Inside

wpd
think energy

How are we treating our environment?

As a marine biologist, Prof. Dr. Antje Boetius experiences how sensitively our Earth is reacting to the pollution of recent times. In the interview, she explains what she thinks the future will be like and what role wind energy will play.

Prof. Dr. Antje Boetius (52) is a Director of the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) and has already won multiple awards – most recently the German Environmental Award 2018.

What was your most beautiful experience during your expeditions?

Diving in the research submarine is always an absolute highlight, the moment when you dip below the diaphanous blanket, it turns dark and the deep-sea life sparkles, then I'm not just happy as a researcher but I also feel a very special love for our strange planet Earth.

Do you have anything in the way of a life dictum? What is it?

"Paths are made by walking." Franz Kafka

As a deep-sea researcher, you study the sensitivity of eco systems. How are we treating our environment as a global community?

As a marine and polar researcher, I travel to extreme regions of Earth where no people live. It's particularly conspicuous, therefore, when traces of man's effect on the world become visible – whether through climate change causing the sea ice to melt and the oxygen concentrations in the sea to decrease, rising CO_2 emissions which are acidifying the oceans or the surge in plastic waste which can be found in the deepest ocean – or even at the North Pole. These are all warning signs that we have to change course so as not to leave a ruined environment to ourselves and coming generations.

Where can we improve so as not to do further damage to the environment? What are we already doing right?

After we unfortunately failed to meet our climate targets for the first time in Germany, things have started to move, and there will be considerable momentum behind the phase-out of coal, not least as a result of the Coal Commission. Alternative energies are quickly becoming cheaper – that's a help but it's still too slow. Of course, we also need a considerable element of management from government and business. I wish there was a much stronger innovative spirit, courage to experiment and better support for the expansion of renewable energies.

What contribution can wind energy make?

The sun and the wind are the great natural sources of energy. We have already seen how quickly wind energy can make a significant contribution towards transforming the energy system – but it's not enough as the opportunities offered by wind as a source of energy have not yet been systematically incorporated and exploited. The challenge is still to replace three quarters of the world's current energy requirements with carbon neutral technology. It's clear that a modern, carbon neutral, integrated energy system has to be conceived for all sectors: industry, households, transport, buildings – and that it's often a question of finding local and regional solutions which of course look different for mega cities than for the countryside. Wind can make a substantial contribution, that much is clear. I was impressed with a study recently showing that offshore wind energy can do a lot more. Correctly realised and conceived for the long term, wind farms at sea may also be able to help with conservation, that needs to be researched.

The astronaut Alexander Gerst has apologised to his grandchildren in a video sent from the space station Cupola for the condition in which we will have left the planet to them. What would you say to your grandchildren?

Well, here's what I'd like to be able to tell them: Back then when it was five to midnight, people trusted scientific insights and the new technology and drew the right conclusions within a short space of time. It was a very tough time because there were many new rules and people had to get used to environmental taxes, the transformation of the energy system and the infrastructure as well as the redistribution of funds. But now that CO_2 emissions are falling at long last, the coral reefs can recover and thanks to a united effort, the destruction of the forests around the world has also been stopped. Polar bears, great apes, rhinoceroses and many other creatures will have a chance if you continue to do the right thing.

PPA – new momentum for proven finance model

Why are PPAs hyped so much in Germany? When do they actually make sense, what different forms do they take and how does wpd deal with the subject?

There's scarcely a subject as hotly debated in the German energy industry at present as that of Power Purchase Agreements (PPAs). Studies are forecasting a rapid rise in PPA contracts in Europe. According to the Energy Agency enervis, by 2030, 25 percent and by 2040 as much as 50 percent of all wind and solar farms built will use PPAs. The reasons are as follows:

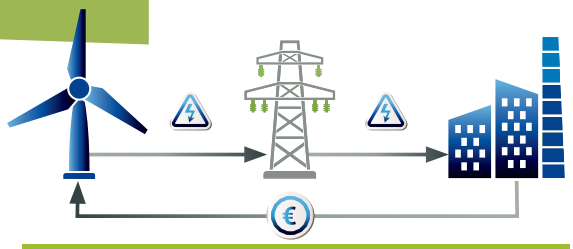
1. For wind turbines over 20 years old which will not receive any further support under the Renewable Energy law after 2021, PPAs represent one of the few opportunities for further income.
2. More and more companies are subscribing to sustainability and increasingly see renewables as an important building block.
3. Due to the conversion of the wind energy market to the tendering model, producers see a way to gain financial planning security.
4. Steadily rising electricity prices and increasing price volatility are causing companies to look for ways of becoming less dependent on and susceptible to their means of procurement employed to date.

"There are different ways of structuring PPAs for the applications specified", according to Ben Bisenius and Wilko Smidt, responsible for PPAs at wpd. "It is likely that the number of short-term contracts which might cushion the removal of support for old turbines under the Renewable Energy law, will soon climb rapidly in Germany." As far as corporate PPAs with a longer term are concerned, it will doubtless be some time before they become a fixed element in the planning of new wind farms", according to Smidt. He makes the point that until now, the generating costs for wind energy have been too high while electricity prices on the traditional procurement markets are still sufficiently low still from a corporate perspective, to put it simply. However, the first signs of rising prices were already observable in the markets last year, he added. "At present, however, PPAs are certainly interesting if the supplier and buyer of the electricity are in close proximity to each other with the result that charges can be reduced."

In Germany, wpd has therefore only implemented one wind farm with a PPA with a major car manufacturer. In other countries, on the other hand, the concept has long since proved itself. "The rule in many European markets in which we operate is as follows: no access to the market without a PPA. In some cases, they are a precondition for the construction of new wind farms and often the main source of revenue for the operators", says Bisenius.

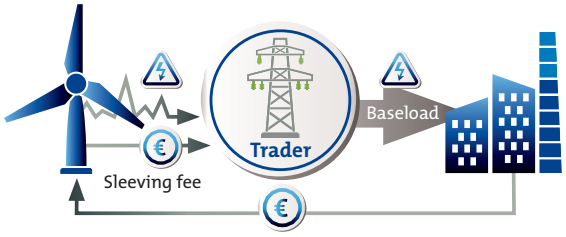
wpd signed its first Power Purchase Agreement for a Belgian wind farm in 2006. In 2018, wpd concluded a PPA with the technology group Google, among others. From 2020, wpd's Kuuronkallio wind farm in Finland will supply Google's Finnish data centre with over 200 gigawatt hours of power per year. (For further info on the wpd Kuuronkallio wind farm, see page 4)

The infographic shows three of the most popular forms of PPA.



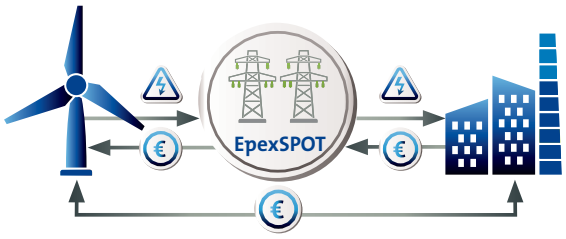
Off-site PPA with as-produced supply

Buyer and seller agree on the price, quantity and period of supply. The seller supplies the electricity to the buyer via the grid.



Off-site PPA with baseload supply

Buyer and seller agree a price and quantity. The seller supplies fluctuating amounts to a trader and pays a fee for secure supply to the buyer.



Financial PPA

Buyer and seller agree a quantity, period and price. Electricity is supplied and purchased via spot markets. Buyer and seller compensate each other on the basis of the agreed prices.

Foundations for wpd's Kuuronkallio project in Finland

Work on foundations in the Kuuronkallio wind farm

We are making progress on our Kuuronkallio project in Finland. We were able to report financial close shortly before Christmas 2018. All the power from the 60 megawatt wind farm will be supplied to Google's Finnish data centre through a direct PPA. (See also page 3.)

We completed six of 14 foundations before the winter break. As scheduled, there was then a break in the construction work due to the low temperatures (-28°C at the end of January). Since March, we have now been working on the remaining foundations. This means the construction is well on schedule. Before work starts on installing the turbines in August 2019 (Vestas V-150 with 4.2 megawatts and a total height of 230 metres), most of the infrastructure of the wind farm is to be completed in order to guarantee smooth commissioning by the end of the year.

wpd: contract for in-house development in Saxony-Anhalt

Jeetze I wind farm

Jeetze II wind farm

Number of turbines: 6

Type: Vestas V-136

Rated power: 21.6 MW

Location: Saxony-Anhalt

In December 2017, wpd launched its application for approval of its 21.6 megawatt Jeetze II project. Almost exactly one year later, we were able to pick up the permit for the six Vestas V-136 from the district administration of the Altmark district of Salzwedel.

This means an important milestone for the Jeetze II wind farm has been reached on time as approval was the mandatory precondition for participating in the 1st call-for-tenders round under Renewable Energy law on 1 February 2019. As we also won a contract in the tender, preparations can now be made for construction.

One unique feature of the project is constant refinement. wpd has been operating in the Altmark region for 20 years and it knows the relevant players. Collaboration with the operators of four old turbines is facilitating the dismantling of the old turbines, creating space for new ones. Repowering has also begun at this location.

Implementation challenges

Construction of the Schlüsselburg wind farm which wpd is developing together with Thiele Consulting GmbH & Co. KG, has been going at full tilt since March. Due to its location directly on the State border between North-Rhine Westphalia and Lower Saxony, the planners had to take account of a wide variety of building regulations. Furthermore, some of the turbines are located in the flood plain of the River Weser, and for that reason, the foundations are being raised by two metres. It will also be necessary to pass below the Weser in order to connect the wind farm to the grid.

To increase acceptance at a local level, residents will be offered a wind savings bond. This is a fixed-interest investment opportunity with a fixed term and above-average rates.

Schlüsselburg wind farm

Number of turbines: 4

Type: Enercon E-115 E2

Rated power: 12.8 MW

Location: Lower Saxony / North-Rhine Westphalia

wpd: facts, data, figures

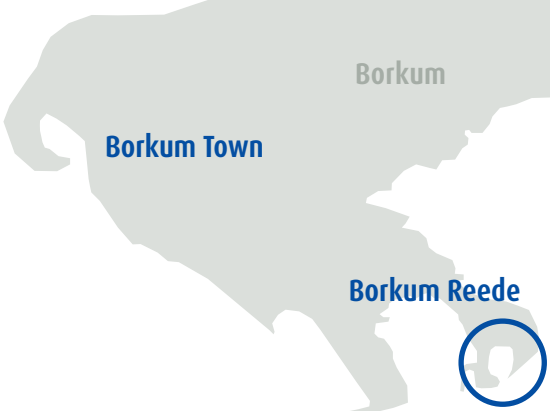
The wpd group also posted growth last year. We now have 2,200 people working for us in 21 countries. The company's total installed power now stands at 4,450 megawatts and further are in the offing as the pipeline for onshore projects is 8,725 and for offshore projects, 7,250 megawatts. The company's own portfolio this year stands at 1,525 megawatts.

wpd at AWEA WINDPOWER in Houston, Texas

AWEA WINDPOWER
wpd stand: 4221

From 20 to 23 May 2019, Houston will be transformed into a wind energy fortress. Wind industry participants from a total of 50 countries will be at the AWEA WINDPOWER Conference & Exhibition. wpd will be there too. You can find us at stand 4221 together with Deutsche Windtechnik.

Development of offshore quarter in Borkum has positive impact on neighbouring Wadden Sea states



View of the new roadstead (Visualisation)

Aerial photo of Borkum Reede

No less than ten offshore wind farms with 551 turbines are now to be found in Germany's North Sea in direct proximity to Borkum, producing climate-friendly electricity. The job of constructing and maintaining these turbines is considered tough – in some cases, engineers and technicians spend two weeks at a time on the high seas, constantly exposed to wind and weather. Not infrequently, they commute from remote makeshift accommodation or embark on a long journey to work every day from home.

To respond to this situation, apartments are currently under construction specifically designed to meet the needs of service workers for offshore wind farms. Borkum Hafen Immobilien GmbH, a sister company to wpd AG, has submitted a corresponding building application for the first phase of 115 residential units. Small apartments are to be realised by the spring of 2020, offering optimum conditions for periodic stays. Thought is currently also being given to connections from Reede to the town of Borkum at a distance of eight kilometres. Leisure activities are also being catered for: communal areas, a barbecue site, fitness rooms, a kiosk and even a cinema which can be used by all island residents.

"We don't just want to build quarter for offshore employees but a facility which will enrich the lives of everyone living on Borkum", says Kai-Uwe Thase, authorised signatory of Borkum Hafen Immobilien GmbH. "That is why the plans are incorporated into the Borkum 2030 mission statement and were accompanied by an island workshop." The quarter is being built in the so-called Reede area, part of the island of Borkum characterised by its former use as a navy base. "Since the navy gave up the base, the challenge has been to find a new use for this part of the island. We are convinced that our plans which are being developed together with Nordseeheilbad Borkum (health spa), will provide some impetus to the revitalisation of Reede and the entire island", Thase explains.

Besides the development of the community, the focus is also on a further aspect: the quarter will be ground breaking in energy terms. In developing wind farms, wpd works daily on CO_2 neutrality. This will also be reflected in the offshore quarter on Borkum. "The aim is to bring the three energy markets, electricity, heat and transport, together. The foundation is electricity from wind turbines. We are in the process of working out an e-car-sharing and heat pump concept which uses North Sea water and is based on the fluctuating infeed from wind energy", states Kai-Uwe Thase. The project is therefore sending a signal to the entire region. "Our neighbouring Wadden Sea states are already looking hard at the energy concept as everyone shares the desire to make the valuable World Heritage Site of the Wadden Sea free of emissions."

Quo Vadis operational management?

The much cited pressure on costs is rising in the wind energy sector. Factors which are initially reflected in project planning, purchasing, etc. on the basis of the call-for-tenders, are increasingly impacting the operating side of the business. This means lower operating costs, while in return operators' requirements are becoming more stringent.

Most operators look first at the running costs in selecting their operations manager. The calculation is simple: lower operating expenses equals higher profit. "Many operators desire slimmed-down operational management. The discrepancy between these ideas and the demands of legally secure operation of a wind farm, is enormous, however", explains Till Schorer, Director Sales at wpd windmanager GmbH & Co. KG.

Operators' liability

Aspects pertaining to liability laws which many operators are not aware of – e.g. the assumption of system responsibility – constitute a central element. Following commissioning and connection to the power distribution grid, operators and managing directors of an operating company bear full responsibility for the wind farm. Specifically, this means that they are accountable in the event of accidents as they are personally liable", Schorer explains.

Legal certainty also plays a role in the area of QHSE (Quality, Health, Safety and Environment). The same applies when it comes to meeting all the necessary inspections – regardless of whether they constitute statutory, contractual or insurance-related rules. "Will all these inspections be taken into account in the event of reduced operational management? Operators should protect themselves here", states Schorer.

Cost savings vs. loss of income

Monitoring wind farms is also a significant cost factor. "Many operating managers offer cut-down alternatives", Schorer continues. "For example, a control room only manned from Monday to Friday from 9 am to 5 pm." However, if an error occurs on a turbine at 6 pm, that turbine or sometimes the entire wind farm will be at a standstill until the following morning – at the weekend from Friday until Monday even. If the farm is operating at full capacity, this quickly leads to loss of income which exceeds the previous cost savings. "A 24/7 control room which monitors the wind farm round the clock, has a response time of a few minutes", Schorer explains. "That pays off for the operator."

In addition, operators should make sure that an operations manager can cover rising demands. "This year, for example, operations management will be exercised by Technical Directive 10 and the associated data storage. The same applies to the subject of Critical Infrastructures which among other things, specifies the establishment of an information security management system", Schorer emphasises. "But how does the operations manager in charge deal with such subjects? Particularly if they cannot or don't want to meet all current requirements for reasons of cost?"

Farsightedness leads to the greatest cost savings here. Because, as the saying in operations management goes: less is by no means more.

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