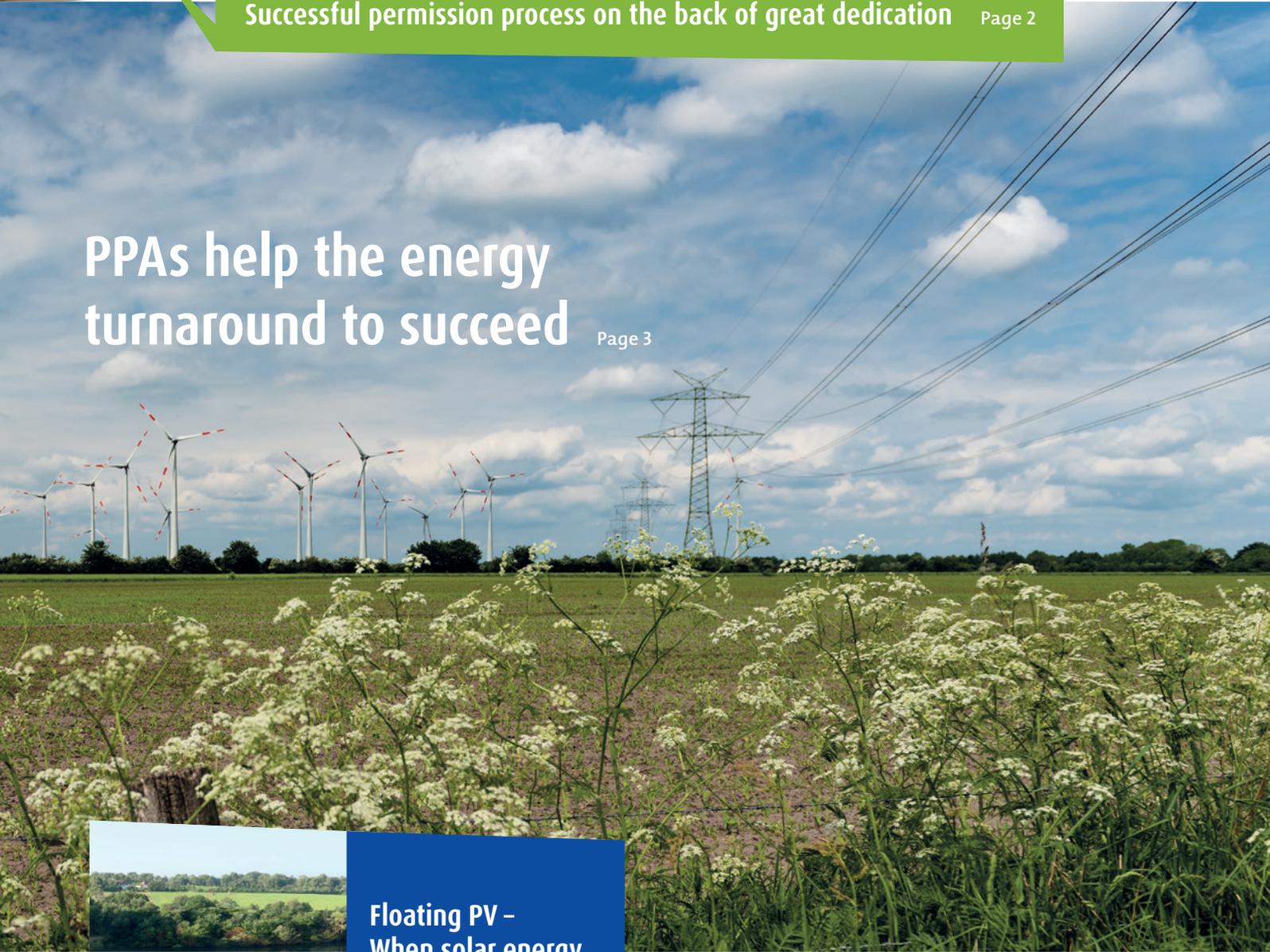




Inside

Successful permission process on the back of great dedication Page 2

PPAs help the energy
turnaround to succeed Page 3



Floating PV –
When solar energy
is captured
on water Page 6

Thanks to experience, know-how and dedication: wpd celebrates successful permission processes



2021 was once again a year of genuine success for wpd: Permits were obtained for projects with a total of 65 turbines and a capacity of over 300 MW.

The receipt of a permit is the prerequisite for taking part in tenders and thus for the construction and operation of wind farms. The permission process is conducted in accordance with the Federal Immissions Control Act and is compulsory for turbines with a total height of over 50 metres. The potential environmental impact of the project is examined under the guise of avoidance, reduction and risk prevention.

In the last few years, the number and scope of added demands from the technical authorities involved and the wider public have further increased – which has had a considerable impact on the length of the process. It now regularly takes one and a half to two years, significantly exceeding the duration of three to seven months defined in law.

The fact that the majority of wpd's applications are completed successfully with the receipt of a permit is remarkable in view of the complex underlying conditions. This is where the experience, know-how and dedication of wpd's project teams pay off.

Since the introduction of the tender procedure in 2017, wpd's project teams have successfully steered a total of around 50 projects comprising 160 turbines and over 600 MW through the permission process and their tenders.

The involvement of the relevant specialist departments is proving to be a significant factor in the process. The maintenance of separate specialist departments for landscape planning and species protection with many long-serving, experienced employees is a stand-out feature of wpd. Proactive planning and communication based on trust and a close working relationship are bread and butter to wpd's project teams. Many a potential conflict can be quickly and professionally resolved thanks to permanent points of contact and early liaison with the relevant authorities.

With a total of almost 50 approved projects comprising 160 turbines and over 600 MW since the introduction of tenders in 2017, wpd is among Germany's most successful planners. These successes represent major motivation for the project teams but at the same time, they reflect one of wpd's important strengths. A successful permission process is an important indication that the projects that wpd enters in tenders carry excellent prospects of being realised – crucial for collaboration partners, landowners, the various representatives of the relevant municipalities as well as partners involved in financing the project.



Before a wind farm is constructed, files containing documentation relevant to the permission process have to be submitted by the boxful.



The process itself is complex and comprises a wide variety of aspects to be examined, from the regulations of nature conservation and species protection legislation via building regulations and planning law to specialist legal questions arising from air traffic legislation or landscape protection and preservation orders. The involvement of the public through the publication of application documents and opportunities for comment also forms part of the process.

Not just for big names: PPAs help the energy turnaround to succeed

Microsoft, Deutsche Bahn, Google, VW or BASF: There has been a never-ending stream of reports in the industry news on renewable energies on the conclusion of Power Purchase Agreements (PPAs) with large, well-known companies. They are concluding long-term direct supply contracts with electricity producers from the wind and solar energy sectors, so-called Corporate PPAs. Thanks to proof of origin, the procurement of green electricity is important for the ecological balance sheet but it is also increasingly significant as a marketing tool.

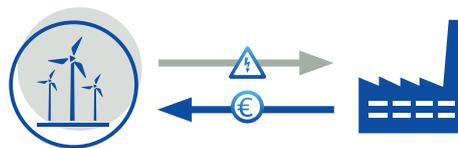
A veritable PPA boom was seen at the end of 2021 for onshore wind and above all in the offshore wind and solar PV sectors. The worldwide volume of Corporate PPAs rose from 19.5 GW at the end of 2019 to 23.7 GW at the beginning of 2021. In Germany, 2.3 GW of PPAs were concluded between 2018 and 2021 of which 66% were Corporate PPAs.

What used to be a relatively modest market for PPAs in Germany has grown up, so-to-speak, conditions have become more structured, the diversity of options larger and likewise the number of competitors. Experience and know-how are now to a certain extent at a premium. This subject is also firmly established at wpd, starting with its first purchase agreement signed in 2006 for a Belgium wind farm, taking in the Leipzig wind farm which has been supplying the local BMW plant directly since 2013 all the way to its PPA successes in the Northern European market or what is currently the largest PPA in the Asian-Pacific region recently signed in Taiwan with a volume of over 1 GW.

This area seems to be primarily dominated by major names. However, even medium-sized companies or the very significant municipal utilities in Germany are faced with the bellwether question “How do we procure green electricity?”.

The market is dynamic and dominated by competition. It is all the more important to have a reliable, expert partner at your side in order to develop tailor-made solutions for a long-term, sustainable business relationship on an equal footing. PPAs are important as an option for operations post-EEG (Renewable Energies Act), but also increasingly in the planning of new projects. The work basically starts with the acquisition of the land as every site has an owner. And for the owner, the main, decisive factors are primarily the expertise of the project developer, their ability to realise their projects and the financial success of the project. While in the project planning stage, the focus is initially on tenders and EEG subsidies, a PPA can create added value, depending on the conditions pertaining to the project.

wpd has concluded more than 90 TWh of PPAs with industrial companies. On paper, that's sufficient to supply around 25 million households with electricity for a year.



Google

Wind farm Kuuronkallio
Finland
Volume: 220 GWh/a
PPA Start: 2020
Term: 10+x years



BMW

Wind farm Leipzig
Germany
Volume: 25 GWh/a
PPA Start: 2013
Term: 15+x years



Reinforcements for further success: wpd continues to grow



In the last 6 years alone, the number of employees at wpd has grown by around 500.

Success brings growth. We notice that, too, at wpd, primarily in the form of our constantly growing workforce. And what is true on the global stage, also applies equally on the domestic front. 2022 will be a year of moving for wpd as the teams in Bietigheim-Bissingen, Kassel, Osnabrück, Hamburg, Rostock and Leipzig have outgrown their offices. They need larger premises from which they can drive the energy turnaround with their accustomed dedication and know-how.

And there is no end in sight. We are looking for reinforcements in all departments in order to bring current and future projects to fruition.

Reward for great dedication: 17 new projects receive permits



In December 2021 alone, wpd was able to celebrate permits for four wind projects. This means that by the end of 2021, the company had received 17 permits for a total of over 300 MW. wpd has now reached the next round of the EEG tender in four projects and has thus made a successful start to 2022.

Our wpd teams responsible for the projects, Am Hainberg, Kladrum, Wulkow-Trebnitz, Ehra-Lessien, Hofgeismar, Keula, Quenstedt, Antrup, Roggenkamp, Oyle-Bühren, Teltow C, Bankewitz, Kesdorf, Hollenstedt, Müssingen, Bornhausen and Kantow, are particularly pleased by the permits.

New wpd offices opened in Poland and Vietnam

wpd has moved into a new facility in Poland to add to Poznan and Warsaw, and in future it will also be driving the energy turnaround in Poland from its office in Gdańsk.

In Vietnam, too, there was a need to find new premises for our growing team. The office of wpd Vietnam LLC is now in the lively central District 1 of Ho Chi Minh City.



Left: new wpd office in Ho Chi Minh City

Right: location of new wpd office in Gdańsk



wpd concludes largest PPA in Asia

wpd has concluded a Power Purchase Agreement (PPA) with one of the world's leading manufacturers of semiconductor products in Taiwan. This PPA is currently the largest for green electricity in Asia, comprising the energy production of various wind energy projects to be realised in the coming years.

These projects will have a total capacity of over 1 GW coming from both onshore and offshore wind energy. The volume of electricity supplied, comprising around 3.7 bn kWh per year, corresponds to an annual CO₂ saving of more than 1.85 million tons.



wpd location in Taipei, Taiwan

In Asia, wpd also has offices in Japan, South Korea, India, Vietnam, Indonesia, Mongolia and the Philippines.

Swedish onshore projects receive permits



Coinciding with the end of the year, wpd Sweden's team was able to post success in obtaining permits. The promising Klöverberget project comprising 19 turbines received a positive notice four years after the application was submitted.

The Broboberget/Lannaberget wind farm was also approved at the second attempt. This project is wpd's largest project for onshore wind in Sweden and boasts a total of 115 turbines. And finally, the Stölsäterberget project also achieved legal force. The wind park is due to be commissioned in 2023 with 8 Nordex N163/5.X turbines. The wpd team in Stockholm is making good progress.

Gennaker offshore project overcomes significant obstacle

wpd is planning to build the Gennaker offshore wind farm, approved back in 2019, in the priority sector for wind energy, around 15 kilometres from the German Baltic Sea coast near Zingst/Darß. With 103 turbines and a total capacity of currently 865.2 MW, Gennaker will be the most powerful offshore wind farm in the Baltic Sea to date. The project's location close to the shore guarantees good implementation condi-

tions and good accessibility in operation. Implementation had been held up for a long time as there were no grid connection regulations for wind farms approved in coastal waters. After this regulatory loophole was closed in 2021, this has removed a significant obstacle on the path towards realisation. Construction is due to start in 2025.

Floating PV: When solar energy is captured on the water

*Photo montage of
wpd's FPV project
in Parnac, France.*



Everybody knows them, the rows of solar panels in fields or on the roofs of residential houses, office buildings or factories. We can now talk of competition for available sites for photovoltaic projects. The teams of wpd solar are also seeing the same phenomenon and here, too, they are eyeing up a possible alternative: Floating PV – FPV for short – in other words PV farms on water. The installation of PV systems on water, mainly man-made waters such as reservoirs and flooded gravel pits, fish farms or other water basins, has been in the making since the turn of the century.

There are more than 400,000 km² of man-made reservoirs around the world. From a purely theoretical perspective, FPV would have the potential to produce green electricity in the terawatt range. The most conservative estimate amounts to over 400 GW, corresponding to the output of 400 large coal-fired power stations.

The first FPV system was built in Japan in 2007. Only one year later, the first commercial system with an output of 175 kW was realised in California. 10 years elapsed before the first projects achieved an output of more than 100 MW. Market leader China has recently installed systems with a capacity of several hundred megawatts. Projects of similar size are planned in India and South East Asia. For example, South Korea has announced a project in an order of magnitude over 2 GW.

Floating PV systems are more compact than land-based systems and they can easily track the position of the sun. The layout is similar to that of systems on land with the modules either attached directly to pontoons or to metal frames borne by floats.

The floating platform can be anchored to the bank, to the ground, to piles or a combination of these options. wpd is also looking at the FPV concept for its first projects in Germany and Taiwan. Specifically, the French wpd solar team is currently preparing its application for a permit for a 15 MW project.

But what are the benefits of FPV systems by comparison with the capture of solar energy on land? Fundamentally, there is no need for the usually extensive preparations of the site, above all with regard to building the foundations. Installation is relatively simple and can be accelerated by a modular design. Water also offers the benefit of less dust formation as well as less shade for the panels. Above all, however, the energy yield is better thanks to the cooling effect of the water as the modules can work at a temperature that is five to ten degrees Celsius cooler.

Floating PV projects in the sea are also currently in development. Here the search is on for coastal locations in bays and lagoons. The typical swell of the sea, the effects of changing tides but also that of salt water and the influence of colonisation by marine organisms on the materials all pose additional challenges.

So technology does not stand still. Floating PV opens up new opportunities for efficiently capturing energy from the sun.

**There are
more than
400,000 km²
of man-made
reservoirs
around the
world.**



10 years of challenges and success: How the Malleco project originated

Since the end
of 2021,
77 wind turbines
have been
turning in the
Chilean Malleco
project.

Wind farm
Malleco



The Chilean region of Araucania is characterised by countryside known as “the Switzerland of Chile”. The Province of Malleco also forms part of this region, situated some 600 km south of Chile’s capital of Santiago de Chile. The prevailing climate here is certainly comparable to that of Central Europe, and above all, wind conditions are very promising. No fewer than 77 rotors belonging to turbines of type Vestas V136 have been turning here since the end of 2021 as part of the 273 MW Malleco project, currently wpd’s largest onshore wind farm.

The beginnings of the “Parque Eólico Malleco” project development stretch back to 2011. After achieving



crucial milestones such as the environmental permit and winning a tender in 2016 to supply electricity, the most extensive construction work for an onshore project in wpd’s history began in April 2019. By October 2019, over 50 km of gravel tracks had ultimately been constructed, 10 minor bridges as well as a heavy load bridge over the Rio Mininco built and more than 100 km of



underground cabling laid. A cable plough specially built in Germany was shipped to Chile to lay the cables, and proved its worth in operation.



The starting gun for laying the foundations and constructing the two dedicated transformer substations for the farm was fired in October. The company’s own concrete factory then produced a total of around 60,000 m³ of concrete.



The next milestone was celebrated in December ‘19. After a total of 4 months, 14 days and countless hours of work with 621 pages alone of main contracts, the financial close brought the financing of the project to a successful conclusion.

No fewer than 350 workers were employed on the wind farm’s numerous construction sites in January 2020. Thanks to the commitment of all concerned, construction of the working areas and roads was completed in May of the same year. The pouring of the last of the 77 foundations was celebrated in July. At that point, delivery of all the major components, in particular the turbines, had already begun. Ultimately, 815 of these major components arrived on site during this 14-month phase, and the final turbine was transported in September 2021. Work on installing the Vestas V 136 units started with the arrival of the first components in August ‘20.

The rotor blades of the first turbines turned for the first time in May of the following year, producing green electricity. In the spring, the electrical engineering team was able to connect the two large internal 33/220 kV transformer substations SE Surco y Semilla and SE Agua Buena. Two 126 ton transformers made in Germany had been delivered for this purpose – the largest transformers ever bought for a wpd onshore project.

When finally installation of the final turbines was announced in November, two years and eight months of construction time ended with joyous celebrations on site, in wpd’s Chilean branches and not least at the headquarters in faraway Bremen.

In the end, this project, exceptional not just on account of its scale but also with respect to the variety of challenges it posed, demonstrates one thing above all others: the outstanding working relationships between the teams involved. In all phases, they were united in their determination to turn this project into a success for wpd and not least for the energy turnaround in Chile.

Picture above
right: On
November 10th,
2021, the last
turbine in the
Malleco project
was installed. The
team celebrated
with enthusiasm.

Pacesetter for offshore wind energy in Romania: wpd initiates first projects

The Dobruzscha region constitutes an historical landscape, forming the extreme southern portion of Romania. A coastline marks the end of the region to the East as this is where the Black Sea starts. And this was where Romania became the first of the neighbouring countries to drive the development and realisation of offshore wind farms.

wpd was the first developer to apply for the creation of offshore wind energy projects in the Black Sea in 2021. The projects “wpd offshore Black Sea 1” and “wpd offshore Black Sea 2” were to be developed and built off the coast with outputs of 500 MW and approx. 1.4 GW respectively. Above all, imminent political decisions will set the stage to allow this to happen.

Against the background of amended EU climate and energy legislation, the national plan for the development of renewable energies is currently under revision in Romania in order to create the conditions for a reduction in greenhouse gas emissions of at least 40% by 2030. While energy laws have already recently been amended, a national offshore wind law is currently being prepared which is intended to tap the country’s considerable offshore wind potential.



wpd has been active in Romania since 2009 and has a project pipeline of 1,900 MW offshore and 750 MW onshore.



 wpd locations in Romania

 Black Sea 1 + 2

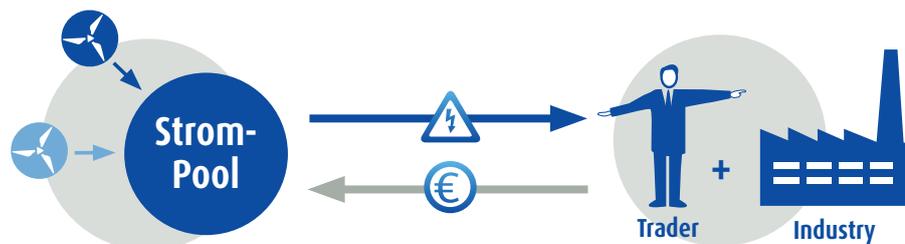
Romania’s Energy Ministry which will take the lead in this development, is relying on the know-how of experienced developers such as wpd. The bill is currently in the parliament’s technical committees. However, it is due to enter into force in 2022. Its contribution towards drafting the Offshore Wind Act makes wpd a pacesetter in Romania’s offshore wind energy. The company will contribute its experience and know-how gathered from over 20 years in the sector in order to support all the necessary processes.

The development of offshore wind energy in Romania would be an important element in the country’s efforts to meet the climate targets it has set itself. wpd is making its contribution to this effort through the development of further projects for onshore wind as the company has been operating in Romania since 2009.

Besides the production of carbon-free energy, the establishment of Romanian offshore wind energy also opens up further economic prospects. For example, excess green electricity in the future could be exported to Bulgaria and other neighbouring countries. In addition, location effects can be mapped out which could boost the local and regional economies at its favourable position at the entrance to the Danube-Black Sea canal. It would offer benefits for industrial sectors of importance in the development, construction and operating phase. The capacity of the important ports in Constanta and Agigea as well as the shipyards located there is sufficiently large to set up the infrastructure needed for offshore wind energy.

Basically, therefore, everything is ready on the Romanian Black Sea coast to drive the energy turnaround in the country. Romania’s clearly defined climate targets support constructive project development. When the final starting gun is fired with ratification of the Offshore Wind Act, wpd’s Projects Black Sea 1 and 2 can form the start of a success story of energy capture at sea.

wpd strompool: Marketing the electricity produced efficiently



-  wpd wind project companies
-  other wind project companies
-  Electricity is pooled and marketed
-  Strompool receives a fee.

The term “pool” reflects an important aspect of the electricity pool structure as here electricity is neither bought nor sold but rather combined in a collecting tank. wpd strompool serves to bundle volumes of electricity, primarily electricity from post-EEG systems, in other words projects that will no longer be subsidised through the EEG after 20 years of production time.

The question arises for post-EEG projects and their companies as to how the green electricity produced can be best marketed, regardless of whether it comes from wind or solar projects. wpd itself was faced with this dilemma when its own portfolio of systems began to drop out of EEG subsidies once the said 20 years of operation were up.

To a certain extent, this was what gave birth to the idea of wpd strompool. If you want to market green electricity, potential buyers tend to be less interested in buying only part of their own total requirement and ultimately in concluding multiple contracts in order to cover it – usually by way of a Power Purchase Agreement. In the electricity pool, individual parts in the form of individual marginal production volumes are bundled to form a total volume and made available to major domestic and global buyers from industry or electricity trading.

The specific marketing is conducted directly by wpd strompool in collaboration with the PPA Department at wpd which has built an international network over the last few years. An electricity producer first allows its production volume to flow into the electricity pool in accordance with the agreement. Only then does

the search for the best possible contract start. That requires trust. Trust which wpd has now built around the world.

Green electricity is significant for customers from industry due to the acquisition of certificates of origin. Demand is growing sharply and there is barely any end to the trend in sight.

The main argument for external systems operators to join wpd strompool is that the electricity from external systems is marketed together with wpd’s own electricity volumes. All the expertise is focused on optimising the electricity revenues. The same income and identical costs – that is the guiding principle for all systems in the pool. And that builds trust.

As post-EEG systems only have a relatively limited useful life beyond their 20-year operating life and repowering is often an attractive option, agreements on marketing via wpd strompool are limited to a very short period. They are usually designed for three years. Three years, however, in which the electricity enjoys optimal marketing.



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, iStock, BMW

