

# Inside

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# Transportation of rotor blades – spectacular for all participants

*Transport with self-propelled transporter with blade adaptor to Holzthaleben wind farm*



Viewed from afar, wind turbines look small, but their real dimensions only become clear when you get close to them. With a total height of up to 200 metres, it is not only children who say with astonishment: “Are they really that big?!”

Transporting all components of the wind turbines is a special logistical challenge. The manufacturer first conducts a study of the route in order to point out any special features that have to be taken into account on the way to the wind farm. These include tunnels, bridges, forest tracks, roads leading through towns as well as winding sections. On this basis, a decision is taken for the most advantageous route.

Special attention is paid to the rotor blades which are now up to 14 tonnes in weight and between 60 and 70 metres long. “Classic transporters for them are often up to 80 metres in length, which is almost the length of a football pitch. If the only conceivable route takes you through narrow forested areas or small villages with sharp bends, you won’t get far with huge vehicles“, explains Holger Groß, Manager of the wpd office in Kassel.

*Transport to Lauterstein wind farm*



This is exactly what happened with the construction of the Holzthaleben wind farm in Thuringia. From whichever direction they approached, there were always two narrow sections which standard transporters were unable to master.

The wpd team finally opted for the more expensive but at the same time efficient deployment of self-propelled vehicle fitted with a blade adaptor. These vehicles are only available in small quantities in Germany, and there are only a few experts who can steer them. A rotor blade is placed on a remote-controlled flatbed truck by crane and simply screwed on by the flange of the blade. This means that the blade can be rotated around its longitudinal axis, stood upright, swung over buildings or trees and manoeuvred in tight spaces. When the blade is stood upright, the vehicle is also much shorter than a classic transporter. This makes a tight village crossroads easily negotiable – if absolute precision is maintained.

“The unusual transport over a twelve kilometre route wasn’t just spectacular for us, schoolchildren were also glad to see the special summer holiday attraction“, says Project Manager Markus Birnkraut, describing the experience.

While the self-propelled vehicle transported one rotor blade per day at max. 13 km/h at the Holzthaleben wind farm, a convoy of three classic heavy load transporters was deployed each night for the Lauterstein wind farm in Baden-Württemberg. Some bends in the road had to be converted to a larger radius for these transporters. Conditions in the Swabian Alb with one or the other bottleneck also turned the delivery of components in this region into an attraction: The first night, over 100 inhabitants followed the manoeuvring at a particularly tight spot in Gerstetten. The corner of one house posed a challenge but it was successfully negotiated on every journey for the total of 19 wind turbines.

# Successful developments in Sweden



wpd's Swedish team has reason to be happy: Five new and at the same time very promising projects were approved in 2015 and 2016, two of which have already been confirmed in law. "Our colleagues have shown exceptional commitment in every phase of the project and they have invested much toil and dedication in planning the wind farms. This success means a lot to us and provides encouragement for our work", says Maria Röske, the Swedish Managing Director, in summing up the story.

The five Scandinavian wind energy projects are distributed across the northern half of the country. They range from central Sweden to close to the border with Finland.

"All the wind farms have massive potential. The wind measurements in some locations suggest we can expect average wind speeds of over 8 m/s at the level of the hub", explains Paul Bade, wpd's Country Manager for Sweden. "We are currently in discussions with turbine manufacturers on suitable turbine types. The low temperatures in winter pose particular technical challenges."

To guarantee the smooth running of a wind farm in northern Sweden, every turbine must be fitted with a so-called "cold climate package". For example, the units are then given special lubricants. These ensure that the turbines can stand weather conditions down to minus 40 degrees Celsius. Another special feature is that darkness predominates in Sweden in the winter months due to its geographical location. This once again puts the focus on the subject of "needs-based lighting".

Johanna Bohn has been involved in the technical planning for the Swedish projects at the German end since 2013. Even if the remuneration system for green certificates shows itself to be very volatile there, she is convinced of wpd's activities: "Politics in Sweden has made a clear commitment to expanding Renewable Energy. This sends a positive signal and gives reason to hope for a better market environment in the future."

*Photo montage for the visualisation of the Broboberget and Lannaberget wind farms*



## Stamina is rewarded

The first plans for the Lauterstein wind farm were created at the end of the 90s. But at the time, there was a lack of political will for expanding wind energy in Baden-Württemberg. Today, things are different. In the last few months, some heavy load transporters have made their way over the Swabian Alb. The majority of the 19 turbines planned are already erected and on the grid. The official inauguration with Minister President Winfried Kretschmann and Environment Minister Franz Untersteller is scheduled for 17 September 2016. Unerring faith in the forest project has paid off in the end. The Lauterstein wind farm is the largest in the State and enjoys a high level of local acceptance.



### Lauterstein

Number of turbines: 19

Type: GE 2.75-120

Rated power: 52.25 MW

Location: Germany

Commissioning: 2016

*Lauterstein  
wind farm*

## Renewable Energy Resolution 2016:

### Clarity in the regulation – but more of a backward step than progress

In July 2016, the German parliament and Federal Council passed the new framework

conditions for the expansion of wind energy in Germany. From 2017, expansion will be pursued both onshore and offshore through invitations to tender. That means that in future there will be upper limits for the annual volume of new capacity.

The limit for wind energy on land has been initially defined from 2017 as 2,800 MW gross (including re-powering), and finally 2,900 MW per year from 2020. In the case of projects which are approved by the end of this year and commissioned in 2017 or 2018, the transitional rule contained in the Renewable Energy Act 2014 applies. That means that the remuneration previously defined in law continues to apply.

As far as wind energy at sea is concerned, the first round of tenders will be limited to the Baltic. The expansion corridor in 2021 and 2022 is set at 500 MW per year, and at 700 MW from 2023 to 2025.

Many detailed regulations represent a major challenge for the industry. For example, the politicians have opted for special rates of degeneration for new

onshore projects. These will have a massive effect on the cost-effectiveness of projects and will impinge on contracts already signed which are based on the previous Renewable Energy Act.

So-called grid bottleneck areas have also been defined for the first time. In these zones, the annual expansion of wind turbines can be additionally restricted (approx. 58 percent of the average of the last three years). To what extent the 6-hour rule for negative electricity prices will also affect the profitability of new projects, remains to be seen.

In offshore, we are facing a double system change. Firstly: invitations to tender of initially 500 MW per year. Secondly: areas to be centrally awarded by the authorities which equates to the expropriation of previous developers who have developed projects putting their faith in the politicians.

All in all, these are the new rules which we will have to adapt to but which as an industry we cannot be content with. With a view to the climate protection targets from Paris and the need to accelerate the conversion of our energy systems: more of a backward step than a positive development.

## France: Everyone working hand-in-hand on site

Joux-la-Ville is currently wpd's largest onshore project under construction in France. 22 Enercon E-82 are being erected in the Burgundy region. Construction of the 44 MW wind farm was held up at the start of the year due to a lot of, and at times very heavy, rainfall. But the on-site team is setting a great pace now in order to catch up. At times, there are four cranes operating simultaneously on site, and all those involved are working hand-in-hand to ensure that the target date for commissioning in 2016 is met. wpd has already installed the associated transformer substation. A total of 26 kilometres of cable have been laid for connecting the farm to the grid – even under a motorway and through two villages. At the same time, wpd is also implementing two further wind energy projects: the wind farms, Blanc Mont with 13.8 MW (six Enercon E-82) and Les Trente with 10 MW (five Vestas V-100) are under construction north-east of Paris.

## Finland: Proprietary developments fully on the grid

It is always a special moment for all those involved in a project when commissioning is completed. wpd's Finnish team was privileged to experience this moment of success twice in 2016: all the turbines in the Mäkikangas and Jokela wind farms are now feeding power to the regional distribution grid via a 110 kV overhead cable. A separate transformer substation was built for each wind farm. Both projects are in-house developments of wpd. They are located in the Nordösterbotten region and are only seven kilometres apart. wpd is currently building the Tohkoja wind farm in the direct vicinity with 22 turbines and a rated power of 73 MW.

*Delivery of the rotor blades for the Mäkikangas wind farm in the port of Raahе*



### Mäkikangas

Number of turbines: 11

Type: Nordex N-117/3000

Rated output: 33 MW

Location: Finland

Commissioning: 2016

### Jokela

Number of turbines: 12

Type: Nordex N-117/3000

Rated output: 36 MW

Location: Finland

Commissioning: 2016



# Implementation strength in 2016



*Lange Heide wind farm in the foreground*

“Every wind energy project is unique!” Viewed from this perspective, 2016 is offering wpd a plentiful supply of exciting challenges. In Germany alone, a total of 20 onshore projects will have joined the grid by the end of the year, according to the current planning status.

*Rotor blade installation at Hambergen wind farm*

The 21.35 MW Hambergen wind farm with seven Enercon E-101 has recently been erected in the district of Osterholz in Lower Saxony. Even during the approval phase, there were indications of archaeological finds. In the end, excavations unearthed 254 individual pieces which show that people were living in settlements in the region even in Roman imperial times.

Another special feature of the project is the so-called wind savings bond which wpd is implementing for the first time in this context.



Citizens can invest financially in the wind farm and they receive an attractive, guaranteed rate of interest for a fixed term. “The offer is in great demand. We are delighted by this success and grateful for the collaboration with the Osterholz Kreissparkasse savings bank”, says Michael Bönisch, Project Manager at wpd. The owners of the land in Hambergen/Lübberstedt have also decided to set up a fund for charitable purposes which among other things is intended to support the local fire service or sports clubs.

Between March and May 2016, five Enercon E-82 from the “Lange Heide” wind farm joined the grid, also in the district of Osterholz. There was very close collaboration with the Osterholz municipal utilities in planning the grid connection of this 11.5 MW project. During the implementation phase, close attention was paid to the construction of the cable route. Although it is “only” five kilometres in length, it runs through several residential areas. Various cable-laying methods were therefore required. As well as open construction where the cables are laid in a trench approx. 1 metre deep, horizontal drilling controlled by a probe was also used. This technique allows you to drill underground sections of up to 300 metres in length, only requiring a few construction pits.

The Mengerlinghausen wind farm also posed special planning requirements. This 14.4 MW project with six Nordex N-117 is situated in Bad Arolsen in Hesse, and it is being constructed in a hilly forest in the town. This is not only a rare and special location for a wind farm, but the land is also the property of the borough, as wpd’s Project Manager, Ekkehard Darge, explains: “The planning process with the borough was an example of excellent collaboration, conducted in a spirit of trust. The result is a concept which takes care of the land – only 0.5 percent of the forested land had to be cleared for the construction, and it is being replanted in another location.”

The Cheinitz-Zethlingen wind farm in Saxony-Anhalt is due to be commissioned in the third quarter. This wpd proprietary development with 16.5 MW has met with a high level of acceptance in the region. One of the six GE 2.75-120 turbines with a hub height of 139 metres is being operated jointly by several land-owners.

# Individual solutions for the entire operational phase

Interview with Nils Brümmer,  
Managing Director of wpd windmanager GmbH & Co. KG



*Nils Brümmer with the contacts for international and domestic projects: Henning Rüpke (l.) and Jörg Streitz (r.)*

## What makes the service provided by wpd windmanager special?

**Nils Brümmer:** We offer complete wind farm management, the all-inclusive, no-worries package, so-to-speak. This comprises both the technical operation and the commercial management with a large range of additional services, e.g. in the areas of IT security, burglary protection, telecontrol and repowering. The fact that all these services come from a single source guarantees short communication chains with no unnecessary intermediate steps and loss of information. Our large portfolio of currently 3,600 MW also gives us a strong negotiating position with service providers, insurance companies and direct sellers which enables us to negotiate good terms for our customers.

## Who are these skills offered to?

**N. B.:** We offer our service to all wind farm operators. Besides those wind farms financed by retail investment funds, more and more external investors from home and abroad now rely on the service package offered by wpd windmanager. Potential and actual customers can put together their own optimum wind farm management package from our comprehensive range of services. We are happy to advise them in the process and together we find the best solutions.

## How many employees are involved in the complete operational management?

**N. B.:** At wpd windmanager, there are now over 300 employees responsible for the optimum operation of the over 320 wind farms of our customers. From mechatronics experts, via accountants, engineers and economists, all the way to environmental engineers and lawyers, our employees cover a wide spectrum of know-how. This enables us to offer all the service building blocks required to operate the farm, from looking after compensatory and replacement measures during the operational phase of a farm, via LiDAR measurements to billing and keeping track of receivables from feed-in management. As well as Germany, we also offer this service in Belgium, France, Italy, Croatia, Poland, Finland, Canada and Taiwan.

## How is wpd windmanager equipped to face new challenges?

**N. B.:** We can look back on 18 years of experience in the field of managing wind farms. On this basis, our specialists continually adapt our services to changes in the industry, technical innovations and ever more powerful turbines. Our range of services is constantly being expanded and optimised by our in-house Research and Development Department. One example of this is the development of our own system for measuring the vibration of foundations. The system allows the measurements to be carried out more efficiently than with conventional systems on the market, thereby reducing costs. With our experienced and motivated staff, we are outstandingly well placed to face the coming challenges.

## **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

## **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, Wiebke Schröder

### **Photos**

wpd

## **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 windmanager GmbH & Co. KG**

Stephanitorsbollwerk 3 (Haus LUV)  
28217 Bremen  
T + 49 (0) 897 66 00  
F + 49 (0) 897 660 99  
windmanager@wpd.de  
Dr. Klaus Meier

[www.wpd.de](http://www.wpd.de)