



Inside

Solar at wpd: on secure foundations Page 5

Solutions-driven: Building infrastructure for wind farms Page 2



Sold directly
wpd impresses with its extensive expertise in PPAs in Northern Europe
Page 3

The challenge to build infrastructure: Meeting tasks with solutions

Location surveys

Route surveys

Feasibility studies

Agreements with communities, authorities

Agreements with owners, leaseholders and land managers

Expert reports

Reviewing nature conservation concerns

Building the infrastructure to realise wind farms means more than paving access roads and working areas or laying cables. In fact, building the infrastructure poses a whole series of complex challenges for a wind energy company such as wpd.

These challenges require disruptions to the status quo. Unfavourable infrastructure conditions such as topographical features, narrow roads, tight bends, existing buildings or tree-lined roads represent major challenges in some cases which frequently make the use of special technology unavoidable. The load on existing roads or bridge structures may raise obstacles which have to be overcome with implications for the finance and the schedule.

Every major structural project is also associated with various kinds of emissions, not least as a result of construction site traffic. For example, the delivery of a wind turbine of steel tube design can alone require up to 13 heavy load journeys. And it's a significantly larger number for hybrid tower alternatives. Added to these are many further vehicle movements required for earthworks and the foundations. Minimisation is the watchword here.

Even the planning phase leads to a high workload in the form of extensive site surveys, route tests, feasibility studies, agreements with the local communities affected, owners and authorities, studies made by experts or dialogue with system manufacturers.

Thanks to good networking, know-how and experience, we are ideally equipped to deal with these challenges at wpd.

Things also become time-consuming when "areas of archaeological interest" are discovered during earthworks. In that case, the responsible Office for the Preservation of Historic Buildings calls up archaeologists who conduct a precise exploration of the construction site.

In the village of Lübberstedt, an Urnfield burial site and the outlines of houses from the Bronze Age were discovered when working on an access road. In such cases, it is essential to work closely with the authorities and local archaeologists in order to limit the additional costs and delay.

This is a problem that really rears its ugly head at the mention of "ordnance explorations". As the developer, in this case the wind farm company, has to guarantee that the land is free of ordnance, he is obligated to commission explorations to establish whether the site is contaminated before construction work begins. During the construction of the Redlin wind farm, the chassis of a World War II bomber was found while exploring 438 m³ of soil, and the find was duly handed over to the Bundeswehr's Luftwaffe Museum of Military History.

The ability to find a solution to every challenge turns out to be a valuable asset in the construction phase of a project as René Ittryk, Head of the Construction Department at wpd Infrastruktur GmbH, emphasises: "So far there hasn't been a wind farm that has failed to be built due to the difficulty of the infrastructure problems, and we owe that to the many, competent and creative specialist teams within wpd."



The Bladelifter can even transport rotor blades round tight bends



Success story to serve as a model: wpd establishes itself as a partner for PPAs

As early as 2006, wpd concluded a power purchase contract with sporting goods manufacturer NIKE for the construction of the Laakdal wind farm (6 wind turbines, overall output of 9 MW) on its site in Belgium: an important first step for the company in the field of marketing electricity. What began for wpd in Flanders, has been gaining in significance in the European market over the last few years.

Power Purchase Agreements – PPAs for short – are all the rage in the financing of wind farms. These long-term power supply contracts, often running for 10 to 20 years and concluded directly with consumers in private industry, secure such companies from price fluctuations in respect of the agreed volume, while guaranteeing the producer steady income.

In Europe, the move away from fixed feed-in tariffs, pressure from green energy quotas for companies and a fall in the cost of turbines have made this form of marketing increasingly attractive. Experts are firmly expecting this development to be taken up in Germany, too, where the bidding process created by the amendment of the Renewable Energies law (EEG) in 2016/17 has now exerted downward pressure on the prices for wind energy remuneration. A market test of PPAs will continue to run in Germany until the end of 2020, but the price leeway defined in law is not currently providing sufficient market incentive.

The focus thus continues to be on the energy markets in European countries outside Germany where wpd has already acquired extensive expertise in this type of marketing. Our experience with PPAs steadily accumulated since 2006 is reflected particularly in Finland and Sweden where wpd is supplying large companies such as Google, UPM and further well-known enterprises with energy from its own wind farms.



*Kuuronkallio wind farm
in the municipality
of Kannus*

The PPA recently signed with UPM, one of the world's leading companies in the manufacture of paper, guarantees that most of the production of green energy from wpd's Finnish wind farm Karhunnevan Kangas with 32 turbines each with an output of 6 MW which is due to go into operation in 2022, will be taken for the duration of the contract. Staying in Finland, all 14 turbines (4.2 MW each) in the Kuuronkallio project have been producing electricity since the beginning of 2020. The wind farm situated in the municipality of Kannus will supply the totality of the electricity it generates to the technology company Google which operates a large data centre near Helsinki. Projects which are ideal advertisements for wpd's project development and upcoming projects to be realised in Northern Europe.

"wpd was selected because it had the most comprehensive offering in the PPA negotiations and its references were impressive", explained Petri Hyyryläinen, Head of the Energy Finland and Energy Hedging Departments at UPM.

wpd has so far been able to realise and sell 200 MW of green production capacity in Northern Europe. A further 71 MW are already under construction. In Sweden and Finland, the company has a pipeline in each country of around 1,000 MW and is in talks with potential partners who wish to use the benefits of a PPA and make a contribution to the energy turnaround.

Schlüsselburg wind farm producing green electricity

The Schlüsselburg wind farm has been delivering electricity for more than 10,000 three-person households since the spring of 2020. This wind farm situated near Schlüsselburg in NRW comprises four turbines of type Enercon E-115 E2 with an output of 3.2 MW each and a hub height of 135 metres. The official inauguration of the wind farm developed by wpd together with Thiele Consulting is currently to be celebrated on 16 August.

Construction of the wind farm was not short of challenges: For example, as the local mains was unable to absorb the volume of electricity generated, a horizontal duct had to be drilled through the rocky ground below the nearby river Weser to allow a 4.5 km cable to be laid to the Leese transformer substation. From there, green electricity is now being fed into the grid.



Schlüsselburg wind farm

Topping out ceremony for Borkum Harbour residential quarter



An important step in a flagship project of the German offshore wind sector was accomplished in Borkum harbour on 2 April. Although the planned celebrations had to be dropped due to the Corona problem, it was still the topping out day for the first 115 residential units in the new offshore residential quarter on the site of the former marine harbour. From here, service crews will in future be able to set out for

the currently ten offshore wind farms in the North Sea with over 550 turbines by taking a few short steps from the apartment door to board one of the service ships. The new residential quarter impresses on account of the carbon-free living that it offers, breaking new ground in terms of energy consumption and located in the direct vicinity of the harbour with a correspondingly short walk to work for its residents.

A hail of awards for wpd projects

The successful achievement of project finance is reflected in a series of awards for wpd. On 5 February, one of the coveted awards from the magazine Project Finance International, which are considered the “Oscars of project finance”, was bestowed on wpd in London for its Yunlin project. Together with awards from the magazines FinanceAsia, Global Trade Review and The Asset, this means that the successful work of the wpd team in Taiwan has now attracted four prestigious awards.

The wpd invest team was also honoured by the Infrastructure Journal. On the occasion of the “IJ Investor Awards 2019” at the end of last year in London, the team won a prize for its “Veja Mate offshore project” in the category “Best Renewables Acquisition”. wpd invest was part of a consortium which took over a total of approx. 80% of the shares in the second largest German offshore wind farm from the previous owners.



wpd solar in France: A renewable energy division comes of age

In the founding years of wpd, the subject of solar energy was part of its commitment to renewable energy. Initially, however, the company focused on creating important basic structures in the field of wind energy. For the last three years, it has been devoting more time again to the potential of solar energy. Besides the dedication of a growing number of employees and teams, important structures, strategic alignment and financial strength are required to open up this market and establish a presence, and these are areas where wpd as an experienced, internationally established developer and operator can boast considerable skill. Besides the USA, Taiwan, Germany, Italy and Greece, France has become one of the most important markets for solar for wpd.

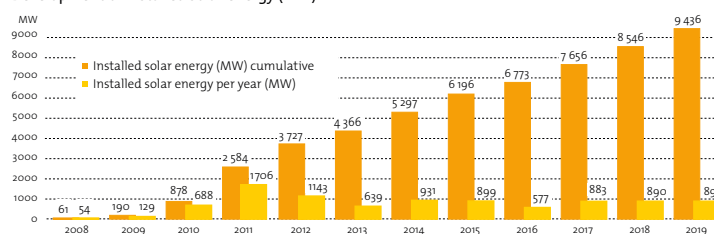
Developments in France's energy market reflect the growing emancipation of this division within wpd's portfolio. It's easy to see here how important existing structures can be for expanding the company's portfolio.

At wpd France's central location in Paris, wpd offshore and wpd solar share the office with the result that from the very outset, it was possible to benefit from synergy effects. For example, wpd beefed up its existing French offices (Dijon, Paris, Lyon) in terms of staff but also deployed project managers in strategically important locations for the development of its solar business (Toulouse, Bordeaux, Tours) which are set to become new offices in the short to medium term. In view of this balanced geographical distribution, the team under Pierre Peysson can now move ahead with growing the solar business in nearly every corner of France.

In this way, a project pipeline for solar farms has been created in suitable open spaces, ideally close to grid connection points. In France, too, the subject of "floating PV", i.e. the use of expanses of water for major solar projects, is gaining in importance.



Development of installed solar energy (MW)



The same applies to the question of marketing electricity, whether this is to be done via a utility / corporate PPA or by taking part in invitations to tender issued by the French regulatory authority for energy, Commission de régulation de l'énergie (CRE). Here, too, wpd's teams in France have acquired valuable expertise which is currently reflected in a total of 25 projects with a secured area of around 600 ha and 400 MWp. These projects in an advanced stage of development are close to submitting applications to obtain permissions for commissioning between 2022 and 2025.

With its solar team, wpd is thus also contributing to the success of the energy turnaround in France as the capacity of solar energy is set to quintuple there by 2028 from its current level of somewhat more than nine GW to almost 45 GW. With the cost of investment and operation falling, the opportunities to seal PPA deals will improve significantly in the near future. Free marketing of the green electricity generated promotes independence from statutory subsidies and political decision-making and not least the pace of the energy turnaround.

9,436 MW had been installed in France by the end of 2019

Offshore project Yunlin: Local content strategy as a genuine pioneering feat



Heavily laden transport ships are repeatedly arriving at the ports of Mailiao and Anping in Taiwan at present. Their cargo: monopiles and so-called transition pieces manufactured in Europe and destined for the construction of wpd's Yunlin offshore wind farm. But not all the components of the foundation structures for the total of 80 turbines in the project are produced in Europe. 50% are made locally in Taiwan.

This is part of the comprehensive local content strategy pursued by wpd, an important prerequisite for winning the Yunlin contract in 2019. This strategy, which serves to incentivise domestic production, comprises the manufacture of 40 monopiles at Formosa Heavy Industries Corp. in Mailiao, Yunlin County (FHI), the production of 40 transition pieces at CTCI Machinery Corp. (CTCI) in Kaohsiung, the creation of 40 turbine towers in a joint venture between CS Wind and Chin Fong in Taichung and the engineering, construction and commissioning of 2 substations by GE Taiwan.

Over the course of the last few months, the wpd project team has worked intensively with local industry to organise the processes and build the infrastructure for producing the various parts. wpd has thus achieved an important milestone in the implementation of the local content strategy for the Yunlin project. A genuine pioneering feat as for the local manufacturers of monopiles, transition pieces and towers, these were the first orders in connection with the structural realisation of offshore wind farms.

For FHI and CTCI, in particular, this has offered them the opportunity to apply their existing know-how from plant engineering in a new field. At FHI, the new production line designed specifically for the Yunlin project received the green light in the middle of January with the result that production of the first monopiles got off to a successful start. CTCI built a new production facility to manufacture the transition pieces, and all the production steps have been implemented there since August 2019.

By working intensively with local industry, wpd can exploit all the strengths which the company can call and rely on with its experienced local team thanks to its flexibility and commitment as well as its extensive know-how garnered from projects already realised. "Our hard work and our faith in local industry are paying off. Successful implementation of the local content strategy is good news, particularly with regard to the tight overall schedule for the project", states Project Manager Eike Schimanski with satisfaction.

The offshore construction phase is due to begin in April with the aim of installing all monopiles and transition pieces by the end of the year. Successful implementation of the local content strategy is thus becoming a flagship policy as it will play a major role in future tenders in Taiwan. It is well understood in the Taiwanese wind market that wpd is equipped for this task.



*Photo above: Delivery of the transition pieces for the Yunlin offshore wind farm
Photo below: Delivery of the monopiles*

No more permanently flashing lights at night



The aim is for wind turbines only to shine a red light at night if there is actually an aeroplane in the vicinity of the wind farm. So-called “Obstruction Light Control” (OLC) can considerably reduce night-time blinking. The intention is to raise acceptance among the population for expanding wind energy and reduce the impact on the environment and local residents.

Amendment allows transponder-based OLC signals

An important component of night identification as and when needed is the technology to detect aeroplanes at night. Previously, only radar-based systems have been permitted. However, as these systems are very expensive and not always easy to implement, the Federal Cabinet approved an amendment to the General Administrative Regulation for the Identification of Aeronautical Obstacles (AVV Identification) on 4 March 2020. This meant that a further safe, proven and affordable alternative was certified: the use of transponder signals.

The obligation to retrofit an OLC system (Section 9 (8) EEG 2017) applies to new and existing turbines. Legislators only provide for a few exceptions, thereby increasing the pressure on the sector through short implementation deadlines which poses immense challenges to operators, operations managers and service companies. At the same time, operators are facing considerable financial damage if they breach this obligation. At present, the implementation deadline, already extended by the Federal Grid Agency, gives them time until 30.05.2021.

wpd windmanager is supporting operators in testing and retrofitting OLC

wpd windmanager GmbH & Co. KG has been following the subject of OLC for some years and playing an active role in technical committees and working with manufacturers to design the OLC system as well as to develop overall technical concepts that are cost-efficient.

“The complexity of retrofitting an OLC system requires a structured approach”, explains Jonas Lesch, Technical Management at wpd windmanager. “Only by taking exact stock of the project and knowing the technical requirements in the wind farm is it possible to identify the measures needed and the potential to reduce costs during installation.” In the process, wpd windmanager can call on its many years of experience, a large network and in-depth know-how in order to implement the specifications of the new regulation.

“Due to the tight implementation deadline, operators can expect service and OLC providers to be at the limit of their capacity”, states Till Schorer, Sales Director at wpd windmanager. “We are therefore working independently, and specifically for each wind farm in order to identify the right overall concept for that particular farm while keeping a watchful eye on the costs.” Good preparation and an early start will speed up implementation and lessen the risk of delay.

wpd windmanager has already conducted preliminary examinations on around 1,500 turbines in over 300 wind farms. The operations manager can support operators in all the steps required for implementation - an offer that initially applies exclusively to the company’s own customers.

wpd onshore GmbH & Co. KG

Stephanitorsbollwerk 3 (Haus LUV)
28217 Bremen
T + 49 (0) 421 168 66-10
F + 49 (0) 421 168 66-66
info@wpd.de
Dipl.-Kfm. (FH) Carsten Schulz

wpd europe GmbH

Stephanitorsbollwerk 3 (Haus LUV)
28217 Bremen
T + 49 (0) 421 168 66-10
F + 49 (0) 421 168 66-66
info@wpd.de
Dipl.-Oec. Ralf Ketteler

wpd offshore GmbH

Stephanitorsbollwerk 3 (Haus LUV)
28217 Bremen
T + 49 (0) 421 168 66-10
F + 49 (0) 421 168 66-66
info@wpd.de
Achim Berge Olsen LL.M.

wpd solar GmbH

Stephanitorsbollwerk 3 (Haus LUV)
28217 Bremen
T + 49 (0) 421 168 66-10
F + 49 (0) 421 168 66-66
info@wpd.de
Niclas Fritsch

wpd windmanager GmbH & Co. KG

Stephanitorsbollwerk 3 (Haus LUV)
28217 Bremen
T + 49 (0) 421 897 660 0
F + 49 (0) 421 897 660 99
windmanager@wpd.de
Dr. Klaus Meier

www.wpd.de

www.windmanager.de

Legal notice

Publisher

wpd AG
Stephanitorsbollwerk 3 (Haus LUV)
28217 Bremen
T + 49 (0) 421 168 66-10
F + 49 (0) 421 168 66-66
info@wpd.de

Editorial

Christian Schnibbe
Dr. Jens Feldmann

Photos

wpd, wpd windmanager
iStock: Page 1, 3, 7
Thiele Consulting: Page 4

