JOINT IMPACT  Interview on further integration of Lagerwey into ENERCON

INTERNATIONAL LAUNCH OF EP3  ENERCON has more than 1,300 MW under contract

INTERNATIONAL COMMUNITY PARTICIPATION  First French wind farm with municipal shareholder
Embracing the energy transition as an opportunity

Dear customers, business partners and employees, dear readers,

In times of change, people tend to show scepticism. Their goals, convictions and everyday actions are suddenly called into question. New rules apply and people are forced to adopt a new focus, which can give rise to uncertainty. They often reject and resist change as a reflex, which is also down to the fact they mainly see the potential negative impacts.

This phenomenon can also be observed in the case of the energy transition. Although there is widespread agreement that climate change poses a threat and climate protection is necessary, Germany is struggling to systematically implement the necessary countermeasures: restrictions are being put on renewable energy expansion, the coal phase-out is being prolonged, and attempts to tackle the issue of electromobility are half-hearted. The end result seems to be: don’t change things too quickly, but hold on to what is tried-and-tested instead.

The energy transition debate is also dominated by alleged risks, doubts and drawbacks.

We are in desperate need of a shift in mentality! It is high time that we start to see the transition in the energy, heat and transportation sectors as an opportunity to embrace instead of continuing to talk it down and clinging on to outdated behaviour. We should look to the example set by Greta Thunberg. The Swedish schoolgirl has been demonstrating in support of climate protection in front of the parliament in Stockholm every Friday for months, and also confidently read the riot act to those in power at the World Economic Forum in Davos. Her dedication has triggered a worldwide climate protection movement among young people.

We are not lacking opportunities: an accelerated coal phase-out would change our carbon footprint abruptly and free up the grids for more renewable energy. Concentrated and accelerated expansion of onshore wind energy, photovoltaics and storage solutions could take place in dismissed coal-mining areas. There are already plenty of ideas in circulation. Now it is up to the government, federal states, municipalities, industries and environmental associations to quickly work out solutions to advance a change to the structure. Renewable energies enable continued employment and creation of added value, and prevent the affected regions from being left behind economically.

The situation in the transportation sector is similar. E-mobility helps the carbon footprint and improves air quality in our polluted metropolises. The integrated energy concept also opens up new business opportunities in the heat and transportation sectors for the renewable energies, as well as for other industries, which in turn leads to the growth of new prospects for the supply and service sectors. Closer networking between renewable energies and industry will provide even more opportunities – the buzzword here is Power Purchase Agreements (PPAs).

All of the above shows that climate protection, industry and Germany (as a business location) would benefit from an active energy transition. The industrial jobs of the future will be provided by the production of renewable energy systems, energy storage systems and electric vehicles and charging infrastructure, plus more energy-efficient machines and more environmentally-friendly products. Economies that manage to change over to a renewable and increasingly carbon-free system of functioning now will be one step ahead in the future. Products from such countries are favoured by consumers, and will also be the cheaper alternative going forward if carbon footprints are priced in. There is no stopping this transformation and it is important that Germany keeps pace internationally. Otherwise, our competitive position will be at stake in the long term. Countries such as China are leading the way. They have developed strategic master plans which aim to put them at the head of key sectors in a matter of years, and are focussed on implementing these systematically.

ENERCON is eager to contribute to the success of the transition. We will be changing ourselves, too: from the production of our WECs and their global sale to being a supplier of complete system solutions for renewable energies. Join us in undergoing this transformation! The efficient and high-performance models in our new WEC generations, our innovative integrated energy products and solutions and our game-changing energy logistics services are our contribution to ensuring the success of the energy transition. Visit us at the WindEurope Conference & Exhibition in Bilbao and at the Hanover Messe to make your own impression and see the positive aspects of change for yourself! We need peers for the energy transition who firmly support our vital plans for the future and spread the positive message of change with conviction. The time of the sceptics, procrastinators and objectives has to come to an end.

Hans-Dieter Kittel
Managing Director of ENERCON
Difficult road ahead for German wind energy sector

The onshore wind energy sector continues to be confronted with huge challenges in Germany. According to figures compiled by market observer Deutsche WindGuard, just 743 wind energy converters were installed in 2018 with a total capacity of 2,402 MW. This means that compared with the record year in 2017, when the industry installed a total of 5,333 MW and 1,792 wind energy converters, there was a drop of 55 percent.

ENERCON is also affected by this decline: while the company was still able to install 2,066 MW in Germany in 2017, the market conditions led to it only being able to connect 1,278 MW to the grid last year. ENERCON installed a total of 2,840 MW worldwide in 2018. Despite the negative framework conditions, ENERCON has a 53.2 percent share of the German market. It was therefore able to once again secure its position as market leader in one of the world’s major onshore markets, which is characterised by significant change and enormous cost pressure.

Photo: Transport of rotor blade to E-138 EP3 prototype site at Wieringermeer/Netherlands.
“W2G” integrated energy project put into operation in Brunsbüttel

The “Wind to Gas Energy” (W2G) pilot project in which ENERCON served as a technology and services partner was put into operation in spring in Brunsbüttel/Schleswig-Holstein. The integrated energy project comprises a 2.0 MW/2.7 MWh battery storage system and a 2.4 MW PEM electrolyser, and is directly connected to a wind farm with ENERCON wind energy converters (3 x E-115 and 2 x E-101). The project is funded by the SINTEG programme of the Federal Ministry for Economic Affairs. With this programme, the Federal Government aims to develop and demonstrate model solutions for safe, economical, and environmentally-friendly energy supply with high proportions of fluctuating power generation from wind and solar energy.

In the W2G project, electrical energy is sold as control reserve on the primary control reserve market with the aid of the battery storage system. This is intended to compensate for short-term frequency fluctuations in the power grid. The electrolyser is integrated into the wind farm-internal grid upstream of the network connection point with the gas grid. The hydrogen filling station is expected to be installed by the middle of this year. A “hydrogen community” with a number of fuel cell vehicles is currently emerging in Brunsbüttel and the surrounding area, representing a further clientele. The communication interface between the wind farm and the electrolyser was one of the developments undertaken by ENERCON for the pilot project. ENERCON and its project partners are also making progress with another integrated energy pilot project planned for the Emsland region of Lower Saxony. The Haren Fehndorf project plans include a new wind farm with ENERCON WECs, a 4 MW battery storage system and an electrolyser with at least 2 MW power. Approval to construct the wind farm and the storage area has been granted. Preparations for the individual construction measures are currently underway. Construction is scheduled to start this year.

This system solution has the benefit of preventing limitations on wind farms related to grid bottlenecks thanks to the power-to-gas technology, while simultaneously enabling appropriate energy volumes to be used in the heating and transport sectors or in industry. At the same time, long-term storage of renewable energy is realised in connection with the gas grid capacities.

ENERCON has put two prototypes of the new E-Storage 2300 into operation. The first containers with the interface technology for connecting battery storage systems have been installed as part of the “Sysflex” research project at the EDF Laboratory Les Renardières in Moret-sur-Loing, France, and at the ENERCON test site in Flisberg, East Frisia. The concluding series of measurements for product certification are currently underway in Flisberg. The system will then be permanently installed in the Pfaffenhofen storage project in Upper Bavaria, which will be realised in cooperation with the municipal utilities there and a community-owned energy cooperative.

The E-Storage 2300 is a bidirectional power conversion system that enables electrical energy to be fed into and out of battery storage systems quickly. The system has a maximum active power of 2.3 MW and a nominal power of 2.0 MW, and is installed in a steel container measuring 40 feet. Its main components are medium-voltage switchgear, a transformer, AC-DC converters, DC-DC converters and a control cabinet. The battery system has a power of 2.3 MW and a capacity of 3.2 MWh.

Two E-Storage 2300 prototypes in operation

ENERCON NEWS

VERSAILLES/FRANCE

Meeting between ENERCON and French President Macron

ENERCON Managing Director Hans-Dieter Kettwig met with French President Emmanuel Macron at the “Choose France 2019” economic summit in Versailles at the end of January. During the meeting, the two exchanged views on onshore wind energy. Kettwig also presented ENERCON’s activities in France and reiterated that the company is in a position to step up its involvement in the expansion of onshore wind energy. ENERCON is more than willing to help make a success of the energy transition in France, Kettwig explained.

From now on, the e.g.o.o will also operate a new Dörpen - Ludwigshafen route. The rail company belonging to ENERCON will transport freight on this line three times a week for a major customer. The trains will run overnight between the Emsland region and Ludwigshafen. They will be drawn by modern electric locomotives and will be able to transport standard containers and chemical tanks.

The route starts at the terminal of the Dörpener Umschlaggesellschaft für den kombinierten Verkehr mbH (DUK) tri-modal logistics hub, and finishes at the rail terminal of the Kombi-Terminal Ludwigshafen GmbH (KTL) on the site of chemicals concern BASF. “The e.g.o.o. connects a number of the key industrial regions in Germany and the neighbouring Netherlands with full 700 metre trains,” says e.g.o.o. Prokurist Christian Stavermann. “As a result, we are playing an active part in helping to move traffic from road to rail. In addition, logistics customers can also directly access attractive interchange connections for destinations such as Italy, France, Spain or Turkey, and send their load units in a safe and environmentally-friendly manner.”
ENERCON’s cargo ship “E-Ship 1” transports third-party cargo for the first time

The “E-Ship 1” cargo ship, originally designed to transport components of ENERCON wind energy converters, is now also transporting third-party freight. Offering transport services for external customers is a way to better utilise the ship’s capacity, for example on return journeys from regions where components had previously been discharged for ENERCON wind energy projects. The first third-party shipments included 5,000 tonnes of steel pipes, which were transported from Turkey to Rotterdam in the Netherlands, and one 500 tonne and one 800 tonne pile hammer on the route Turkey - Hamburg.

The “E-Ship 1” is propelled by four Flottner rotors and its design as a multi-purpose vessel (MPP) makes it very well suited for transporting bulky goods and heavy cargo weighing up to 180 tonnes per unit. Two on-board cranes mean it does not have to rely on the port infrastructure when discharging cargo. ENERCON Logistics sees great potential on-board cranes mean it does not have to rely on the port infrastructure when discharging cargo. ENERCON Logistics sees great potential for the use of the WEC cargo vessel in the steel, machine and plant construction industries as well as the wind energy sector.

In order to intensify ENERCON’s focus and strengthen the company’s position for the global wind energy market, challenges that lie ahead, Hans-Dieter Ketteig and Simon-Hermann Wobben stepped down from their positions on the board of the Aljos Webben Stiftung on 1 January 2019. The ENERCON GmbH Managing Directors made the decision to take this step based on a desire to concentrate fully on their roles as ENERCON Managing Directors in light of the persistently tough market conditions in the important home market of Germany, and ENERCON’s increased focus on international markets.

“We all share a common goal: to drive ENERCON’s strategic and operational development forward and achieve success for the company”, says Hans-Dieter Kettwig. “In the face of drastically changing framework conditions, this task demands our full attention”, adds Simon-Hermann Wobben. “That is why we asked the trust advisory board to release us from our functions on the board of the Aljos Webben Stiftung.” The advisory board accepted this request.

Since then, the trust advisory board has succeeded in filling the vacant positions on the board of trustees: this organ of the Aljos Webben Stiftung consists of Heiko Janssen as Chairman of the Board and Jochen Riser as Member of the Board. Heiko Janssen is a lawyer and notary public who runs his own law office in Aurich. Jochen Riser is a retired graduate engineer who served with ENERCON’s research and development division WRD.

The Aljos Webben Stiftung thanks Hans-Dieter Ketteig and Simon-Hermann Wobben for their hard work and commitment in their functions on the board over the past years, and is looking forward to continuing its trust-based collaboration with them as ENERCON Managing Directors in future.

Successful lab test runs for enera research project

ENERCON has successfully performed several lab test runs on automated grid operation for the enera research project. The tests were conducted by WRD in cooperation with EWE NETZ GmbH in the electrical energy systems laboratory at the Jade University of Applied Sciences, Wilhelmshaven. The main focus was on testing the fundamental functions of grid controllers. The tests in the laboratory are part of the preparations being made for the field tests which will be performed in the medium-voltage grid region of EWE NETZ GmbH in East Frisia in the coming months.

A test grid with electrical properties comparable to those prevailing in the grid region (resulting from a comprehensive grid study) was set up for the lab tests in Wilhelmshaven. Various areas were tested, such as utilisation management with automated peak capping, voltage stability management and reactive power management. The test team designed a range of scenarios for these tests, including high or low feed-in from renewable generating plants, high or low consumption performance, feed-in management requirements, and the failure of sensors and actuators.

As well as other topics, the enera research project centres on regional system services that stabilise the grid locally and enhance the reliability of the power supply on the basis of renewable energies. It offers ENERCON a suitable platform to work together with project partners and test the systems required for the next step in the evolution of the energy transition in their entirety. The findings will help to tackle the challenges of the energy transition in Germany.

ENERCON brings its vast competence in the areas of power electronics, project management and electrical characteristics of wind energy converters to the table. In terms of hardware, its scope of services includes the provision of E-Storage units and the retrofitting of WECs in the region with STATCOM features, as well as testing a grid operation concept on a reduced scale at lab level.

AURICH

Personnel changes in Aloys Woebben Stiftung board of trustees

WILHELMSHAVEN

Successful lab test runs for enera research project

ENERCON has successfully performed several lab test runs on automated grid operation for the enera research project. The tests were conducted by WRD in cooperation with EWE NETZ GmbH in the electrical energy systems laboratory at the Jade University of Applied Sciences, Wilhelmshaven. The main focus was on testing the fundamental functions of grid controllers. The tests in the laboratory are part of the preparations being made for the field tests which will be performed in the medium-voltage grid region of EWE NETZ GmbH in East Frisia in the coming months.

A test grid with electrical properties comparable to those prevailing in the grid region (resulting from a comprehensive grid study) was set up for the lab tests in Wilhelmshaven. Various areas were tested, such as utilisation management with automated peak capping, voltage stability management and reactive power management. The test team designed a range of scenarios for these tests, including high or low feed-in from renewable generating plants, high or low consumption performance, feed-in management requirements, and the failure of sensors and actuators.

As well as other topics, the enera research project centres on regional system services that stabilise the grid locally and enhance the reliability of the power supply on the basis of renewable energies. It offers ENERCON a suitable platform to work together with project partners and test the systems required for the next step in the evolution of the energy transition in their entirety. The findings will help to tackle the challenges of the energy transition in Germany.

ENERCON brings its vast competence in the areas of power electronics, project management and electrical characteristics of wind energy converters to the table. In terms of hardware, its scope of services includes the provision of E-Storage units and the retrofitting of WECs in the region with STATCOM features, as well as testing a grid operation concept on a reduced scale at lab level.

E-138 EP3 prototype installed
ENERCON has reached the next stage of its EP3 programme. At the end of February, the prototype of the E-138 EP3 WEC was installed at the Wieringermeer wind energy test site in the Netherlands. The low-wind WEC (IEC wind class IIIA) follows in the footsteps of the E-126 EP3 for wind class IIA sites and is the second WEC type to feature the new compact design. “We are pleased that we are making progress with our EP3 programme, and that we have successfully installed the first E-138 EP3”, says ENERCON Sales Director Stefan Lütkemeyer. “Our development and installation team have all done a brilliant job to make this happen. This is even more impressive considering we are pushing a number of other large-scale WEC and Smart Solutions developments at the same time.”

Fast prototype installation in Nordholland

The first E-138 EP3 is located in the province of Nordholland. The WEC was installed on a hybrid tower at the test site approximately 80 kilometres north of Amsterdam. After clearly demonstrating its advantages during installation of the first E-126 EP3, the new compact WEC design proved itself a second time around with the E-138 EP3, thanks to the main components being already finally assembled at the plant. “This allows the processes on the construction site to be sped up significantly”, reports Project Manager Daniel Wolken from ENERCON PLM GmbH. The installation time for the E-138 EP3 has also been considerably reduced compared to the time required for the egg-shaped nacelle used up until now. Work to achieve further reductions is ongoing.

However, delivery of the rotor blades did present new challenges. At 66.8 metres, the E-138 EP3 one-piece rotor blades are very long. This makes them more difficult to handle during transportation. For this reason, ENERCON’s Logistics Department had purchased new special trailers featuring a hydraulic system to raise the semi-trailer. This mechanism proves particularly advantageous when driving round narrow bends and entering and exiting motorways: the blade can simply swing over any obstacles in its way. The equipment was used for the first time to deliver the rotor blades to the prototype project in Wieringermeer. “The trailers passed their first big test”, says Project Manager Daniel Wolken. “The hydraulic system for raising the semi-trailer works very well. It makes the transport of the long EP3 rotor blades much easier.”

First test results positive

ENERCON’s research and development company WRD began testing components for the E-138 EP3 in autumn, before the prototype stage had actually begun. In addition to the usual tests, a new safety system project in Wieringermeer. “The trailers passed their first big test”, says Project Manager Daniel Wolken. “The hydraulic system for raising the semi-trailer works very well. It makes the transport of the long EP3 rotor blades much easier.”

First test results positive

ENERCON’s research and development company WRD began testing components for the E-138 EP3 in autumn, before the prototype stage had actually begun. In addition to the usual tests, a new safety system...
TECHNICAL SPECIFICATIONS – E-138 EP3 E1

- Nominal power: 3.5 MW
- Rotor diameter: 138.25 m
- Wind class: IIIA (IEC)
- Available hub heights: 81m, 111m, 131m, 160m

TECHNICAL SPECIFICATIONS – E-138 EP3 E2

- Nominal power: 4.2 MW
- Rotor diameter: 138.25 m
- Wind class: IIIA (IEC)
- Available hub heights: 81m, 111m, 131m, 160m, further hub heights on request

Further development to E-138 EP3 E2

Meanwhile, the EP3 programme at WRD is continuing to run at full speed. The next type of EP3 WEC, the E-115 EP3 for wind class IA locations, is already in the development phase. Installation of the prototype is planned for the first quarter of 2020. At the same time and also with a 2020 aim, WRD is developing the E-138 EP3 into the E-138 EP3 E2. This wind turbine will have an enhanced nominal power of 4.2 MW and an annual energy yield up to ten percent higher than that of the E-138 EP3 E1 – based on a mean wind speed of 6.5 m/s at hub height. On top of this, the developers are using the E2 to pursue the goal of further optimising the compact WEC and installation concept. ’We intend to reduce the installation time for the E2 even further than we did for the E1’, says zur Mühlen.

For example, the E2 rotor blades for WECs with a hub height of 149 metres and less are installed using a modified version of the single-blade installation method, explains Florian Rubner, Division Manager of Rotor Blade Development at WRD. The first rotor blade is bolted at the 3 o’clock position. Then the lock is released to lower the blade until the next free blade connection is at the 9 o’clock position and the second blade can be installed there. Afterwards the hub can be turned again. This is done using the crane, instead of with the aid of a ballast arm as before. ’The crane pulls up on the second blade until the last free blade connection is approximately at the 2 o’clock position, where the third rotor blade is then installed from above at roughly a 30° angle’, says Rubner. ’We can’t turn the hub to the 3 o’clock position with the crane, as that would exceed the tolerable forces.’

A considerable amount of time and money is saved by abandoning the use of the ballast arm and the associated work steps of installing the ballast arm, turning the WEC and removing the ballast arm. ’The time and costs involved in using the ballast arm are not just restricted to the construction site, where several crane lifting operations are required’, explains Rubner. ’A ballast arm for the EP3 is a heavy installation aid and is expensive to produce. It also has to be transported to the construction site as an abnormal load and has to be assembled before each use. These issues no longer apply with the new installation concept.’

ENERCON is planning installation of the E2 prototype by the end of 2019. Series production is set to begin at the start of 2020. In view of the EP3 orders that have already been placed, ENERCON Sales Director Stefan Lütkemeyer is pleased with the interim result of the market launch: ’The new E-126 EP3 and E-138 EP3 wind energy converters are very well received by customers and potential buyers the world over. The response we are recording is highly positive, and is further proof for us that we are developing the right products to match the changing market requirements.’ //

Distinctive appearance: the E-138 EP3 is the second ENERCON WEC type to feature the new compact nacelle design.
Two technology leaders join forces

Since they teamed up at the end of 2017, ENERCON and LAGERWEY have been rising to the global challenges of the energy transition together. In an interview with WB, ENERCON Sales Director Stefan Lütkemeyer, Lagerwey Sales Director Ronald Boerkamp and Lagerwey Technical Director Aart van de Pol told us more about the process of joining the companies together, the exploitation of synergies and the impact of their combined technological forces in the global market.

The interviewees \(\text{lr: Lagerwey Sales Director Ronald Boerkamp, ENERCON Sales Director Stefan Lütkemeyer, Lagerwey Technical Director Aart van de Pol.}

**wb**: It has been more than a year since ENERCON and Lagerwey formed an affiliation. How is the collaboration working out? What has happened since then?

**Stefan Lütkemeyer**: Rapid progress has been made in joining the individual areas of both companies since we came together at the end of 2017. Everything is going well, regardless of whether we’re talking about Research and Development, Sales or Purchasing: we are developing new WECs as the EP5 platform and the LP4, was only possible because we could pool our R&D resources. Other joint R&D projects include the adaptation of the MST tower concept for the EP3 platform and the development of a more powerful Climbing Cranes for WECs bigger than the LP2.

**Boerkamp**: In terms of project business, we are able to report that the first big contracts have been concluded for the L-136 LP4 and L-147 LP4. We are also already conducting intensive discussions with customers and interested parties on the supply of the new EP5 platform WECs. We are particularly pleased that our customers are putting their trust in these new WEC types, and it is a nice confirmation of the quality of our development work.

**Lütkemeyer**: Another objective we had was to utilise synergies in the Production and Purchasing divisions. We are making progress here, too: LP2 components for the Russian project that Lagerwey brought to the affiliation, for example, are starting to be produced by our production partners in Germany. Where tapping of new international markets is concerned, we are now at a stage where Purchasing departments in the new countries are coordinating uniform supply chains across all products from the beginning.

**wb**: What specifically has been achieved at this point?

**Aart van de Pol**: The most notable accomplishments are the WEC types we have developed together based on the Lagerwey LP4 platform. We will be launching these WECs as the E-147 EP5 and E-160 EP5 in the near future. The fast development, which also involved positioning the WECs at a higher level in terms of nominal power than with the LP4, was only possible because we could pool our R&D resources. Other joint R&D projects include the adaptation of the MST tower concept for the EP3 platform and the development of a more powerful Climbing Cranes for WECs bigger than the LP2.

**Boerkamp**: In terms of project business, we are able to report that the first big contracts have been concluded for the L-136 LP4 and L-147 LP4. We are also already conducting intensive discussions with customers and interested parties on the supply of the new EP5 platform WECs. We are particularly pleased that our customers are putting their trust in these new WEC types, and it is a nice confirmation of the quality of our development work.

**Lütkemeyer**: Another objective we had was to utilise synergies in the Production and Purchasing divisions. We are making progress here, too: LP2 components for the Russian project that Lagerwey brought to the affiliation, for example, are starting to be produced by our production partners in Germany. Where tapping of new international markets is concerned, we are now at a stage where Purchasing departments in the new countries are coordinating uniform supply chains across all products from the beginning.

**wb**: What is next in store for the development of technology and the union of the companies?

**Lütkemeyer**: By the end of the year, Lagerwey will be completely integrated. The effects of this will be seen primarily in our presentation to the public: the products we have developed together will be marketed under the brand name ENERCON. We will start with the new E-147 EP5 and E-160 EP5, which Ronald already mentioned. Lagerwey will disappear as a product designation but will remain as the name of an innovative development unit within the ENERCON group.

**Boerkamp**: In terms of project business, we are able to report that the first big contracts have been concluded for the L-136 LP4 and L-147 LP4. We are also already conducting intensive discussions with customers and interested parties on the supply of the new EP5 platform WECs. We are particularly pleased that our customers are putting their trust in these new WEC types, and it is a nice confirmation of the quality of our development work.

**Lütkemeyer**: Another objective we had was to utilise synergies in the Production and Purchasing divisions. We are making progress here, too: LP2 components for the Russian project that Lagerwey brought to the affiliation, for example, are starting to be produced by our production partners in Germany. Where tapping of new international markets is concerned, we are now at a stage where Purchasing departments in the new countries are coordinating uniform supply chains across all products from the beginning.

**wb**: What significance does the company affiliation have for the increased involvement in international markets?

**Lütkemeyer**: Joining forces benefits us greatly in competition. Our accumulated development power puts us in an even better position to supply our customers with our most suitable and most competitive WEC technology for their projects all over the world. We offer them a product portfolio that is optimally enhanced.

**Boerkamp**: Yes, without a doubt. The collaboration is a great success on an internal level, too. We have a fantastic, highly motivated joint team with tremendous expertise.

**Lütkemeyer**: East Frisians and Dutch people get along well, that’s not a problem! Our team is working very hard and is coping well with the task at hand.

**Ronald Boerkamp**: I also get the impression that we have a great team spirit which makes for a very constructive cooperation. In addition to our development work, we are also in the process of establishing uniform standards and processes in all areas of the company. This equally demands a lot of work, but our colleagues are all highly motivated. The nice thing is that our teamwork is already producing excellent results.

**wb**: How have customers and business partners reacted to the affiliation?

**Lütkemeyer**: The majority of our customers have reacted positively and welcome the collaboration. The excellent response to the WECs we have developed together is proof of this. The new WECs are very well received, the LP4 (or EP5) is the technology favoured by customers in many projects in Germany and further afield. This is testimony to the confidence our customers have in us.

**wb**: And the colleagues? Do the Dutch people get on with the East Frisians?

**Boerkamp**: Yes, without a doubt. The collaboration is a great success on an internal level, too. We have a fantastic, highly motivated joint team with tremendous expertise.
A change to the product designation has been made in the next stage of ENERCON and Lagerwey’s affiliation. In future, all of the new WECs developed in partnership will enter the market as ENERCON WEC types with a uniform “E” series designation. The new E-147 and the new E-160 are taking the lead, as ENERCON WEC types with Lagerwey's affiliation. In future, all of the new WECs developed in partnership will enter the market as ENERCON WEC types with a uniform “E” series designation. The new E-147 and the new E-160 are taking the lead, as ENERCON WEC types with Lagerwey’s affiliation. In future, all of the new WECs developed in partnership will enter the market as ENERCON WEC types with Lagerwey’s affiliation.

The E-147 EP5 for wind class IIIA has a nominal power of 5.0 MW. The nominal power of the E-147 and the new E-160 EP5 for wind class IIIA turbines. By positioning the E-147 and the new E-160 EP5, WITH THE NEW DESIGNATION COMES AN INCREASE IN POWER.

The compact size of the climbing crane means it only takes three trucks to transport it on standard trailers. For projects in foreign markets, the crane equipment can also be shipped in containers to the installation site. The special crane is assembled and ready for use on the construction site after a setup time of approximately one day. It offers many advantages which together play a huge part in reducing the installation costs of wind energy projects. These aspects are the simplified transportation, shorter setup time, a broader scope of application including in strong winds and more relaxed requirements regarding the crane platforms.

Lagerwey has tailored the “Climbing Crane” to its modular steel tower concept (MST) (see WB 4/2018). The MST components feature special connection points which the climbing crane uses to pull itself up the tower from segment to segment. ENERCON and Lagerwey are currently working together to develop the “Climbing Crane” further, in order to be able to use this highly efficient type of crane to install WECs in ENERCON’s new EP3 and EP5 product range in the future, too.
Premiere for EP3 rotor blade transport with self-propelled vehicles

ENERCON HAS INSTALLED THE FIRST E-126 EP3 WEC ON A STEEL TOWER IN THE HüLSCHEID WIND FARM IN NORTH RHINE-WESTPHALIA. THE CONDITIONS AT THE SITE MEANT SPECIAL EQUIPMENT HAD TO BE USED TO DELIVER THE COMPONENTS FOR THE Prototype.

The components belonged to an E-126 EP3 WEC that was installed on the “Böllinger Heide” heath in the Märkischer Kreis district south of Hagen. It was the first ever EP3 to be installed on a steel tower, at a hub height of 116 metres. The wind turbine is accessed via a curvy back road that leads through the forest, which is impassable for conventional rotor blade transport vehicles. After making most of the journey from Magdeburg by truck, the rotor blades were therefore stored temporarily at the motorway services to begin with.

“We were given permission to block off truck areas”, says Linda Fastenau. “The car parking spaces were still usable during the day.”

The motorway services were then closed completely in the nights to follow when the wind conditions were favourable, so that the rotor blades could be reloaded onto the self-propelled vehicle.

This 10-axle special transport vehicle is extremely manoeuvrable and can raise a loaded rotor blade up to an angle of around 60 degrees using the Alpine transport frame. This means rotor blade transport vehicles can also take tight curves in forest regions without a large woodland clearing operation having to take place beforehand.

A mobile crane and a telescopic handler lifted the EP3 rotor blades for reloading and manoeuvred the blade connection bolts into the holes in the adapter plate built specially for the new blade types on the special transport vehicle. Once the blades had been bolted, they were reversed at walking speed down a side exit from the motorway services. From the next curve onwards they were transported forwards through the forest to the installation site.

“We are pleased that the premiere was a success and that we have now gained valuable experience for further EP3 projects”, says Project Manager Linda Fastenau. “As ENERCON uses one-piece rotor blades for its EP3 wind turbines, logistics planning for future inland projects will often have to work around challenges like these ones and rely on special equipment for transportation. Our project showed that we are well-equipped to deal with the logistical challenges.”
Coal phase-out calls for more expansion of wind energy – not less

The energy transition in Germany suffered a delicate setback in 2018, with only 2,400 MW of new onshore wind energy capacity compared to 5,333 MW the year before. The figures even fell significantly short of the cautious forecasts. The fact that Enercion was able to expand its market share with 1,278 MW is of little comfort in one of the most important onshore markets in the world, which is currently characterised by significant change and enormous cost pressure.

The setback is not only down to considerably fewer projects being able to submit an application under the German Federal Immission Control Act due to the limitations of eligible areas in the federal states, but also the reduced chance of them receiving approval afterwards. A study conducted by Fraunhofer Navigant on behalf of the Federal Environment Agency (UBA) found that a third of all project applications now no longer receive approval.

The results of the most recent round of tendering were disclosed by the Federal Network Agency (BNetzA) in the middle of February. Wind projects with a total volume of 499 MW were the only ones to make a bid – over 200 of the 700 MW put out to tender will therefore remain unused. This signal is devastating considering the total of 1,810 MW that has been approved and reported to the BNetzA.

Research by the specialist agency “Wind An Land” shows that the majority of approved projects are not putting in bids at this moment because they are being sued. Changes in the rights of associations make a bid – over 200 of the 700 MW put out to tender will therefore remain unused. This signal is devastating considering the total of 1,810 MW that has been approved and reported to the BNetzA.

The CDU/CSU and SPD Bundestag factions have now convened an “AG Akzeptanz” working group that aims to arrive at results in the second quarter. Its objective is to bring the growing resistance to a number of projects under control and achieve more expansion again. One topic under discussion in the group is a value creation levy for local communities. However, general height limits and distances to buildings are also under discussion, and they are both fatal signs for further wind energy expansion. If the overall height permitted for a wind energy converter were to be limited to 150 metres, for example, the popular WEC types would no longer even be considered for projects. Instead, the huge trend towards larger wind energy converters fuelled by the switchover to the tendering system would be reversed, and more than twice as many wind energy converters would be needed to reach the target of 65 percent renewable energy by 2030 as would be the case with modern WECs. “Where inland locations are concerned, our high hub heights are the only ones which are successful in the tendering process”, explains Egbert Terhol- sen, Sales Director for Southwest Germany at Enercion. “In North Rhine-Westphalia, the districts of Steinfurt and Bor- ken are some of the most successful in terms of wind energy expansion and acceptance – and that in spite of densely built-up areas and total heights of well over 150 metres. Up until now, these regions have succeeded in allowing the people who live there to benefit from the created value, in particular as a result of direct participation in the projects and regional wind energy tariffs.”

The German Wind Energy Association (BWE) has proposed a regional value creation law, in order to ensure local communities profit from the added value across the board: in consultation with the local authorities, planners are to be obliged to invest two percent of the project volume in the site region. This regulation has a clear advantage compared to the special regulation for community-owned energy that failed in the first rounds of tendering – the acceptance measures benefit all residents instead of just the circle of citizens with a financial interest in the wind energy converters. Particularly in East Germany, where many of the citizens in rural areas do not possess much capital, this type of value creation levy would be the only way to enable them to share in the success of the energy transition on a wider scale. “Including the local people is paramount”, explains Enercion Managing Director Hans-Dieter Kettwig. “At ENERCON, we can look back on several years of positive experiences with involving the local people at an early stage. To make the benefits of wind energy clear to people across the whole country, ENERCON is taking part in the campaign “DIE WINDKRAFT”. This is something the scores of companies in the wind energy industry urgently need to do – after all, a coal phase-out no later than 2038 as announced by the Coal Commission can only actually be realised if widespread backing for wind energy expansion exists.”
Energy policies set the course at EU level

THE AGREEMENT ON REFORMS TO THE EUROPEAN ELECTRICITY MARKET DESIGN MARKS THE OFFICIAL CONCLUSION OF THE MAJOR “EU WINTER PACKAGE” LEGISLATIVE PROJECT. THE FOCUS IS NOW ON THE EUROPEAN ELECTIONS IN MAY, WHICH THE WIND ENERGY INDUSTRY WILL ALSO BE FOLLOWING WITH A GREAT DEAL OF INTEREST.

Looking back: agreement on new rules for electricity markets in the EU

Just before the end of last year, the EU institutions agreed on new rules for a uniform electricity market design in the EU. The EU legislator had the explicit objective of using these rules to lay the foundation for the inclusion of larger amounts of electricity from renewable energy. The results show that this objective was at least in part achieved.

The first welcome effect of the new rules is that they go a long way towards making the electricity market more flexible. This means, for example, power supply companies in the whole of the EU will have to offer their customers flexible electricity tariffs in future. Feed-in of renewable energies will be better accommodated with targeted management of demand. In addition, aggregators are to help bring fragmented capacities onto the market in the future by grouping them.

The new rules intend to enable electricity trading to be performed at shorter notice. The aim is for it to be possible to trade electricity in 15-minute units in the whole of the EU from 2020 onwards. Germany’s legal position already complies with this demand, but the shorter trading window will bring about a significant improvement in other EU countries. Long lead times put generators of wind and solar energy at a disadvantage, as their production cannot be planned as precisely as with fossil fuel power plants. The shorter units that have now been agreed will make it easier to sell electricity from wind energy (beyond national borders, too), and will therefore play a huge part in further developing the internal energy market.

Security of supply in the electricity sector is to be guaranteed thanks to a more intensive cooperation between grid operators across borders. Generating capacities available in neighbouring countries are to be taken into account when planning supply security. This cross-border cooperation means fewer reserve power stations are required in total. Up until now, holding reserve power has been heavily subsidised. Furthermore, strict emission limit values apply for capacity mechanisms, which spell the end of subsidisation for many coal-fired power stations.

One point of elementary importance for the wind energy sector is priority for renewables. This is already common practice in Germany, and will soon apply in the whole of the EU: if there are grid bottlenecks, renewable power generators must remain on the grid until all the other resources have been exhausted. If limitation cannot be avoided, the WEC operator/owner must be compensated (as is standard in Germany).

The agreement on the market design marks the conclusion of two years of negotiations on the “EU winter package” in Brussels. The legislative package comprises a total of eight directives and regulations which add up to more than 1,000 pages of text. The regulatory cornerstones for the energy sector in the EU pre-2030 have thus been laid just in time before a new political course is set in the coming months.

Looking forward: European elections 2019 – crucially important for the future of wind energy in Europe

After the work of the European institutions was characterised by the legislative process regarding the winter package in 2018, 2019 will be marked by the election of the European Parliament and the appointment of the European Commission. To begin with, EU citizens are called on to vote for a new EU Parliament between 23 May and 26 May, in December 2019 the top positions in the EU Commission will be filled.

What does all of this have to do with the energy transition and the further expansion of wind energy in Germany and the other member states? A lot: for example, the European Parliament was on an equal footing with the EU Commission and the member states during the legislative process for the winter package, and therefore helped to define the renewable energy expansion target and the future design of the internal energy market. The Parliament also determines budgets for research and development and participates in making expansion plans for (grid) infrastructure projects in the whole of Europe. The members of the EU Parliament thus play a vital role in creating the framework conditions for wind energy which apply in concrete terms at national, state and regional level right now and in the future.

One of the focal points of the work of both institutions for the 2019-2024 term will be to develop the long-term decarbonisation strategy for Europe further. This strategy was presented in autumn of last year and aims to achieve a climate-neutral economy by 2050. In light of the target issued, intensifying renewable energy expansion has to be a fundamental measure in the strategy.

It is therefore particularly important for the wind energy sector across Europe that representatives in Brussels get to grips with the key issues surrounding the energy transition and the specific regulations for wind energy, and continue to help shape them in a positive direction. //
Canada gets off to flying start with EP3

ENERCON has taken another step towards its goal of increasing focus on international markets. The company has signed agreements with various clients to supply ENERCON’s E-126 EP3 and E-138 EP3 wind turbines for the Canadian market totaling 500 MW. “Over the past few months we have seen a lot of momentum for the new EP3 platform in different international markets”, says Hans-Dieter Kettwig, Managing Director of ENERCON GmbH. “The fact that ENERCON has been chosen to supply turbines in Canada is a great indicator of the suitability of the new efficient, compact and cost optimized EP3 platform for our international markets.”

Under the agreements, ENERCON will supply more than 120 EP3 turbines for more than ten projects in Canada over the next two years. Given the quantity and dimensions of the turbines and its components, international procurement and optimized logistics will be of particular importance.

With more than 2,200 MW of installed capacity in eight provinces and territories across Canada, ENERCON is looking forward to further expanding its presence in North America. “Canada has a great wind regime. Renewable energy, and wind energy in particular, is well suited to help governments fulfill their necessary carbon emission reduction goals by further electrifying the economy. ENERCON is proud to have the right technology to be a part of this venture and the EP3 platform positions us very well for upcoming procurement processes”, states Michael Weidemann, Executive Vice-President of ENERCON Canada Inc. //

More than 600 MW with EP3 under contract in Turkey

For many years now, Turkey has been one of ENERCON’s most important international markets. The company has been active in Turkey since 1998 and has attained a great deal of success there. As one of the biggest companies in the Turkish wind energy sector, ENERCON has installed about 1,400 MW (as at 02/2019) since entering the market and is currently preparing to add another chapter to its success story with the new EP3 platform WECs. “We already have over 607 MW under contract with the EP3 technology for Turkey”, Arif Günyar, Managing Director for ENERCON Turkey, reports with obvious pleasure. “The new wind turbines are going down very well with our Turkish customers, which is an encouraging position for us to start from in the coming months in Turkey.”

The signed supply contracts for 155 E-126 EP3 and E-138 EP3 WECs are currently spread out across ten projects which will be installed in 2019 and 2020. “Our aim is to have another 500 MW for the next two years in the pipeline”, says Arif Günyar.

The projects are partly subject to local content requirements. “We are able to supply all of the required components for both EP3 types in accordance with the applicable local content criteria”, assures Günyar. The towers and rotor blades for the Çakıl project, for example, will be produced locally. For over 110 other WECs, local production of all of the main components is an integral part of the supply contract.

Günyar does not consider the continued tense economic climate in Turkey to be a problem for ENERCON: “We do not believe our current activities will be affected by the situation. However, we are keeping a close and critical eye on all developments. We are hoping that the situation will take a positive turn so that we can implement all of our project plans with our customers as intended. We are full of confidence that this will be the case, as Turkey is a promising growth market with significant potential for the onshore wind energy sector. Together with our customers, we want to continue our contributions to the energy transition in Turkey in the future.” //
ENERCON is making headway in the realisation of major wind energy projects in Sweden. 26 E-103 EP2 wind energy converters with a capacity of 2.35 MW each have already been installed and commissioned at the Ersträsk wind farm in the municipality of Piteå in the province of Norrbotten. The wind farm will have a total of 68 WECs and a power output of 229.1 MW. Preparations for the next construction stage have also already begun, starting with the completion of the first six foundations: 42 new E-126 EP3 WECs with a nominal power of 4.0 MW will be installed in 2019 after the weather-related winter break, meaning the project in northern Sweden will be completely finished by the end of the year.

The search for an investor was brought to a successful conclusion before 2018 came to a close: London-based renewables investor “The Renewables Infrastructure Group Limited” (TRIG) will acquire the majority share with commissioning of the wind energy converters, which will take place in two batches in the first quarters of 2019 and 2020. Acquisition of the first batch was recently signed.

“We are glad that in TRIG we have found a strong and experienced partner for Ersträsk that has an interest in joint long-term operation of the wind farm,” says ENERCON Managing Director Hans-Dieter Kettwig. “The project marks another important logical milestone in the development, implementation and operation of large wind farms in Sweden.”

Furthermore, ENERCON already made the investment decision back at the end of 2017 to enable implementation of phase II of the Markbygden wind energy project in the coming months, in signing the construction contract with Swedish transmission network operator Svenska Kraftnät. The 844.2 MW sub-project “Maximus” is also planned for Norrbotten, and will involve the installation of 201 E-138 EP3 WECs. Svenska Kraftnät has been commissioned with ensuring connection to the grid by July 2020. Construction work for establishing the grid connection has already started. On top of this, ENERCON has also made a start with the necessary infrastructure measures. The project is scheduled to be completed by the end of 2021.

“Both of these projects fit perfectly into ENERCON’s increasing international focus”, says ENERCON Managing Director Hans-Dieter Kettwig. As a result of the decline in market development in Germany, ENERCON has intensified its international activities significantly in recent times. Sweden is one of ENERCON’s core international markets and will continue to play a significant role in future plans for international business. ENERCON has its own supply chain in Sweden, complete with exclusive production partners and a large Service organisation. It is one of the biggest companies in the Swedish wind energy sector.”
Did Boris de Wolf honestly think that the Champ Feuillant wind farm would ever be connected to the grid in the end? He nods. "Yes! Even though there were certainly times when I found it difficult to believe", replies the Project Developer at ENERCON IPP GmbH. After 14 years of project development and arduous legal disputes at several instances, the wind farm in the Hauts-de-France region was commissioned in December 2018. A total of 14 E-82/2.3 MW wind energy converters installed on hybrid towers at hub heights of 108 metres generate energy in an environmentally-friendly manner in the Ferrières, Royaucourt and Welles-Pérennes communes in the northern French department of Oise. "The wind turbines are now turning", says de Wolf with pleasure. "They are making a valuable contribution to the French energy transition! Now that the wind energy converters are operating, it is clear that there is widespread acceptance. This project demonstrated to us once again that a small disappearing minority of local wind energy opponents can often create quite a stir."

The Champ Feuillant wind farm is a good example of how it can pay to have staying power. After the prefecture bowed to local political pressure and rejected the application for planning permission submitted in 2007, and the project initiator filed a successful complaint against this, local wind energy opponents emerged again to block the project by starting legal proceedings against the building permit. They took legal action against the wind farm at all three instances, which explains why the dispute took so long.

In the end none of the legal action taken was successful, meaning construction work could finally begin in January 2018. Christian Mbeumo, Project Manager at ENERCON PLM GmbH, verified that the installation phase went without a hitch, so that the last of the 14 WECs was commissioned at the turn of the year. "Close collaboration with the project developer and the willingness of local landowners and residents to cooperate during the construction phase helped us to install the wind energy converters with no complications", Mbeumo reports with satisfaction.

According to Boris de Wolf, the high standards placed on the project planning, on support during the approval procedure and on any legal disputes that may have had to be settled also played a role in the success. "Ultimately, quality also prevails in the expert reports and planning strategies concerning the wind energy projects."

The French government has now recognised that drawn-out legal disputes of this kind are not conducive to the quick realisation of renewable energy expansion targets. It therefore introduced limitations on lawsuits at the start of this year, namely that they can be tried at a maximum of two instances.

ENCON CHAMP FEUILLANT WIND FARM COMPLETED IN FRANCE IN JANUARY. COMPLAINTS FROM LOCAL WIND ENERGY OPPONENTS CAUSED MAJOR PROJECT DELAY.
Inauguration of first French wind farm with municipal shareholder

The "Questembert Communauté" municipalities association holds 25 percent of the shares in the "Rocher Breton" project developed by ENERCON in Brittany.

Four ENERCON E-82 wind energy converters measuring almost 150 m turn majestically in the wind atop a half-forested hill ridge, on a plot bearing the fitting name of "Breton rocks". The "Rocher Breton" wind farm has been connected to the grid since November 2017, much to the delight of André Sérazin, Mayor of the commune of Larré in the northwestern French department of Morbihan. "I can still remember our very first contact", says Boris de Wolf from ENERCON IPP GmbH, pleased with the developments. "We held talks with the 'Questembert Communauté' municipalities association and the commune where the wind farm was set to be built and quickly agreed on a trust-based cooperation. From the very beginning, the aim was to allow the public to participate in the wind farm."

In Germany, municipalities sharing in wind farms constructed in their region is a popular model for community participation in the energy transition. The wind energy industry welcomes this involvement with open arms. It brings about a noticeable improvement in acceptance for wind energy among the people living by the sites. In France, this type of participation is also politically endorsed and is on the rise. The "Questembert Communauté" municipalities association holds 25 percent of the shares in the wind farm developed by ENERCON. But what is so special about Rocher Breton? According to Boris de Wolf, it is "the first French wind farm where a federation of communes has shares directly in the operating company." The French Energy Transition Law which came into effect at the end of summer 2015 made this possible.

The wind farm was officially inaugurated in autumn 2018, and a multitude of visitors from all generations celebrated the public involvement in renewable energy in their area. "We are pleased to have a partner like the municipalities association that, like us, is sure of the benefits wind energy brings to the people in the region and is interested in operating the wind farm on a long-term basis", says de Wolf. He hopes this project will send out a signal to other regions: "It would be a welcome development for the energy transition in France if other communes would follow this example!"

The first contact to other regional administrative bodies has already been established. //