virtual environment.

Can this application also be used abroad?

"Passage" will be available for use throughout Europe from the third quarter of 2023 onwards and for world-wide use by the end of the year.

Author
Martin Schneider
Editor-in-chief at German
Wind Power Magazine



German Start-ups

In this new section, we present start-ups from Germany that are advancing the wind industry with innovative approaches and technologies.

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PPA-CONNECT the match-making platform Read article	58
VoltStorage Energy Storage for Wind Parks Read article	61





Ideas from Germany

Cube Green Energy – Your Energy Partner

The start up repowers wind farms, develops greenfield wind and solar farms and invests battery storage and e-fuel solutions to address electricity intermittency.

Over the next decade, unprecedented levels of investment into the renewable energy infrastructure in Germany is needed for national security and to address the climate emergency.

Cube Green Energy collaborates with local stakeholders in the renewable energy sector, providing strong financial backing and world class energy expertise to increase Germany's renewable energy generation capacity, improve efficiency, address electricity intermittency, and support the growing applications of renewable energy.

Who is Cube Green Energy?

Cube Green Energy is led by a seasoned team of energy experts with decades of experiences in numerous leading renewable institutions (including at General Electric, Ørsted and Vestas). Skilled in multiple disciplines including development, contract negotiations, financial structuring and asset

management, the team actively manages projects and works with partners to strategize, optimise, and implement innovative energy solutions.

We benefit from strong financial backing through I Squared Capital, an independent global infrastructure investment manager with over € 32 billion in infrastructure assets under management. I Squared Capital has also invested over € 6.5 billion specifically in the energy transition sector since 2014.

Strong relationships with WTG manufacturers, banks, developers, and other stakeholders make us well-networked in the industry. Our expertise in underwriting complex projects creates value for our partners and we drive successful projects through our stakeholder connections and innovative solutions.



Our strategy is to partner with regional and local stakeholders in the renewable industry who require strong financial backing for their projects and who can benefit from our connections and strong domain expertise.

Cube Green Energy's ambition is to build 1GW of power generation capacity in Germany and contribute to the energy transition through investments in high efficiency repowered wind farms, greenfield wind and solar plants, battery storage projects and innovative hydrogen or e-fuel projects.

How does Cube Green Energy achieve success?

- We increase energy generation capacity by funding and working collaboratively with local developers to build up greenfield onshore wind and solar energy production.
- Generating renewable energy requires a lot of land and suitable land is hard to find. Solar and wind farms need up to 100 times more space than gas to generate the same power. It is therefore imperative that renewable energy is generated efficiently. By acquiring late-stage operating wind farms and upgrading the technology or improving WTG layout through

re-densification, we are investing in improving the efficiency of Germany's electrical generation facilities.

- To address renewable energy intermittency, we invest in storage solutions, including batteries, hydrogen and other e-fuels, making renewable energy a viable future alternative for consumers and industrial users who require a 24/7 uninterrupted supply.



WI

WEBINAR

27.09.2023 | online

Update floating wind turbine technology: Latest advancements and successful projects



more information

© BW Ideol & V.Joncheray - BD



Information on the company

Cube Green Energy GmbH
Budapester Straße 35, 10787 Berlin, Germany

- Year of foundation: 2021
- Number of employees: 13

We are looking for:

- Acquiring wind farms operating for more than 10
- Investments in battery storage and e-fuel projects requiring strong financial backing and technical expertise
- Cooperation partners on greenfield solar and wind projects

Contact

Niko Meißner
Managing Director at Cube Green Energy
Phone: +49 30 8009349-21



Who we are and what we can offer:
At Cube Green Energy we welcome partnerships in, or the acquisition of, projects in renewable energy generation (greenfield and repowering), energy efficiency/storage and e-fuels. Deploying our strong financial capabilities and market leading energy expertise, we are a reliable partner and offer fair terms and help unlock the inherent value in your energy project, driving success through our relationships, active management, and creative solutions.



"With a team based in Berlin, Hamburg and Stuttgart, we offer fair and attractive terms to partners and incorporate local interests in our projects to ensure community support."

Niko Meißner,
Managing Director at Cube Green Energy

LUMENION – Decarbonisation now!

LUMENION makes a stable heat supply from renewable sources possible: by separating energy supply and demand, fluctuating wind power can be used effectively.

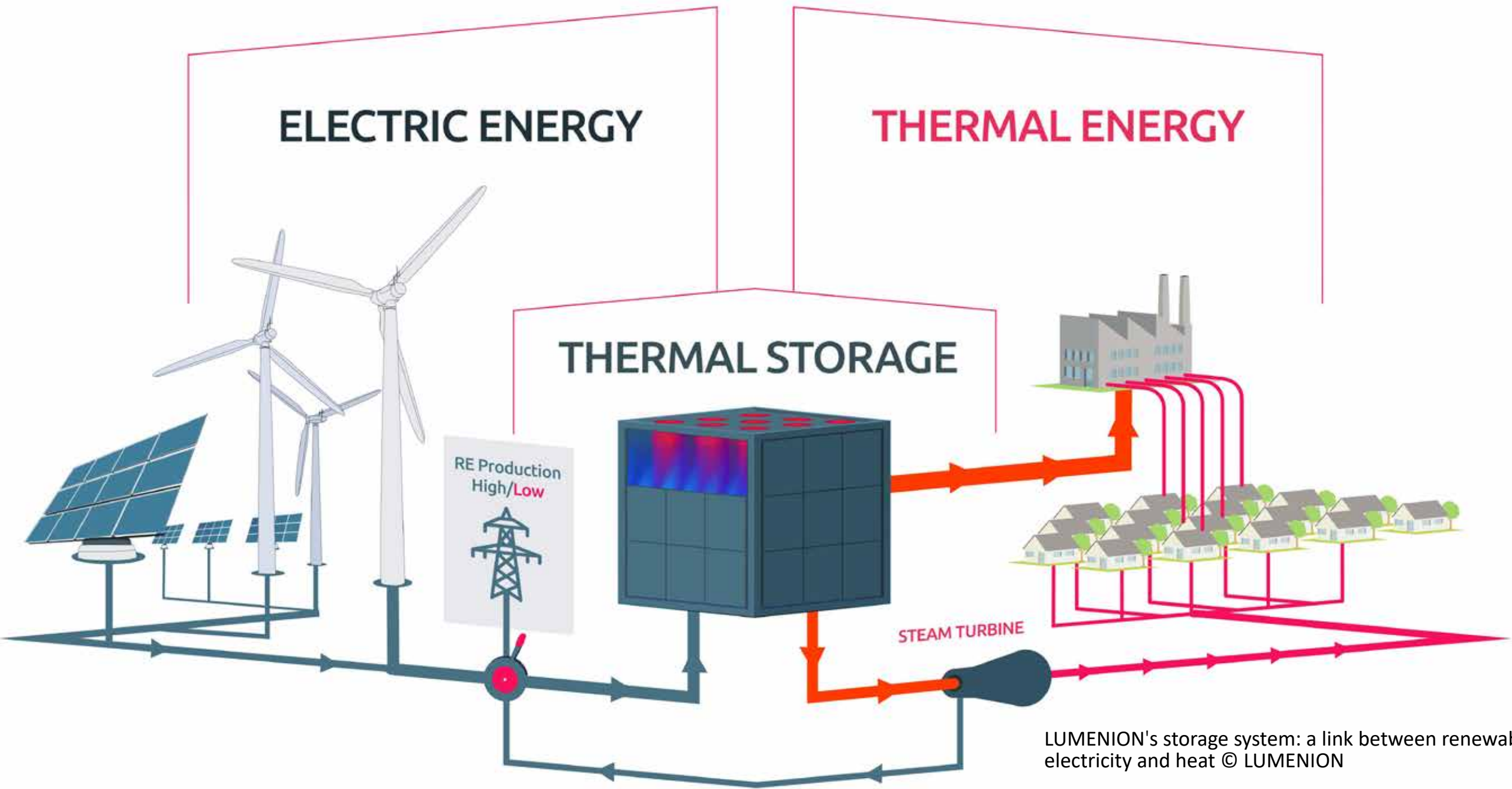
There is no question that the energy transition is long overdue. We show that its realisation is easy with our innovative TESCORE storage system, which allows for an immediate reduction of CO₂ emissions. At LUMENION, we prefer to speak about a heat transition when addressing the current energy demand: Heat accounts for more than 50 percent of final energy consumption in Germany; in the industrial sector it is even higher, making up for two-thirds, most of which is used for process heat. With our high-temperature storage system, we make renewable energies easily available for the heat market and thus make a significant contribution to the heat transition.

Using "surplus" electricity to generate heat

The basic idea of our power-to-heat technology is to shift the energy behind generation peaks out of the power grid and into the heating grid, thus serving as a relief valve for the power grid. This

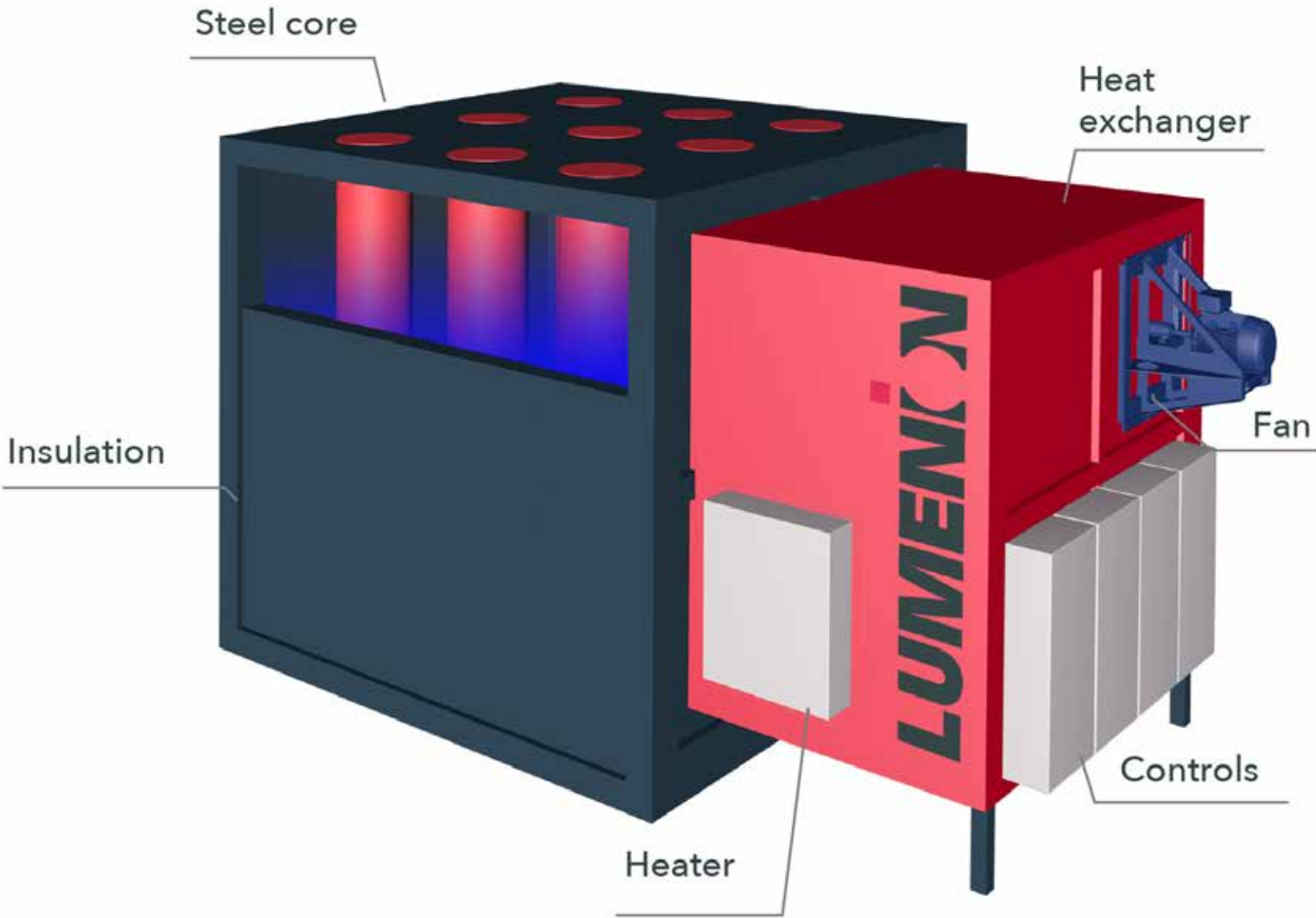
ensures system security, maximises the use of power plants, can compensate for grid congestion and enables the decarbonisation of heat-powered processes.

TESCORE can be charged in about four to six hours (continuously or discontinuously over the course of a day) – for example, when electricity prices drop during off-peak periods. With the help of an electrically powered heater, the storage core is





then heated up to 600 degrees. Whenever energy is needed, the discharge process can be started, in which the stored thermal energy is transferred to a heat exchanger. The possibility of simultaneously charging and discharging the system ensures maximum availability and optimises the use of resources.



The design of TESCORE is simple © LUMENION

Usable for industry, local and district heating networks

Possible applications include the supply of process heat in the industrial sector. Wherever high-temperature steam is needed for industrial processes, for example, in the chemical or food industry the storage system can be used as a quick solution for a climate-neutral energy supply. Integration into local and district heating networks is also possible, as already demonstrated by our pilot project in Berlin-Tegel: since 2020, a thermal storage unit with a capacity of 2.4 MWh has been supplying around 360 surrounding flats with hot water.

Depending on the energy demand, TESCORE is scalable in size; we offer storage capacities ranging from 0.2 MWh and 500 MWh. The storage modules can be flexibly combined, offering the right storage solution for every need.

Main component steel is regionally procurable and recyclable

We use steel as storage material for the core because it offers numerous advantages. Thanks to its robustness and high density, a lot of energy

can be stored in a small space. Thanks to the durability of steel, the operating life of our storage system is at least 20 years – and afterwards it can be recycled with a residual value of 40 %. All other components of the system are also industry-proven and can be sourced locally, which promotes regional value creation. TESCORE can thus be operated and maintained without any risk or having to obtain any permits.

Industry Report
**Wind Industry
in Germany
2024**

The most extensive
company directory
in the industry





Information on the company

LUMENION GmbH
Ella-Barowsky-Str. 11, 10829 Berlin, Germany

- Year of foundation: 2016
- Number of employees: 17

We are looking for:

- Developers and operators of wind farms who would like to optimise their wind yields and reduce curtailment with our thermal energy storage system

Contact

Peter Kordt
CEO of LUMENION GmbH
Phone: +49 30 55 57 051-0



Example of a storage system integrated into the heating system of a residential complex © LUMENION

Who we are and what we can offer

With our storage technology, we create a link between the electricity and heat markets and enable reliable and cost-effective storage of large amounts of energy. In this way, we create an enormous improvement in the business case of wind turbines and offer our customers the necessary component for 100 % decarbonisation with 100 % security of energy supply.

"Our thermal energy storage system is the ideal supplement for wind farm operators in order to significantly reduce curtailments and bring yields to an optimum."

Peter Kordt,
CEO of LUMENION GmbH

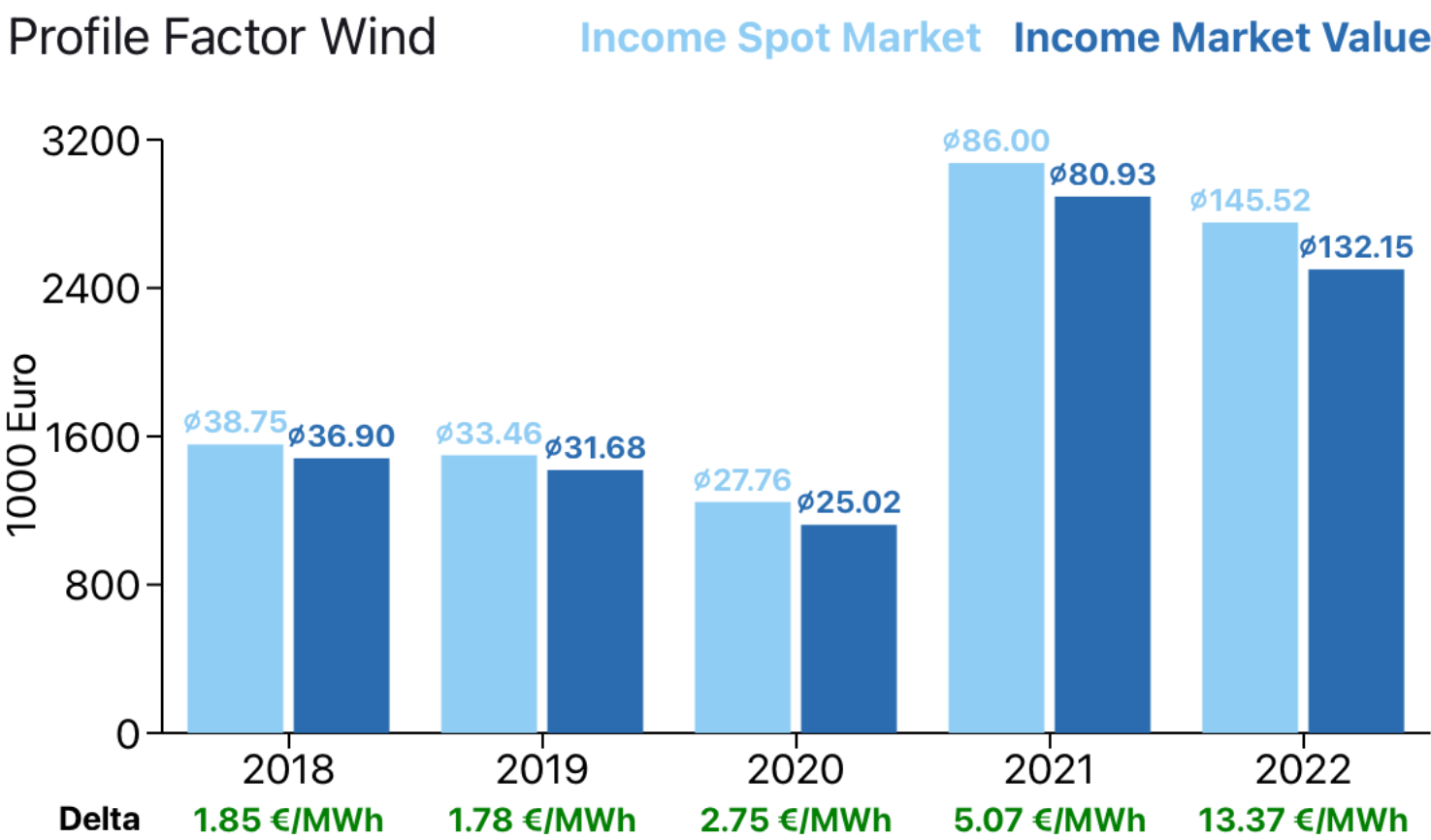
PPA-CONNECT – the match-making platform

The start up offers a comparison platform for direct marketing and utility PPAs with automated tendering process and reduced effort for asset owners and direct marketers.

With the latest price rally on the electricity market, direct marketing has become more attractive for renewable energy asset owners in Germany. Compared to fixed feed-in-tariffs, asset owners can directly profit from the high electricity prices and generate high additional revenues. However, the market for direct marketing and PPAs is not very transparent and a broad market tender is associated with a lot of effort for the asset owner - the direct marketers have to be approached individually and provided with all data necessary for calculating a quote.

Solving the data chaos for asset owners and direct marketers

PPA-CONNECT centralizes the tender and, as a central data hub, also handles the distribution of the data. After registration, asset owners can enter their plants into the platform. We collect all the data that the direct marketers need for calculating a quote and the registration of the asset with the distribution network operator. Through a direct link to the ‚Marktstammdatenregister‘ (master data register), we can reduce the required data entry effort to an absolute minimum. All data is checked by us for completeness and plausibility. Thus, we try to prevent any data related questions from direct marketers and avoid possible risk surcharges in case of incomplete data. The data is also enriched by us with market data and graphically processed to give the asset owner an over-



Screenshot of the dashboard showing the development of the specific market value of a windfarm. © PPA-CONNECT

view of the economic performance of his assets in a dashboard, e.g. an overview of the specific market value. This information can also be used for the evaluation of the offers.



PPA-CONNECT simplifies the comparison of different quotes

When operators tender their assets, they can decide which direct marketers to request a quote from. They can choose from a large pool of well-known direct marketers. The overview of quotes contains not only information on prices, but also on the most important contractual elements. In addition, sample contracts are attached to the quotes for review. Thus, asset owners have all the information they need to choose a quote in one place.

The platform can be used to request quotes for assets in operation and new projects under construction or in the planning. The only limitation is a minimum installed capacity of 1 MW. In one tender, quotes for up to three terms can be requested simultaneously. Asset owners can ask for quotes for the classic direct marketing with payment of the market value (wind/solar) or the spot price as well as for a utility PPAs. The use of PPA-CONNECT is completely free of charge for the asset owners.

Dienstleistungsentgelt

TI

Test2-DV
Laufzeit bis: 31.12.2023

Marktwert Solar – 2,45 €/MWh

Vergütungsmodell: Zweistrommodell ✓

Ausfallarbeit: Pauschal ✓

Bürgschaft: Keine ✕

Vergütung Redispatch: Keine ✕

Vergütung marktbed. Absch.: Marktwert ⚙

Übernahme EIV: inklusive ✓

Übernahme BTR: inklusive ✓

Das Angebot ist noch 16 Tage gültig.

Muster-Vertragsdokumente (1) ▾

Angebot annehmen

Festpreis

TI

Test2-DV
Laufzeit bis: 31.12.2023

Basierend auf Terminmarktpreisen vom 27.06.2022 ? 148,00 €/MWh

Vergütungsmodell: Einstrommodell ✓

Ausfallarbeit: Pauschal/Spitz/Spitz-Light ✓✓

Bürgschaft: Keine ✕

Vergütung Redispatch: Keine ✕

Vergütung marktbed. Absch.: Festpreis ✓

Übernahme EIV: inklusive ✓

Übernahme BTR: 1200,00 € / Jahr ⚙

Das Angebot ist noch 16 Tage gültig.

Muster-Vertragsdokumente (0) ▾

Angebot annehmen

Overview of two different quotes of a tender for a windfarm. © PPA-CONNECT



Information on the company

PPA-CONNECT GmbH

Kuhnkestraße 6, 24118 Kiel, Germany

- Year of foundation: 2021

We are looking for:

- Renewable energy asset owners and commercial managers

Contact

Hardy Kallsen
Co-Founder PPA-Connect
Phone: +49 152 241 187 02



"With PPA-CONNECT we offer the easiest and fastest solution for wind and photovoltaic plant owners to manage the tender process for a new direct marketer."

Hard Kallsen, Co-founder of PPA-Connect GmbH

Who we are and what we can offer

Our goal is to offer a simple, efficient and transparent solution for the match-making of asset owners and direct marketers. With PPA-CONNECT, we want to free up space at both operators and direct marketers, so that they can concentrate on the further development and market integration of renewable energies. Register your plants at www.PPA-CONNECT.de and find the perfect partner for the direct marketing with us.





VoltStorage – Energy Storage for Wind Parks

VoltStorage develops cost-effective battery storage systems for wind parks to supply required base load for 10-100 hours in low wind phases to enable 100 % renewable energy 24/7.



VoltStorage energy storage systems for solar and wind parks © VoltStorage

With the expansion of renewable energies, we are setting the right course for a climate-friendly future. However, considering the increased share of renewable energies, technological solutions will soon be needed to bridge natural supply gaps to provide the required base load even in times of less sun and wind. Usually, it is claimed that solar and wind power generation ideally complement each other as wind generation is higher in times of low sun and vice versa. But in reality, this complementarity is not sufficiently reliable to ensure 100 % CO2-free energy supply.

Store surplus green energy cost-effectively

Energy storage systems are the key technology for shaping the future of climate-friendly energy supply. So far, however, there has been a lack of technological solutions to store surplus solar and wind energy cost-effectively and to be able to close supply gaps of up to 100 hours.



For this reason, VoltStorage is developing Long Duration Energy Storage solutions. These are battery storage systems that are specifically developed for longer charging and discharging periods to bridge longer power generation gaps. The Munich-based tech start-up relies on innovative iron-salt storage technology. VoltStorage's iron-salt batteries have significant benefits:

- High efficiency: With an efficiency of 70 %, iron-salt batteries are more efficient than other long duration storage technologies such as thermal energy storage (40 %) or Power-To-Gas-To-Power (35 %).

- High temperature resistance: Iron-salt batteries are exceptionally temperature-resistant and can also be used even in climatically challenging parts of the world.
- High raw material availability: The most abundant raw material worldwide is used in iron-salt batteries thanks to the iron-based storage medium.
- Low costs: Due to the high availability of the main storage medium, iron, the costs per kWh are significantly lower than with other storage solutions.

Energy storage systems ensure a continuous base load during operation

Simulations of a solar and wind park (5.9 MW) show that without any energy storage system, a base load of 500 kW can only be provided in 54% of the operating time. This underlines that the complementarity of sun and wind, which is always assumed, is not sufficient to fully provide even a comparatively low base load. However, if the solar and wind park is combined with an iron-salt

battery from VoltStorage (24 MWh), a base load of 500 kW can be provided in 95% of the operating time for a duration of 48 hours. This puts the combination of solar and wind park and iron-salt battery at a comparable availability level to fossil power plants. VoltStorage is aiming to launch the first pilot projects for the iron-salt battery in 2024/2025.



Make bearings go further: Analyzing leading methods for strengthening wind turbine bearings





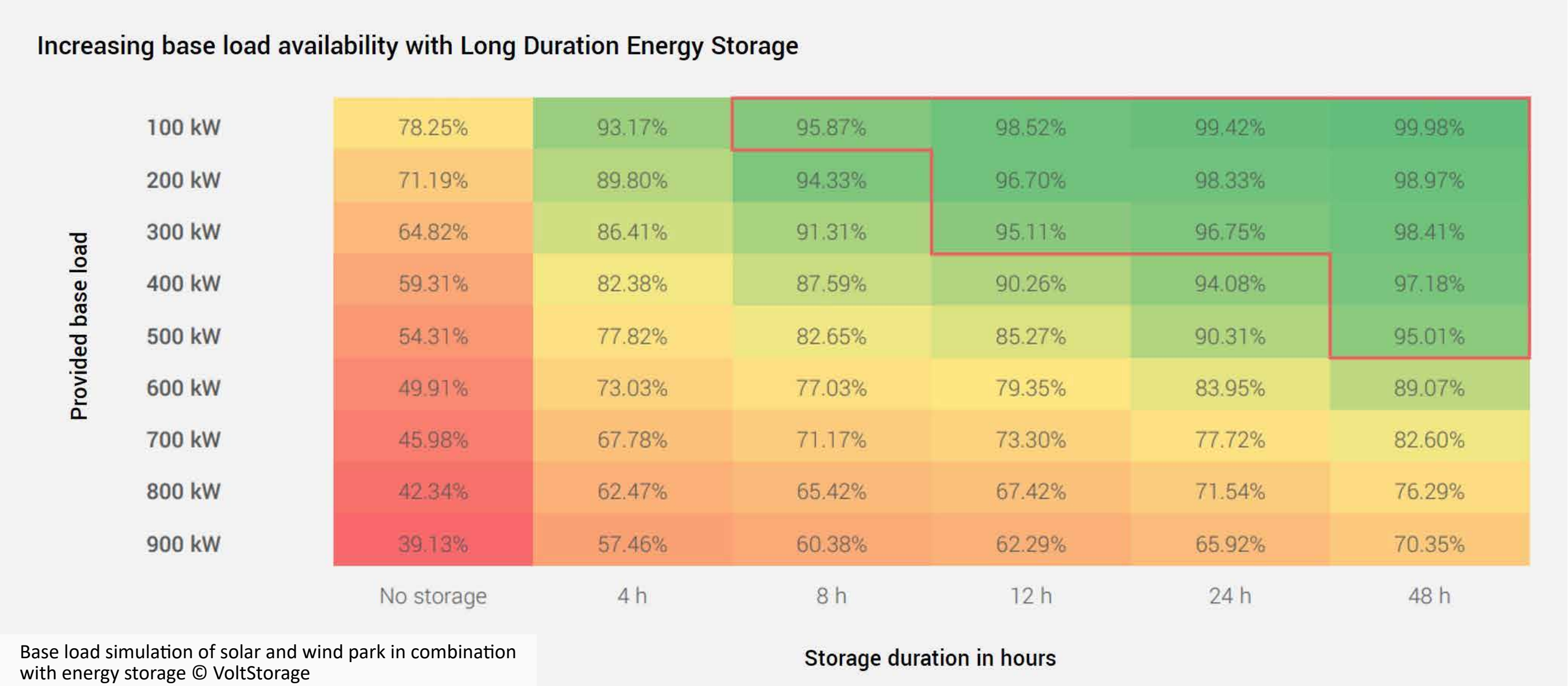
Information on the company

VoltStorage GmbH
Gmunder Straße 37, 80807 München, Germany
➤ Year of foundation: 2016

We offer:
➤ Sustainable battery storage systems for commercial and industrial applications as well as for solar and wind parks

We are looking for:
➤ Cooperation partners for pilot projects

Contact
Michael Peither
CTO & Co-Founder
of VoltStorage
Phone: +49 800 000 4937



Who we are and what we can offer:
The demand for long duration energy storage solutions will increase continuously with the growing expansion of renewable energies. With the iron-salt battery, VoltStorage offers a particularly cost-effective and resource-saving storage solution for solar and wind parks to enable climate-friendly renewable energies for base load operation.



Directory: These companies may help you on different topics

Categories

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➤ Direct marketing

➤ Education and Training

➤ Finance & Law

➤ Operation and Service

➤ Planning and Construction

➤ Recycling

➤ Specified Services

➤ Supplier of electrical and electronic components

➤ Supplier of mechanical components

➤ Supplier of other components

➤ Transport and Logistics

➤ Wind turbine manufacturer

Your contacts to German experts

<div></div> <div><p>DunoAir Windpark Planung GmbH Hawstr. 2a, 54290 Trier, Germany</p><div><div>➤ Planning and Construction</div><div>➤ Operation and Service</div></div></div> <div><div></div><div></div></div>	<div></div> <div><p>ERG Germany GmbH Jungfernstieg 1, 20095 Hamburg, Germany</p><div><div>➤ Operation and Service</div></div></div> <div><div></div><div></div></div>	<div></div> <div><p>Maschinenfabrik Wagner GmbH & Co. KG (Plarad) Birrenbachshöhe 17, 53804 Much, Germany</p><div><div>➤ Operation and Service</div><div>➤ Specified services</div></div></div> <div><div></div><div></div></div>
<div></div> <div><p>EnBW Energie Baden-Württemberg AG Schelmenwasenstr. 15, 70567 Stuttgart, Germany</p><div><div>➤ Planning and Construction</div><div>➤ Operation and Service</div></div></div> <div><div></div><div></div></div>	<div></div> <div><p>FGH Voltastr. 19-21, 68199 Mannheim, Germany</p><div><div>➤ Technical consultants</div><div>➤ Planning</div></div></div> <div><div></div><div></div></div>	<div></div> <div><p>RENOLIT SE Horchheimer Str. 50, 67547 Worms, Germany</p><div><div>➤ Corrosion Protection Film for wind turbine tower</div></div></div> <div><div></div><div></div></div>
<div></div> <div><p>Energiequelle GmbH Hauptstr. 44, 15806 Zossen, Germany</p><div><div>➤ Planning and Construction</div><div>➤ Operation and Service</div></div></div> <div><div></div><div></div></div>	<div></div> <div><p>Goldhofer AG Donaustr. 95, 87700 Memmingen, Germany</p><div><div>➤ Manufacturer for transport solutions for wind power plant components</div></div></div> <div><div></div><div></div></div>	<div></div> <div><p>Schmidbauer GmbH & Co. KG Seeholzenstr. 1, 82166 Gräfelfing/ Munich, Germany</p><div><div>➤ Transport and logistics</div><div>➤ Specified services</div></div></div> <div><div></div><div></div></div>



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SICK Vertriebs-GmbH
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➤ *Sensor solutions*



Winergy
Am Industriepark 2, 46562 Voerde, Germany
➤ *Drivetrain solutions*



TOP seven GmbH & Co. KG
Schiffbauerweg 1, 82319 Starnberg, Germany
➤ *Sensor solutions*
➤ *Technology*



XERVON Wind GmbH
Waldstraße 39, 49808 Lingen, Germany
➤ *Operation and Service*
➤ *Planning and Construction*

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Fall
2023

In the next issue



Visualising the world

See the worldwide wind industry developemnt

Expanding the market

When exporting abroad, German industry meets competitors from overseas

Offshore

Increase efficiency with new bearings

Sometimes we change our plans and find newer, better and more exciting topics. Therefore, the content and the look of the next issue may change a bit than we announce here.

BWE-Business report



The current report about the German wind industry is released! Here you can find the **Who's Who of the German wind industry** and all the important partners who will support you in your projects. [Download the PDF here](#) or browse our [online database](#).

International Events

WEBINAR

Update floating wind turbine technology: Latest advancements and successful projects
27.09.2023



WEBINAR

Make bearings go further: Analyzing leading methods for strengthening wind turbine bearings
05.10.2023



WEBINAR

Offshore Substations: Improved electrical design
25.10.2023





Contact / Imprint

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