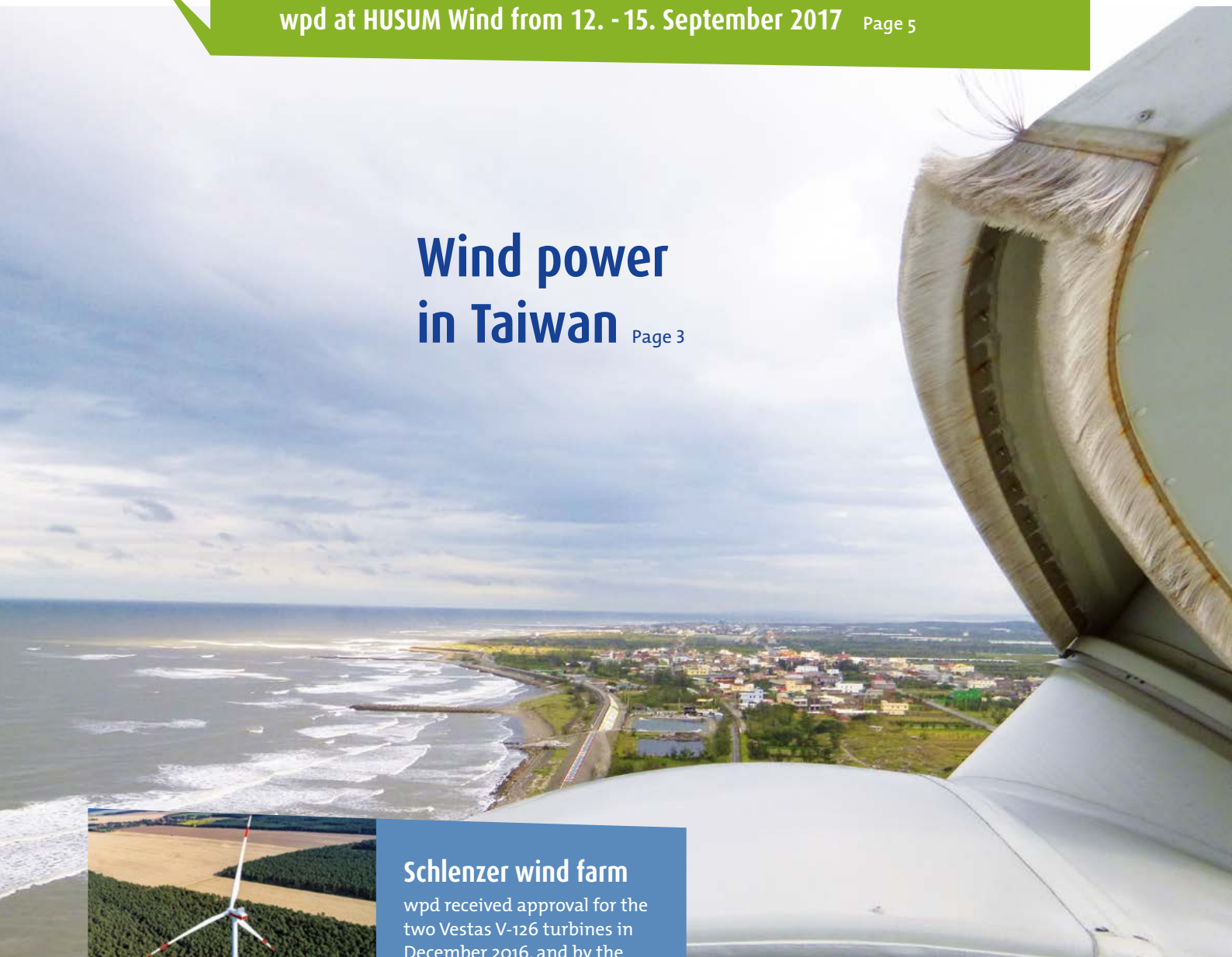


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wpd received approval for the two Vestas V-126 turbines in December 2016, and by the beginning of July, they had already produced their first kilowatt hour. Page 4



The importance of planning connection to the grid

Interview with Jochen Weidenhausen, wpd Project Manager in the Electrical Engineering Division



Jochen Weidenhausen,
Diplom-Ingenieur (FH)

What does the work of planning and implementing grid connection entail at wpd?

The job comprises two main elements: on the one hand, the electrical planning which consists of submitting grid connection requests, negotiating the grid connection point with the grid operator, planning the cable routes, substations, compensation systems or transformer substations. On the other hand, the construction of the electrical infrastructure also forms part of our responsibilities. This includes drawing up the documentation for the invitation to tender, awarding the contract and supervising the construction work all the way to commissioning the entire production system.

How is the department organised?

I was the first electrical engineer to start at wpd in the summer of 1999. Ten years later, international projects and our first offshore project, Baltic I, meant that the responsibilities had become so extensive that I was joined by further colleagues. wpd now has numerous electrical planners for the areas of domestic and international onshore and offshore projects.

The electrical planning and construction management for German projects comprises five employees – four electrical engineers as well as a team assistant who work in Potsdam. All these colleagues handle the entire spectrum of planning and construction management as a total package. We often involve engineering offices for planning long cable routes. Our lawyers support us in clarifying legal questions in the contracts. The landscape designers support us in questions surrounding the protection of species and nature conservation.

Designed substations
Left: in Jübar
Right: in Lehmke



What was your most exciting project?

For example, concluding a framework contract for the delivery of five transformer substations. Every transformer substation had to be specially configured for different grid operators, modified to fit the localities and five approval procedures had to be completed at the same time. But every project is interesting at the implementation stage. That is why for me the most beautiful and exciting moment every time is when a wind farm is connected to the grid.

What are the challenges?

We have to regularly adapt the power station characteristics of our farms to the legal and technical specifications. One example: the replacement of the TransmissionCode 2007 by TAB Hochspannung 4120 (Technical Connection Conditions for High Voltage Systems) as from 1 July 2017 for the connections of our transformer substations. Generally, however, every project throws up challenges as things do not always go to plan.

What are the particular strengths of wpd's grid connection planning?

We are the immediate point of contact for our colleagues in sales, technical and commercial project management and project procurement. On the basis of the existing grid infrastructure in the planning region and our experience stretching back many years, we offer an initial overview of grid connection points, cable routes, the need to set up a transfer station or our own transformer substation as well as a budget estimate. Short lines of communication represent one special feature. wpd maintains a culture of friendly cooperation which makes many things faster and simpler.

A project can only be successful if all the cogs in the wheel intermesh. The work of the Potsdam branch in turn depends on good teamwork with wpd's own specialists in construction planning, lawyers or the implementation managers. In this way, projects can be quickly and professionally implemented. That is the hallmark of our work and of wpd.



Taiwan – obstacles are no barriers

Wind turbine in the Houlong wind farm

The island of Taiwan, officially known as the Republic of China, lies in the western Pacific off the mainland of China, and it is unusual in many respects. It is no bigger than Baden-Württemberg but has over 23 million inhabitants in this small patch of land. The majority of the people are also concentrated in major cities such as the capital Taipei as two thirds of the island consists of mountain ranges. Earthquakes are as widespread as the typhoons which regularly plague Taiwan. But the inhabitants come to terms with these circumstances impressively and prove in many areas that obstacles are no barriers – as is also the case in the field of wind energy.

Numerous wind farms have been set up on land over the course of the years. The installed onshore power by 2017 amounted to around 680 MW. The turbines have been modified to take account of the special weather conditions on the island. For example, they have to withstand the extreme wind speeds of the typhoons.

Onshore wind power projects in Taiwan frequently consist of just a few turbines. Wind farms are not approved in their entirety. Each individual location requires a separate inspection. Most of the suitable areas are in state ownership.

wpd has played a leading role in helping to shape the expansion of wind power on land in the last few years, and it will continue to work on the Taiwanese energy turnaround in the future. Only in April, wpd signed a memorandum of understanding in Yunlin County, thereby sealing close collaboration in the future in the expansion of renewable energy. Together with collaboration partner InfraVest, over 376 MW have been installed onshore since 2005, mainly on the north-west coast. In January 2016, wpd took over InfraVest's planning company in Taipei with its existing projects and more than 70 employees. Since May 2017, the Taiwanese company has been trading under the name wpd Taiwan Energy Co. Ltd. The collaboration to date has fostered such trust that everyone is sure that the next challenge will also be successfully met: offshore!

Wind turbines at sea represent uncharted waters for Taiwan. The government has earmarked areas with a water depth of up to 50 metres to the west of the island. The aim is in future to be less dependent on energy imports and to reduce CO₂ emissions. By 2025, Taiwan wants to switch off its total of three nuclear power stations, and by then to have set up offshore wind turbines with a rated output of 3 GW. The country commissioned its first two offshore turbines at the end of April this year in a pilot project.

Employees of wpd Taiwan Energy



First kilowatt hour from the Schlenzer wind farm

Schlenzer

Number of turbines: 2

Type: Vestas V-126

Rated power: 6.6 MW

Location: Brandenburg

Commissioned: 2017

wpd has recently commissioned a 6.6 MW wind farm in Schlenzer in Brandenburg. wpd received approval for the two Vestas V-126 turbines with a hub height of 137 metres in December 2016, and by the beginning of July, they had already produced their first kilowatt hour. The green power is fed into the electricity grid with the aid of the already existing transformer substation Petkus of which wpd has shared ownership.

The land for the project is secured on the basis of the so-called site pooling model which is founded on the basic idea of spreading the lease payments across the entire area of the wind farm in order to create a balance of interests between all participating land-owners.

Approval for a third turbine in the Schlenzer forest project is still pending.



Additional 57 MW in France



Turbines in the wind farm at Joux-la-Ville commissioned in 2016.

After the recent commissioning of the major project at Joux-la-Ville (22 x Enercon E-82), wpd is currently working on six further wind farms in different regions in France. This means that wpd will probably implement a total output of 57 MW in France in 2017.

Delays in establishing external grid connections occasioned by the grid operator and telecoms supplier represented challenges in the project. Particular attention had to be paid in the planning process to diverse technical issues that had to be overcome such as constructing in a wine-growing area, building foundations in a drinking water protection area, moving the sewage pipes of a sugar factory, using protective fences for frogs and deterrence measures for ground-nesting birds.

Inaugurations in Lower Saxony and Saxony-Anhalt

A total of 300 residents and project participants celebrated the inauguration of the seven turbines that form the Hambergen wind farm in Lower Saxony together with the wpd team in spring. wpd organised trips through the farm in covered wagons, tours of the turbines, live music and events for the children. The wind farm has been on the grid since September 2015 and it generates up to 56.7 million kilowatt hours of electricity per year.



The next inauguration will come round on 9 September as the Cheinitz-Zethlingen wind farm in Saxony-Anhalt was commissioned in the third quarter of 2016. This project, developed by wpd itself, enjoys a high level of local acceptance. One of the six GE 2.75-120 turbines with a hub height of 139 metres is operated by several land-owners as a citizens' turbine.

A small thank-you was the reward for taking part in an event where children from the municipality of Hambergen were able to give the turbines names.

wpd at HUSUM Wind again this year



Every year for more than 25 years, Husum becomes the centre of the German-speaking wind power sector for a few days in autumn. This year, the HUSUM Wind trade fair will be held from 12 to 15 September. wpd has been taking part since 2000, and first and foremost it appreciates the family atmosphere and authentic environment.

Good participation and a great atmosphere at the wpd Cup

20 teams and one round leather ball: this combination provided a lot of fun at this year's wpd Cup on Friday, 16 June. Project developers, manufacturers, lawyers and insurance brokers swapped their suits for a football strip and displayed fair-minded ambition on the football pitch. The good atmosphere carried over into the ensuing barbecue, and those attending took the opportunity to get to know each other better outside the business environment.



Minsener Oog

Improved habitat for coastal birds by way of compensation for Nordergründe nearshore wind farm



Minsener Oog in Lower Saxony's Wadden Sea

The East Frisian island of Minsener Oog is a mere 3.7 square kilometres in size but nevertheless fulfils an important function: at the beginning of the 20th century, the German navy built breakwaters and dams on the sandbanks between Mellum and Wangerooge in order to counteract the increasing silting-up of the shipping channel of the Jade river. To this day, Minsener Oog which was thus created, catches the sand drifting from west to east, thereby preserving the channel to Wilhelmshaven. The island is uninhabited but animals and plants have long since discovered this pristine location for themselves. First and foremost, ground-nesting birds such as terns, seagulls, waders and also the ground-nesting peregrine falcon have made it their home.

However, the ground-nesting birds are plagued by washed-up rubbish and tall dune grasses. wpd is therefore currently in the process of upgrading the island for its animal inhabitants. The work is part of a 25-year agreement between the federal government, WWF, OWP Nordergründe GmbH and the State of Lower Saxony which was signed in connection with wpd's Nordergründe nearshore project. „Upgrading the island is just one of the initial measures agreed for the construction“, explains Freerk Nanninga who

is responsible for the work on wpd's side. Further examples include monitoring the breeding success of coastal birds, appropriate maintenance of the land on Minsener Oog as well as a project on bird migration at the Nordergründe facility.

Six sub-initiatives are planned on Minsener Oog: mowing the so-called clover meadow; optimising the lower moor areas by cutting back the trees and bushes; collecting rubbish on the north beach; removing atypical trees such as poplars; removing single trees which attract natural enemies of the birds (birds of prey) and upgrading the breeding grounds in the south dunes. „All the measures will serve to improve the quality of life and breeding situation for the ground-nesting coastal birds“, says Nanninga.

Preparations and implementation required a lot of time and organisation. „The agreement on the measures to be implemented was signed at the beginning of 2011. We have been planning since then. Numerous special reports were required, for example an erosion report, a biotope species map and an assessment of the danger from ordnance. All that and coordinating all the many different parties involved was very complicated and time-consuming.“

The first steps have recently been implemented. Construction of the 111 MW Nordergründe wind farm is due to be completed in the autumn with the installation of the topside.

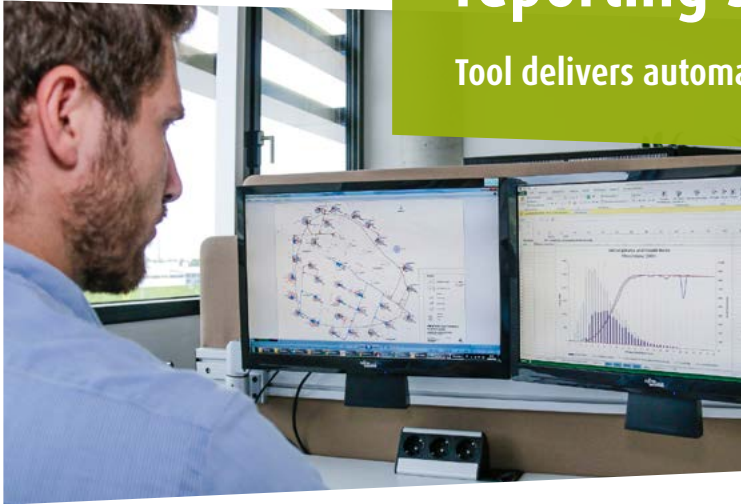
Left: Sandwich Terns

Right: Well disguised eggs of the Common Ringed Plover on coquina shell



wpd windmanager develops new reporting system

Tool delivers automatic evaluations of site performance



With the new tool, employees can automatically evaluate detailed analyses of the performance characteristics.

The demands made on the technical operation of a wind farm have increased with the new Renewable Energy Act (EEG) 2017. The scope of reporting for a turbine is growing accordingly and far exceeds the mere registration and monitoring of individual key indicators. Operation managers are now confronted with new demands, for example, in the area of data storage, determining the quality of a facility or the automatic registration of availability. To enable it to meet these requirements in the future, wpd windmanager GmbH & Co. KG has developed a new reporting tool which automatically delivers detailed evaluations of the performance of individual turbines.

Previously it was necessary to make exhaustive searches of yield data, downtimes and location characteristics in order to arrive at a comprehensive analysis of a wind farm's performance. For example, this included monitoring and analysing power availability, standstill times, performance indicators or yield data. „In the past, such evaluations were carried out individually as part of proprietary analyses and made available to the operators on a case-by-case basis“, emphasises Peter Spengemann, Technical Management & Repowering at wpd windmanager. „That was very complicated and time-consuming.“

wpd windmanager has now designed a new, automated evaluation tool. „On the basis of no more than the 10-minute data of wind turbines, we can automatically record the main indicators of

the turbine's operation, evaluate them and present them with reference to the location“, Spengemann explains. As the particular types and manufacturers of wind turbines differ greatly at times in the format of the SCADA data from the turbine control unit, the new reporting tool will be successively extended to all existing turbines in wpd windmanager's portfolio.

„With the new tool, we can now generate a standard report to analyse the performance of a wind farm and individual turbines at the location at the touch of a button“, Spengemann states. The evaluations focus on detailed analyses of the performance characteristics, comparisons of the yields of individual turbines in the farm and automatic evaluations of their availability from a technical and power perspective.

wpd windmanager now compiles the results of the analysis separately in a clear report. „The evaluations contained in it far exceed the previous scope of technical controlling in terms of their content. We can easily integrate relevant variables, particularly with regard to definitions of availability in accordance with the current Renewable Energy Act 2017, and evaluate them too. In this way, we can already lay the foundations for future requirements“, says Spengemann.

After the end of the test phase, wpd windmanager will also provide these additional evaluations to operators and investors on request.

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