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Nordergründe nearshore wind farm

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Largest wind farm in Baden- Württemberg on the grid

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Largest wind farm in Baden-Württemberg is on the grid



Photo left: Ceremonial commissioning of Lauterstein wind farm - fr. l to r: Mayor Michael Lenz, Minister President Winfried Kretschmann, wpd CEO Dr. Hartmut Brösamle, Albwerk Chairman Hubert Rinklin, Minister for the Environment Franz Untersteller and District Administrator Edgar Wolff

The Lauterstein wind farm in Baden-Württemberg reveals clearly how effective a strong will, the unwavering belief in a project and personal perseverance are. There are almost 20 years between the first designs and actual commissioning.

“I myself was involved in those days as a project manager, and that was my first wind project, so-to-speak. Our wind measurements and the evaluation of the location clearly proved the immense potential”, says today’s wpd CEO Dr. Hartmut Brösamle, summing up the situation. “That’s why we submitted the construction application for four turbines in Lauterstein in the district of Göppingen.” In spite of approval at a local level, the application is rejected by Stuttgart politicians. The Nature Conservation Agencies announce that the wind turbines would to a large extent spoil the pristine scenery.

A setback. But the wind farm planners refuse to get discouraged. There follow numerous reports, appeals to the Committee on Petitions, dates for public hearings and court hearings over several stages. The case even goes as far as the Federal Administrative Court. In 2001, an important intermediate objective is achieved, sending a portentous signal to the whole sector. The judges decide that the construction of wind turbines cannot be rejected solely on the grounds that they spoil the scenery. But even this positive decision is initially of no help – and the Higher Administrative Court in Mannheim once again refuses to allow the four turbines to be built.

Only after the reactor disaster of Fukushima is there a change of heart. Chancellor Merkel announces the

energy turnaround in Germany, and in 2011 Winfried Kretschmann becomes the first Green Minister President of Baden-Württemberg and anywhere in Germany. The first sod is thus finally turned for the Lauterstein wind farm in September 2015. “The inauguration of this wind farm was a genuine highlight for me”, says Dr. Hartmut Brösamle with undiminished enthusiasm. Over one thousand guests celebrate with among others Minister President Kretschmann and Minister for the Environment Untersteller while the rotor blades start to turn for the first time.

With 16 turbines of type GE 2.75-120, the Lauterstein wind farm is today the largest in Baden-Württemberg. The annual production of energy lies around 120,000 MWh. The project in the forest enjoys a high level of local acceptance. “We included local people in the planning process from the outset and kept them informed at all times”, says Project Manager Benjamin Boy, describing wpd’s way of working. “That created trust.”

Mayor Michael Lenz also emphasises the excellent working relationship with wpd at the opening ceremony. “It could not have gone any better. The local council and citizens were included from the first planning idea onwards, the planners and construction engineers were always contactable and we were able to rely on wpd as a partner at all times.”

Local residents are also able to take a stake in the wind power project as part of a collaboration with the local Albwerk power station.

wpd helps to shape the energy turnaround in Croatia

The Katuni wind farm went into operation in Croatia in December 2016 with twelve GE 2.85-103 turbines and a hub height of 98 metres. The project lies on a high plateau in the interior of the country, around 50 kilometres east of Split. The motorway to Dubrovnik passes close to the wind farm. The easily visible logos tell every car driver that wpd is playing an active part in the Croatian energy turnaround.

“wpd’s well-oiled Croatian-German team that has been in place for years, has succeeded in setting up the infrastructure for the wind farm including a 110 kV transformer substation in only nine months of construction time”, explains Andreas Chollet, wpd’s Country Manager for Croatia. “The particular challenge consisted in laying the high voltage cables from the wind farm to the transformer substation firstly over a steep gradient and then through the town of Šestanovac. A plan was drawn up together with the local authorities in order to keep the impact on residents as low as possible.”

For the wpd Group, this was the first project with turbines from the manufacturer GE in Croatia, but already its fourth farm in the country. After the Trtar-Krtolin wind farm was commissioned in 2006, there followed Orlice in 2009 and Ponikve in 2012. With a total of 91.8 MW, wpd operates an impressive proportion of the total installed capacity in the country of currently 480 MW.

Experience in day-to-day operations is also very positive. Marijana Baričević, Managing Director at wpd windmanager Croatia d.o.o., which operates all four wpd wind farms in Croatia, can certainly testify to that. “The Croatian coast has above-average potential for wind thanks to the Bura, a strong wind that blows down from the interior of the country. This is underlined in impressive fashion every year by the yields obtained from our wind farms. And in addition, the wind farms deliver very consistent power from one year to the next:

the yields fluctuate within a tight corridor of +/- five percent of the annual forecast.”

Many good arguments in favour of further expanding wind power in Croatia. Croatian politicians have set their objective for total installed capacity currently at 744 MW of wind power by 2020 which is to be promoted in accordance with the old feed-in tariff system. Thereafter the intention is to follow the current trend towards bidding systems. The rules and targets for such a system, however, are only now being discussed.

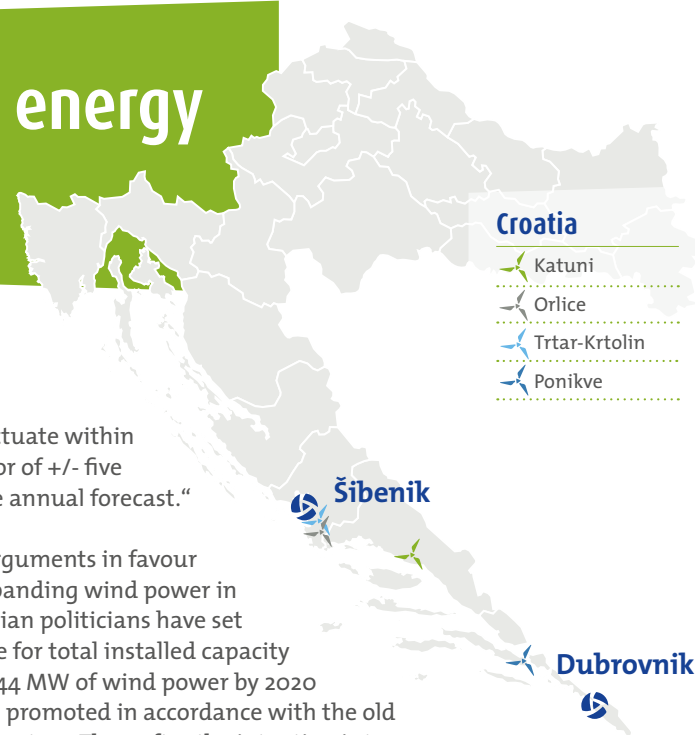


Photo above:
Laying the foundations
in Croatia’s karst rock

Photo below:
Transporting the nacelle to
the construction site





Town harvesting its own power from wpd wind farm

Mengeringhausen

Number of turbines: 6

Type: Nordex N-117

Rated power: 14.4 MW

Location: Hesse

Commissioning: 2016

wpd has recently realised a 14.4 MW wind farm in the urban forest of Bad Arolsen, in the district of Mengeringhausen in Hesse. The town intends to run one of the six Nordex N-117 turbines installed itself. This was the unanimous vote of Arolsen's town council meeting in December 2016.

This will be made possible by the foundation of a company by the name of Bad Arolser Wind GmbH. It will take over one wind turbine from wpd. The revenues from the wind power are to flow into the municipal coffers and thus benefit all local residents. In this way, the town is making use of an option of financial participation offered by wpd.

wpd planning to install more than 350 MW in Chile

Terrain of the project in Malleco



The wpd team was very successful in the largest power tender in Chile's history in 2016. It won the contract for onshore wind farms with a total capacity of over 350 MW. This means that wpd has agreed to feed an annual volume of 786 GWh into the power grid of this South American Andes state, starting in 2021. The supply contracts will run for 20 years.

In order to meet this obligation, wpd will realise a total of three wind farms. They include the Negrete and Duqueco projects with 39 MW and 50 MW respectively. The Malleco wind farm is also to be built in the south of Chile. This project alone will have up to

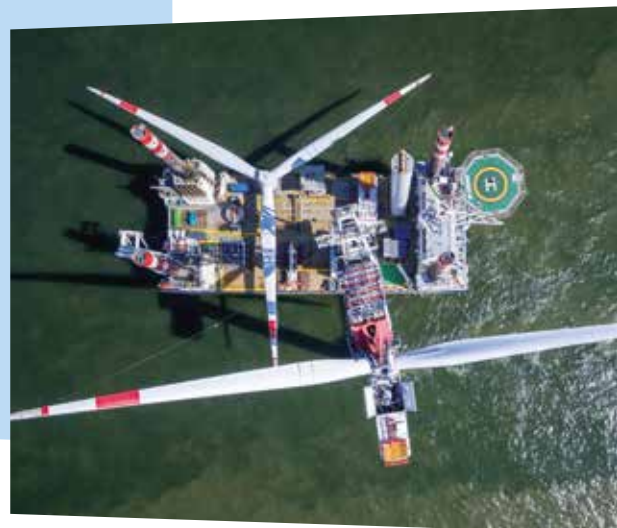
77 turbines and comprises a total capacity of 273 MW. Due to the enormous size of the farm, the process of obtaining the necessary environmental approvals took almost three years. That process has just been successfully concluded.

Work on the projects continues at full speed. Including the indigenous local population is particularly important to wpd. With the support of the German Society for International Cooperation (GIZ), wpd is therefore developing a model for the exemplary integration of local communities.

France: Good chance again for wpd in new round of offshore tenders

After participating successfully in the tendering process in 2012 and winning the Courseulles and Fécamp projects, wpd again has a good chance in the new round of tenders.

The French procedure for participating in tenders has been recently revised and is now similar to those in place in the Netherlands and Denmark. Besides the Dunkerque project also the Oléron project area is qualified as tender area. Oléron has been developed by wpd, 15 kilometres from the Atlantic island of the same name, and forms part of the French tender. The process will begin in the spring of 2017. wpd participates in both Dunkerque and Oléron tender.



Continuity and steady growth

As in previous years, wpd showed positive growth in 2016. A total of 433 MW were implemented. The total installed capacity now stands at 4,100 MW. It has 1,800 employees in the group around the world, all committed to expanding wind power in 18 countries. On land, wpd is working on a pipeline of 7,500 MW, and offshore the figure is 5,400 MW.

Ten locations become twelve

wpd is expanding its network of offices in Germany. Project Development now has its own office in Bad Kreuznach. The team will in future look after the projects in Rhineland-Palatinate.

wpd staff will also be deployed in Leipzig from now on. They will predominantly be strengthening sales activities in Saxony, Saxony-Anhalt and Thuringia.

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wpd erects all turbines in nearshore Nordergründe project



Installation of cables on the Nordergründe construction site

In the last few months, up to 200 people have been working on the construction site for the 111 MW Nordergründe wind farm. They were working in parallel on implementing the offshore project in the Weser estuary. All 18 turbines have now been erected.

Nordergründe is being constructed inside the 12 sea mile zone, and lies 15 kilometres north-east of the island of Wangerooge. As it is close to the shore, the transportation routes and travel times for the assembly and service teams are short. However, the location contained one challenge in the form of the foundation. Some of the 18 turbines have been erected on a sand bank. As a result of the sand masses in constant motion in the river estuary, experts found very different and changeable depths of water. Special excavation work was required in some areas to enable the assembly ships to access the site.

“There are always situations in offshore projects which are unforeseeable. However, after almost 15 years’ experience in this field now, we know one thing: there is a solution to every problem! And I am personally delighted to see the extent to which the entire wpd team embraces this attitude and time and again finds solutions to the most varied of situations”, says Project Manager Hans-Christoph Brumberg.

After the successful commissioning of Butendiek near Sylt in the summer of 2015, Nordergründe is the second offshore project that wpd is realising in the German North Sea. While Butendiek consists of 80 turbines, Nordergründe has 18. But time and effort cannot be automatically reduced to a quarter of the original sum. “Basically, both projects require the same steps and succession of activities. One particular challenge during the construction window in the summer, however, was the location and size of the project area. The Nordergründe construction site is roughly only one tenth the size of Butendiek. It was essential for all the different trades to coordinate closely with each other. In some periods, there were more than twenty specialist ships in the waters at the same time, some of them over one hundred metres in length, in a total area of 3,5 km².”

Delivery of the transformer substation was delayed due to the bankruptcy of the supplier. But in the meantime, the project is being continued as conceived by all those concerned. Installation of the topside and completion of overall commissioning are planned for the second half of 2017. From their project office in Hooksiel, the wpd team can already look out onto the 18 completed Senvion turbines of type 6.2M126 on the horizon.

Finance for the Nordergründe project was concluded in June 2015 with the participation of the European Investment Bank and KfW IPEX. Besides wpd, the John Laing Group and Gothaer Versicherungsgruppe are also acting as the providers of equity.

Loading nacelles in Bremerhaven



windmanager develops vibration measurement system for assessing foundations

The foundations of turbines are exposed to high stresses in their operating lifetimes spanning at least 20 years. The wind in the rotor blades makes the tower act on the foundations like a long lever. This high dynamic strain to which the foundations are exposed, is conducted from the steel construction of the tower to the foundations, e.g. by an anchor basket or specially fitted component. If this is not successful, the foundations of turbines will usually suffer damage. Typical damage, for example, would be

- cracking
- spalling
- erosion
- erosion of soft layers and corrosion on reinforcements

Special attention is paid to this potential damage during the regular inspections of the turbines conducted by wpd windmanager's field staff. Any damage is reported to the specialists for foundations in the office in Bremen who then initiate further measures. „There are various methods for checking the foundations. We determine the appropriate procedure in a joint discussion with the operator of the wind farm“, explains Kai Mahnert, expert for turbine foundations at wpd windmanager.

For example, so-called vibration measurements are conducted in order to establish if there is any damage to the foundations. These are conducted between the concrete foundation and the foundation structure.

In the opinion of the technical specialists at wpd windmanager, the existing systems used previously for measuring vibrations did not meet the definitive concept of a high-quality measurement set-up. wpd windmanager's in-house research department therefore developed its own procedure.

For this, the turbine is operated at a generator revolutions per minute (rpm) range of 1,600 rpm, and subsequently the rotor blades are turned so that the edge of the blade faces the wind. The turbine is thus brought to a standstill and the tower vibrates. If the abrupt braking manoeuvre results in vibration movement greater than 1 mm, the experts then conduct regular measurements of the movement of the foundation structure in the concrete. Experience tells us that early detection of potential damage leads to less expensive repair.

“The services provided by wpd windmanager are divided into basic and plus services. Assessment of the foundations and vibration measurements are offered as a plus service which can be taken up even without any existing management contract“, says Mahnert.



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Photo bottom left:
Set-up for vibration measurements
Photo on the right:
Data from the measurements

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