EP3 DEVELOPMENT

New compact design focuses on functionality with retro style

MARKET LAUNCH UNDERWAY  ____ First ENERCON E-Charger 600 rapid charging station in operation

PARTNERSHIP FORGED  ____ ENERCON is investing in Dutch manufacturer Lagerwey

MAJOR PROJECT  ____ ENERCON supplies 34 x E-115/3.0 MW WECs for Krammer wind farm in the Netherlands
We need a bolder and more ambitious energy policy!

Dear customers, business partners and employees, dear readers,

It’s official: we have a new Federal Government! We are very pleased about this! For almost half a year, the parties elected on 24 September 2017 engaged in exploratory talks and negotiations in various configurations. The process of forming a government was tedious and drawn-out. A speedy approach now needs to be taken to tackling urgent topics, including the energy policy of the future, which needs to be redesigned with improved coordination. And the renewables must no longer be used as a scapegoat for unsolved issues.

It is encouraging to see that the ‘GroKo’ partners have agreed highly gratifying plans for our industry in their coalition agreement. The most significant of these are: permanently establishing approval under the German Federal Immission Control Act as a prerequisite for admission to a tendering process for all participants; increasing the expansion target for onshore wind energy; and a special 4-gigawatt tender to compensate for the severe decline in onshore expansion feared as a result of a disastrous year in 2017. Several topics affect onshore wind energy directly – key subjects are repairing the flawed tendering system, guaranteeing the expansion path, complying with agreed climate protection targets or carrying out rapid grid expansion coordinated with the renewables. A roundtable discussion on these issues is absolutely essential.

However, although the agreements reached are positive for us, they must not cover up the fact that where energy policy is concerned the coalition agreement is, on the whole, lacking in ambition. For example, the phasing out of coal necessary for climate protection has been postponed for an indefinite period, instead of being tackled head-on. Emissions trading with pricing for fossil fuels is only to be carried out internationally via the G20. This means it is effectively being set aside, as it is unrealistic to expect that the industrial nations will come to an agreement on this issue. We hope very much that Germany and France, as the leading industrial nations in the EU, will resolutely demand carbon pricing. We too must bear responsibility for the past and not shrink away from it! It is bad enough that Germany cannot find a solution for the ‘yellow barrels’ of the atomic age, and relies on other states.

The coalition agreement also falls short of the necessary measures where the integrated energy concept is concerned. The coalition partners are missing an opportunity to reform the tax and levy system to provide economic incentives for the integrated energy concept, in order to replace fossil fuels with renewable energy in the heat or transportation sectors.

As a renewables company fighting for the energy transition from conviction, we want to see a more ambitious energy policy from our new government. Otherwise, our country – pioneer of the energy transition and driver of innovation in renewables – will rob itself of countless chances. We hope that the new government will become more committed still to tackling these issues, and take the liberty of raising a finger in warning: 45 percent renewable energy by 2030, that calls for clear guidelines and no new discussions as to whether another revision of the EEG is necessary! There is already enough uncertainty in the renewables market. Clear policies from a grand coalition – now that’s something we’d like to see!

Hans-Dieter Kettwig
Managing Director of ENERCON
Renewable energies are accounting for an ever-increasing share of gross electricity consumption in Germany. According to information received from the Federal Association of Energy and Water Industries (BDEW), the figure was more than 36 percent in 2017. In other words, nearly 217 billion kilowatt-hours (kWh) of electricity were generated from wind, solar and other renewable sources last year. The amount of onshore wind energy produced rose by 21 billion to a good 87 billion kWh. This accounts for more than 40 percent of the electricity generated from renewables, and continues to represent the main source of such energy.

The figures for the number of converters erected also reflect the advances made by onshore wind energy. According to the studies made by Deutsche WindGard for the BWE and VDMA trade associations, approximately 5,333 MW of new onshore wind energy capacity were installed in Germany in 2017: a record amount, which can be attributed in part to the many transition converters erected as a result of the reforms of the Renewable Energy Sources Act (EEG). ENERCON installed 2,004 MW in Germany in 2017. Thus ENERCON’s market share is about 38 %, or roughly comparable with that of the previous year. Worldwide, ENERCON’s installed capacity was 3,608 MW. Photo: Transporting the rotor blade for the Chamoles wind energy project in France, for which ENERCON erected six E-115 E1 wind energy converters in 2017 (cf. also the report on p. 28).
Partnership deal for legacy WECS as EEG support dries up

In its capacity as a supplier of system solutions in the field of renewable energies for operators of legacy WECS, ENERCON has been developing solutions for the period after EEG support has dried up. The ENERCON 20+ energy concept (EEK20+) will provide advice and support for repowering projects as well as for various scenarios in which existing WECS continue to operate because repowering is either not possible, or is not desired by the operator/owner. The payment guaranteed by the state under the EEG will stop from 2020 for more than 2,000 ENERCON WECS currently in operation in Germany. The same will apply to thousands of legacy WECS manufactured by competitors and unscathed from the start of this century. After this date, the payment per kilowatt hour for electricity generated by such WECS will be determined solely by the market price. Given the fast-approaching conclusion of this phase of the EEG, it is therefore with over greater urgency that many operators/owners are looking into the possibility of repowering: where legacy WECS are replaced with modern, more efficient ones which then, following successful participation in the tendering process, are eligible again for guaranteed remuneration under the existing EEG rules. Others are seeking instead a new operating and marketing concept which ensures that legacy WECS can continue to be operated profitably. In both cases, ENERCON can offer an extensive package of support to both its own customers and operators/owners of WECS of other competitors. The main priority is always to ensure that the site is retained for wind energy generation in the future.

If repowering is the preferred option, the sales and planning departments will develop individual solutions for site renewal and, if necessary, help with the approval process and the necessary participation in the tendering process. Solutions for the continued operation of legacy WECS require an initial examination to be made of the viability of retrofitting the legacy WECS for remote controllability. This is essential if they are to continue to operate outside the EEG. Solutions for direct marketing of the energy or alternative marketing options (such as direct supply of industrial customers or an integrated energy concept) are then elaborated in association with ENERCON’s energy marketing company Quadra Energy GmbH. Alternatively, it might be possible for ENERCON to take over the site in these circumstances. ENERCON will present the first details of the EEK20+ at the HANNOVER MESSE (23 to 27 April).

The first point of contact for interested parties is ENERCON Vertrieb National (Contact: vertrieb@enercon.de).

Volkswagen Nutzfahrzeuge has supplied ENERCON with an e-Crafter for it to test. In the area covered by WEA Service Nord-West GmbH in East Frisia, the fully-electric van is being put through its paces under the tough everyday conditions experienced by ENERCON Service for several weeks prior to the series launch. ENERCON is interested in finding out whether the electric vans can cope with the specific requirements placed on its service vehicles, and whether they represent a possible alternative to the conventional diesel vans used up until now.

ENERCON is giving serious thought to replacing its extensive fleet of service vehicles with electric models in the medium term. These could be ‘filled up’ with 100-percent green power from ENERCON wind energy converters. To this end, the service stations could be equipped with ENERCON’s rapid charging facility, the E-Charger 600 (see report on p. 16). The service companies would improve their environmental footprint with the electric vans, and would be able to contribute to the much-needed energy transition in the transport sector.

ENERCON is particularly interested to discover how the vehicles cope in practical trials in terms of payload, performance of the battery in everyday conditions, including at low temperatures, and the actual range of the vehicles. “We are keen to see whether the electric vans have genuinely been perfected”, says Michalina Kiec, commercial team leader for the ENERCON fleet. “We will review the results of the practical tests when we take our next steps towards the electrification of the fleet.”
ENGERCON NEWS

EAGOO. CELEBRATED ITS TENTH ANNIVERSARY

At the beginning of April, EAGGO. celebrated its tenth anniversary. To mark the occasion, ENGERCON’s own railway company invited numerous business partners, politicians and media representatives to take part in a special excursion from the company site in Dörpen, Lower Saxony to the container terminal in Wilhelmshaven. To coincide with its anniversary EAGGO. is expanding its portfolio to offer a daily shunting service in northwest Germany (Delmenhorst, Oldenburg, Wilhelmshaven and Emden) with a powerful shunting engine. Onboard the train, the guests were given a demonstration of the company’s current position.

Over the past ten years, the former ENGERCON factory supply train has evolved into a competitive nationwide railway company, and an internationally operating rail forwarder. Its business activities focus mainly on conventional and combined freight transport, both with block trains and with special transport solutions for freight with excess load. EAGGO. makes 25 train journeys every day and transports around 1.6 million tonnes of cargo every year. External customers outside of the wind energy industry now account for over 30 percent of the cargo. This share is expected to increase in the future.

The EAGGO. fleet comprises 10 locomotives in different sizes and performance classes, including electric locomotives fuelled with 100% climate-neutral green energy.

ENGERCON employees donate to good causes

Employees of ENGERCON and its suppliers once again raised money for charity in the period leading up to Christmas. The staff raised a total of 17,656.87 euros, which was topped up to 25,000 euros by ENGERCON’s management.

The fund-raising campaign took place during the Christmas parties at the Aurich site. Employees submitted their own suggestions as to who should benefit from the donations. This year, ten organisations were shortlisted from the many whose names were put forward, with each receiving Euro 2,500. As far as possible, the donations were to be about people in the region of East Frisia, and the goals of the various institutions were to be compatible with those of ENGERCON. The money raised was handed over to representatives of the chosen organisations at ENGERCON’s visitor centre in Aurich in early February.

The following charities each received Euro 2,500 in support of their good causes: the Friedel Orth hospice in Jever, the local branch of the child protection association in Aurich, the ‘Heart of Mercy’ organisation in Grossseelheim, the Blau-Weiss von 1920 Emden-Borsum sports club, the premature neonatal/children’s ward at the Ubbo Emmius hospital in Aurich, LEUKIN (for children with leukaemia) in Ostrhauderfehn, the parents’ association of children with cancer, the Else Cremer Foundation in Aurich, and the children’s and youth initiative ‘Plant for the Planet’.

Donations are handed over at the ENGERCON visitor centre in Aurich. Back row (left to right): Thomas Higens (Ubbo Emmius hospital in Aurich), Dr Rainer Willing (premature neonatal/children’s ward of the Ubbo Emmius hospital), Horst Feddermann (Aurich hospice), Tim Kruthoff (Blau-Weiss von 1920 Emden-Borsum sports club). Front row (left to right): Felix Rathwald (ENGERCON Corporate Communication), Jana von der Lage (Assistant to ENGERCON Management), Anna Fennen (LEUKIN Ostrhauderfehn), Sabine Böttcher (local branch of the child protection association in Aurich), Horst Feddermann (Aurich hospice), Agnes Kramer and companions (parents’ association of children with cancer of East Frisia), Norbert Stieglitz (Friedel Orth hospice in Jever), Meike Eschen (Else Cremer Foundation in Aurich), Agnes Kramer and companions (parents’ association of children with cancer of East Frisia), climate ambassador Moritz Jurgens and companions (Plant for the Planet).

AURICH

Engercon has moved into its newly-built customer centre in Aurich. Following the completion of the construction and removal work, nearly all of the new offices at the Dreekamp site are now occupied. As part of the expansion project, new conference rooms were also built at Dreekamp, and a staff canteen opened.

Employees from all ENGERCON departments that are in direct contact with our clients work at the customer centre, including sales and purchasing, project and logistics management, and energy management. Around two hundred new office workstations have been created by expanding the Dreekamp site. Additional parking spaces have also been provided, and a grass verge and habitat area included to offset the building work.

AURICH

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With the EP3 new developments, the E-138 EP3 and the E-126 EP3, Enercon is pursuing a wind turbine design which is efficient, compact and cost-optimised in every respect. The shape also reflects this objective: an ultra-functional compact design was chosen for both WECS. This design is a reference to Enercon’s first gearless WEC type: the legendary E-40/500 kW from the 1990s. The typical egg shape of the nacelle could not be implemented for the new wind turbines.

Back to the roots: The new EP3 design is distinguished by the annular generator which protrudes like a collar, just like the old E-40.

Back to the ring – Compact EP3 design focuses on functionality with retro style
“Compared to the E-115, we use 80 percent fewer standard parts for the EP3.”
Arno Hildebrand, Head of System Engineering at ENERCON’s research and development company WRD

There is one particular type of wind energy converter that stands out in ENERCON’s company history as being hugely significant in more ways than one. The E-40/500 kW was the first gearless wind energy converter to be produced by ENERCON. It was exceptionally successful – over 4,400 machines were installed worldwide. As a result of the direct drive, the E-40 turned out to be so reliable that ENERCON decided to make a complete change-over to gearless technology. These are just some of the reasons why ENERCON’s research and development company WRD was part of the developer team that designed the E-40 in the early 1990s. This legendary WEC type also derived from the E-40.

However, the new EP3 design achieves so much more than just an attractive retro look. It fulfills highly specific functionalities. The compact dimensions demonstrate this particularly clearly. “The components are optimally adapted to the drive train. Our aim was to keep them as small as possible and make optimal use of the nacelle interior”, explains Coordes. The size of the machine house and hub has therefore been reduced to a point that each component can be finally assembled as one transport unit and, following a functional test at the factory, loaded onto an abnormal load truck for transport to the installation site. This has the effect that no more extensive completion work needs to be carried out at the construction site.

Transport costs and installation time can be significantly reduced as a result. This is important as the site and logistics costs make up a considerable part of the total costs for onshore wind energy projects. The extent of the advantage is made clear when drawing a comparison to the current E-115 E2: “Several 20-foot containers are required to transport the casing of an E-115 to the construction site”, says Coordes. “This stage of transportation is completely eliminated with the EP3. At the same time, we save several days of installation time for each WEC, as we no longer have to factor in time on the construction site for pre-assembling the nacelle.”

Although the diameter of the generator makes it impossible to deliver these components to the construction site as one transport unit, their design has been optimised by WRD for transport and installation processes. While the stator will continue to be further elements: the root line of the nacelle, which slopes down towards the rear, the ‘rolled-up’ spinner in the transition area from the rotating part to the stationary part, and a sloped rear with sunk-in ventilation damister units. These characteristics were also derived from the E-40.

The 3D graphic that appears on Hildebrand’s computer screen has little in common with the typical egg shape of the nacelle that has come to be associated with ENERCON wind energy converters over the years. The distinguishing features of the E-138 EP3 and the E-126 EP3 with a smaller rotor diameter are a blunt spherical hub and a compact machine house, separated from the annular generator which protrudes like a collar. “It was not possible to incorporate the egg shape with its outer shell enclosing all of the WEC components in the new EP3 wind turbines, where the brief emphasized the importance of compactness and cost-optimisation”, says Ihno Coordes, Head of the Casings and Subcomponents Department at WRD. “In order to create a design for the EP3 wind energy converters that meant they were still recognisable as ENERCON WECs at first glance, we went back and examined the old E-40 in detail.”

Taking a closer look at the ENERCON book of developments provides the necessary stimulus. “The egg design was defining for our wind energy converters in recent years, and became more or less their trademark. On the new compact WECs, the trademark will be the distinctive protruding annular generator, which also characterised the E-40”, says Coordes. “In a way, the new design marks a return to our roots.” This impression is reinforced by three standard parts for the EP3.”

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Leaving the egg shape behind: The nacelle shape typical for ENERCON WECs up until now can no longer be incorporated in the compact design required for the EP3.

delivered in two parts, a new three-part separation of the rotor will be implemented. This will be made up of a larger middle section, as wide as the maximum permissible transport dimensions, and two narrower side sections. The middle section will be bolted to the new compact bearing and aligned at the factory, meaning this complex production step, which only allows for very low tolerances, no longer needs to be carried out at the construction site. “This also proves advantageous, leading to an improvement in quality and shorter installation time”, says Ihno Coordes. Only the narrow rotor sections have to be assembled at the site, and this is relatively straightforward.

Since the generator juts out as part of the new design, and the machine house surrounding all of the components is no longer featured, a special enclosure had to be developed to protect against external influences. “The EP3 generator is surrounded by a complete enclosure to protect against the weather and mechanical impact. We have placed high demands on this enclosure”, Coordes explains.

High demands were also made with respect to the generator performance. “The E-126 EP3 designed for wind class IIA zones (IEC) is available in the performance levels 3.0, 3.5 and 4.0 MW. The E-138 EP3, designed for wind class IIIA zones (IEC), has a nominal power of 3.5 MW”, says Christian zur Mühlen, E-138 EP3 project manager at WRD.

Preparations for the EP3 prototype phase are currently in full swing at WRD – installation of the E-126 EP3 prototype is planned for August and installation of the E-138 EP3 prototype for the end of December. The new technology components, however, are already being tested in practice. Beginning of April, ENERCON installed a technology prototype based on the E-115 at the Test Site Lelystad in the Netherlands. The new compact bearing and the spherical hub, for example, are installed inside. “The main purpose of this test machine is to validate the new main bearing unit. We have also used it to practice the production and installation procedures”, says Arno Hildebrand. “When introducing a new form of technology, it is helpful to get findings from practice as early as possible. This comes in useful in the prototype phase and during the launch of series production.”

Parallels to the E-40 can also be drawn here. “At the time we were entering new technological territory with this machine”, explains Hildebrand. “We therefore assembled and tested the E-40 main bearing and rotor head in our test centre before installing the prototype in the field. As a result of the test runs, we were quickly presented with the finding that we had developed a safe and reliable system.” This is a great omen for the EP3. Judging by the progress of the development project so far and the feedback from the prototype, it certainly has the best prerequisites to continue writing the success story of its ancestor, the E-40.
ENERCON has commissioned its first 350 kW rapid charging station. It is the highest-performing rapid charging solution for e-vehicles available on the market at this time, and is the prototype of ENERCON’s E-Charger 600. The supplier of system solutions for renewable energies intends for the prototype to promote the use of renewable energy in the mobility sector, and in turn advance the energy transition on the roads. The rapid charging station was installed in January at the Energy, Education and Experience Centre (EEZ) in Aurich-Sandhorst.

The E-Charger 600 (also see technical lexicon, p. 18) enables rapid charging of next-generation e-vehicles with maximum charging capacities of up to 350 kilowatts. In an ideal scenario, an electric car would be able to ‘fill up’ with enough energy for a journey of 400 kilometres in around 8 minutes. A minimum of four charging columns ensures that there is always a space available. Charging an e-vehicle is therefore no different to the familiar procedure of filling up at the petrol station today. This development means e-mobility is ready for the mass market, and battery-driven cars can be used without any restrictions as primary vehicles that can also make longer journeys.

For ENERCON and its customers, the issue of rapid charging opens up additional sales channels for green energy from wind energy converters. At the same time, it represents an ideal way of realising the integrated energy concept so that the energy transition necessary for climate protection can be implemented in other areas as well as the energy system. “As a supplier of system solutions for renewable energies, ENERCON is thus creating an ‘ecosystem’ around its core product, the wind energy converter”, says Jens Winkler, head of the power industry division at ENERCON. “In the future, this ecosystem will be expanded with further integrated energy applications such as power-to-gas, battery storage systems and innovative marketing models for wind energy – including from old WECs.” Interested parties should contact ENERCON via the responsible regional Sales department or the power industry division in Aurich.

The launch of the E-Charger 600 on the commercial market is currently underway, starting with Germany and Europe. Preparations for installation of the first serial systems are being made across Germany. Versions of the rapid charging technology for other international markets are also in preparation. “ENERCON has concrete plans with several filling station chains and utilities to fit E-Chargers at further locations across Germany over the course of the year, in order to quickly make ultra-rapid charging ready for use in practice”, Winkler explains the next steps. “We have also started to equip our own property, such as Service points, with public E-Chargers.”

The Stadtwerke Aurich is the operator of the first 350 kW rapid charging station at the EEZ. It will advance the issue of e-mobility in and around Aurich in the coming years. For example, plans have been made to build up a needs-based charging infrastructure which will be supplied with renewable energy. Co-partner ENERCON supports the Stadtwerke Aurich in this project, which also represents a successful example of the decentralised energy transition. //
How does wind energy get into the vehicle battery?

THE E-CHARGER 600 IS ENERCON’S INNOVATIVE RAPID CHARGING SOLUTION FOR CURRENT-GENERATION AND NEXT-GENERATION ELECTRIC VEHICLES. ITS KEY COMPONENTS ARE THE ENERCON INVERTERS WHICH ARE BUILT INTO EVERY ENERCON WIND ENERGY CONVERTER. THEY ENSURE THAT VEHICLE BATTERIES ARE CHARGED WITH GREEN WIND ENERGY IN JUST A FEW MINUTES, AND THAT THE SUPPLY GRID IS STABILISED AND SUPPORTED AT THE SAME TIME.

A variable DC voltage is required to charge a battery. This is formed by the ENERCON inverter technology into a direct current (DC) voltage, which is output at the charging column. Rapid charging no longer simply comes straight out of the wind farm. The high power which future electric vehicles will require for long-distance travel and the need to expand charging procedures make rapid charging essential. In the ENERCON E-Charger 600 the inverter technology draws the power gradually from the grid (active rectifying) and feeds reactive power into the grid as required in order to support or stabilise the voltage. Where the grid is concerned, the ENERCON rapid charging technology thus manages practically everything that an ENERCON wind turbine can.

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Pilot project for needs-based nighttime marking launched

FOLLOWING THE CONCLUSION OF THE FIELD TEST IN THE BAGBAND WIND FARM IN EAST FRISIA, ENERCON’S ACTIVE RADAR SOLUTION FOR DETECTING AIRCRAFT WILL BE AVAILABLE IN SERIES. PERMANENTLY SWITCHING OFF THE RED WEC OBSTRUCTION BEACONS OFFERS A WELCOME RELIEF FOR THE RESIDENTS OF WIND FARMS.

The German administrative regulation on the marking of aviation obstacles (AVV marking) now permits needs-based nighttime marking (Bremen: BNK) of wind energy converters. With such a system, the WEC nighttime marking stays switched off and is only automatically activated if the system detects aircraft in the vicinity of the wind farm. The legislator places minimum requirements on the technology used; for example, the system must function independently of the aircraft trajectory and must reliably detect aircraft in the area. An effective area is defined for this. The system has to activate the WEC nighttime marking at 100 % of its rated luminous intensity at the very latest when an aircraft flies into this area.

The provisions of the AVV marking render it necessary to equip the wind farm with an active or a passive radar system in order to be able to implement needs-based nighttime marking. ENERCON has developed a universal interface for fitting ENERCON WECs with such systems. In addition, ENERCON has also worked together with its cooperation partner ARCHE Systeme GmbH to design its own primary radar system, fulfilling all AVV marking requirements.

The Bagband wind farm in the municipality of Großefehn in East Frisia, with 13 e-181/3 MW turbines, has become the first to be fitted with this system in a pilot project. Extensive tests are currently being carried out to verify the effectiveness of the technology in practice.

The system is made up of a static radar transmitter installed on the machine house of a WEC; a radar receiver installed on other WECs, and a variable quantity of receiver units depending on the wind farm layout and topographic conditions, fitted on the towers of several WECs. Arranging the layout of transmitter and receiver units in this way ensures 3D resolution radar imaging of the monitored area, meaning relevant aircraft can be detected clearly and reliably, and false interpretations of radar echoes from moving objects on the ground can be ruled out. The radar system is connected to the wind farm SCADA system via the BNK interface.

One of the advantages the ENERCON BNK system has over other solutions is the low transmission power the radar transmitter antenna works with. It has a double cone structure and transmits the radar signal with the highest intensity horizontally up to an angle of 15° in order to cover the effective area stipulated by the AVV marking. Due to the distance between the transmitter antenna and the ground, and the small angle of the main beam, the intensity of the radar impulse is very low close to the ground.

At the same time, the double cone structure of the transmitter antenna also ensures that the system covers the critical ‘cone of silence’ above the transmitter antenna. This is important in situations where aircraft approaches from above, such as a rescue helicopter in landing approach on the wind farm.

A further argument to benefit operators is that the ENERCON BNK system can be installed without having to obtain planning permission. This is not the case for radar solutions from competitors which involve the installation of a radar mast outside of the wind farm premises. The ENERCON system can also be expanded as required, for example by installation on other wind farms, without being subject to planning permission.
No apparent strategy

THE GRAND COALITION AMENDS THE TENDERING SYSTEM BUT MISSES THE CHANCE TO SUSTAINABLY TRANSFORM ENERGY POLICIES.

Following months of uncertainty, Germany is now finally in a position to take action again. Anyone who got the impression in the past months that the political process can continue to run smoothly even without a new Federal Government is sorely mistaken. The last few weeks and months in politics have been proof of this. Even urgent issues were postponed by the acting Federal Government and the relevant committees in the Bundestag, with reference to the pending formation of a government.

At ENERCON, we have used the time that has passed since the Bundestag election intensively to convince many of its members of the necessity to make amendments to the existing legal framework for the onshore wind tendering system. As a reminder: approved projects ready for construction were barely able to win any bids in the 2017 tendering rounds. The last Federal Government offered just a limited response to this bleak situation and its effects, and the 2017 tendering rounds. The last Federal Government offered just a limited response to this bleak situation and its effects, and the 2017 tendering rounds. The last Federal Government offered just a limited response to this bleak situation and its effects, and the 2017 tendering rounds. The last Federal Government offered just a limited response to this bleak situation and its effects, and the 2017 tendering rounds. 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This means economic incentives to replace fossil fuels with renewable energy are lacking. Reducing the electricity tax would have made the product ‘electricity’ more competitive in the heat and transport market.

In this context we would like to take the opportunity to thank the numerous suppliers that have supported our appeal to politics. As a result of our joint efforts, the coalition partners have recognised that the recent expansion records distract from the threat of a major disruption in onshore wind energy expansion, which is now almost impossible to prevent. If appropriate legal amendments are not introduced, wind expansion in Germany will suffer tremendously.

A short-term solution therefore had to be worked out to avoid grave consequences for our production sites and the industrial structures in the supplier area. We are extremely pleased that the coalition partners are now correcting these flaws and making approval under the German Federal Immission Control Act as a legal prerequisite for admission to a tendering process for the first two rounds of tendering in 2018 only.

In a rapid revision to the EEG, the coalition agreement also provides for organised and accelerated grid expansion. Optimisation and digitalisation of existing grids offers huge potential for integrating renewable energies. This also has to be echoed in the corresponding incentive regulation. At the same time, we suggest that the system services potential of wind energy converters and storage systems is factored more heavily into the considerations for grid optimisation.

The corresponding signals are already visible on the future markets for energy contracts. By doing this, Germany is not only depriving itself of the opportunity to initiate a clear reduction in CO2 emissions in the short term, but is also continuing to put off energy price-indexed innovations in the field of storage systems and renewables.

For energy consumers, this is not being taken. This is wrong and will also throw a spanner in the works for many a greatly conceived offshore expansion plan. //
ENERCON forges strategic partnership with Lagerwey

COOPERATING WITH THE DUTCH MANUFACTURER OF GEARLESS ONSHORE WIND ENERGY CONVERTERS WILL ENHANCE THE OVERALL PRODUCT PORTFOLIO. BOTH PARTNERS CAN ALSO EXPECT TO BENEFIT FROM SYNERGIES IN THE FIELDS OF RESEARCH AND DEVELOPMENT, SALES AND PURCHASING.

Like ENERCON, Lagerwey has come to specialise in gearless onshore wind converters, and has the same extremely high standards in terms of technology and quality. Founded in 1979 by Henk Lagerweij, the company domiciled in Barneveld near Arnhem – like ENERCON – one of the pioneers in the field of wind energy. It developed the L136, which has won great acclaim in the industry: it has a 136-metre rotor diameter, comes with a nominal power of 4.0 – 4.5 MW, and hub heights of up to 166 metres. Other Lagerwey innovations which have recently gained considerable recognition in the sector include a modular steel tower and a compact ‘climbing crane’ designed specifically to ascend the tower during assembly of the tower and wind energy converter.

ENERCON and Lagerwey already have a long-standing relationship with one another. When former shareholders – Dutch financial investors who got on board at the company in 2014 – decided to divest themselves of their shares, ENERCON’s potential involvement came up for discussion. An agreement was reached in late 2017, and the deal was signed and sealed. Many synergies will result from the collaboration which began on 1 January: as well as cooperating in the field of R&D and expanding and optimising their joint WEC portfolio through the addition of competitive and reliable wind energy converters, says ENERCON’s Managing Director Hans-Dieter Kettwig.

“Like ENERCON, Lagerwey has come to specialise in gearless onshore wind converters, and has the same extremely high standards in terms of technology and quality. Founded in 1979 by Henk Lagerweij, the company domiciled in Barneveld near Arnhem – like ENERCON – one of the pioneers in the field of wind energy. It developed the L136, which has won great acclaim in the industry: it has a 136-metre rotor diameter, comes with a nominal power of 4.0 – 4.5 MW, and hub heights of up to 166 metres. Other Lagerwey innovations which have recently gained considerable recognition in the sector include a modular steel tower and a compact ‘climbing crane’ designed specifically to ascend the tower during assembly of the tower and wind energy converter.”

"Our strategic partnership with Lagerwey gives us an excellent opportunity to strengthen our foothold in the market by expanding our portfolio through the addition of competitive and reliable wind energy converters," says ENERCON’s Managing Director Hans-Dieter Kettwig.

"We regard Lagerwey as an ideal technological partner with an experienced and highly-skilled workforce." Hub Moors, CEO of Lagerwey, adds: "This investment in our company by ENERCON – global market leader in the field of gearless wind energy converters – is indicative of its respect for our advanced technology and the innovative capacity of our team. This strategic partnership and ENERCON’s strong market position will help Lagerwey’s technology break through into international markets."

In terms of R&D, development projects already launched by the companies – such as ENERCON’s EP3 converters – will continue as planned up to completion. In addition, a team of experts from both companies is currently determining how the gearless converter technology can be developed jointly, where the focus should lie, and for which branded product this technology is best suited. Additional benefits, not least in terms of costs, will result from the fact that Lagerwey will be able to make use of ENERCON’s extensive global sales network in the future, and that the two companies will be able to pool their activities in terms of purchasing of materials, components and services. This will prove advantageous for both partners, especially in the light of growing price and competitive pressure and the increasing challenges facing the onshore wind energy sector in relevant markets. ENERCON’s well-established international sales network, which now covers more than 45 countries, will play a very important role in their joint activities. And conversely, ENERCON will soon have access to competitive products, in the form of compact Lagerwey turbines, which will help them to open up new international markets. Both ENERCON and Lagerwey want to continue to increase their international presence. The downward trend in its hitherto strong domestic market of Germany is already driving ENERCON to focus more intently on international opportunities. Its objective is not to cut out the established markets, but also in countries where it has not yet sought to gain a foothold. ‘Cooperation is therefore a win-win situation for both companies’, says ENERCON’s Managing Director Hans-Dieter Kettwig.

ENERCON is investing in the Dutch wind turbine manufacturer Lagerwey. By making this strategic investment, ENERCON will be strengthening its portfolio of onshore wind energy converters in every wind class, and it will be possible to benefit from synergies in a number of different fields. Lagerwey will continue to conduct its own business independently and under its own brand and organisational structure, whilst at the same time collaborating closely with ENERCON.

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"Our strategic partnership with Lagerwey gives us an excellent opportunity to strengthen our foothold in the market by expanding our portfolio through the addition of competitive and reliable wind energy converters," says ENERCON’s Managing Director Hans-Dieter Kettwig.
ENERCON HAS INSTALLED AN E-70 WIND TURBINE FOR THE KNOCK PUMPING STATION IN EMDEN-WYBELSUM. THE WIND ENERGY CONVERTER SUPPLIES THE ENERGY TO DRIVE THE FOUR DRAINAGE PUMPS IN A CLIMATE-FRIENDLY MANNER. THE ERSTE ENTWÄSSERUNGSVERBAND EMDEN (FIRST DRAINAGE ASSOCIATION EMDEN) IS THE CUSTOMER AND OPERATOR. OVER 30,000 LANDOWNERS ARE INVOLVED IN THE ASSOCIATION.

With their project in Emden-Wybelsum, ENERCON and the Erste Entwässerungsverband Emden have together created a textbook example for the direct supply of major industrial consumers and decentralised community-owned energy. At the beginning of December, the partners installed an ENERCON E-70/2.3 MW at the Knock pumping station located at the estuary of the river Ems. The wind turbine feeds its energy directly into the pumping station and powers the high-performance pumps needed for draining the hinterland in the north west of East Frisia. Since the association’s members are made up of 30,000 landowners and tenants under building leases, it is also a groundbreaking project in terms of community participation in wind energy converters in the region.

In the 49,000-hectare region that it covers, the drainage association is responsible for discharging the rainwater into the North Sea. In addition to areas of the towns Emden, Norden and Aurich, it also covers parts of the municipalities of Ihlow, Krummhörn, Brockenhardt, Süd-Brockenhardt and Hins. The association maintains 1,100 kilometres of waters and operates 3 sluices and 2 estuary pumping stations as well as 22 pumping substations for drainage. A hugely important task that is essential to securing livelihoods, emphasises Ober- stapelmeister Reinhard Behrends, Chief of the drainage association: “Without regular maintenance of the association water system and operation of the sluices and pumping stations there would be large-scale flooding in the low-lying areas of north-west East Frisia.”

The sluice and pumping station at Knock is the best performing in the region covered by the association, with a conveying capacity of 60,000 litres per second. At the heart of the system are four pumps, each with a capacity of 600 kilowatts. They are powered electrically, making the pumping station a major industrial consumer. “Our energy demand averages between 600,000 and 700,000 kilowatt-hours every year. In wet years where we have to pump for longer and more often, it is over 1 million kilowatt-hours”, says Reinhard Behrends. The E-70 is the first wind energy converter in the country to feed its energy directly into a pumping station. “Our slogan is ‘Wind for Water’”, says Behrends.

As far as it is possible, the pumps in the pumping station are to be powered using environmentally-friendly energy from the wind turbine. By taking this approach, the association is drawing on a deep-rooted tradition of using wind to supply energy for drainage work in the region: in earlier centuries, drainage mills powered by wind were often used. They went on to be replaced by pumps during the course of industrialisation.

The Knock area offers conditions which are close to perfect for installing a wind energy converter. “This location has excellent wind conditions”, says Hanno Stoll, the Sales Manager at ENERCON Sales Niedersachsen responsible for the project. The average wind speed at a hub height of 64 metres is 7.0 m/s. The estimated energy yield of the E-70, taking into account shutdown times and power reductions related to approval, is a 4.2 million kilowatt-hours every year.

Climate protection is of utmost importance for the association, and some of the reasoning behind this is entirely pragmatic: Climate change brings with it an array of negative consequences for drainage management: the sea level is rising, limiting the possibilities of the sluice system and causing a greater need for water pumps. In addition, the amount and intensity of precipitation is increasing, meaning larger volumes of rainwater are entering bodies of water more and more frequently and over shorter periods of time. The rainwater has to be directed to the North Sea via the pumping stations, presenting a huge challenge for the drainage associations. For this reason, the associations are becoming involved in research projects investigating the effects of climate change on drainage and working out how to make use of renewable energies in this field.

The decision to install the E-70 was not only motivated by a desire to contribute to climate protection, but also to reduce power costs, explains Chief Reinhard Behrends. Rapidly increasing energy prices pose a serious problem for the association: Energy costs totalling an average of around 150,000 euros are incurred every year just to operate the water pumps at the Knock pumping station. “Our aim is that the E-70 will help to significantly reduce these costs”, says Behrends. In turn, the 30,000 association members – and co-owners of the wind turbine – will benefit greatly. An increase in energy costs would force up their association fees.

ENERCON’s own energy logistics company, Quadra Energy GmbH, is responsible for the energy management of the E-70. It handles both the direct supply to the pumping station and the marketing of the energy that is not consumed at the site. The E-70 was approved according to the old Renewable Energy Sources Act (EEG).

ENERCON E-70 is the Knock pumping station.

This means the association is free to feed surplus energy into the public grid and receives EEG remuneration for this. The current edition of the EEG no longer allows this combination. Operators and owners of wind turbines instead have to choose whether to use the energy generated exclusively for direct supply, or whether it should be fed into the grid according to the EEG.

The drainage association views the installation of the E-70 to be only the first step in a wide-ranging and sustainable plan to switch over its energy supply to renewables. The next stage in the project will therefore be to work together with ENERCON to develop an emergency power supply and energy storage concept for the Knock pumping station. The storage system would be able to store energy that is not required during strong wind phases, which would then guarantee the pumps could be powered at times when supply levels are critical. “It would mean we were completely self-sufficient – even if network loss occurred during a calm wind phase”, says Reinhard Behrends. Behrends leaves no doubt that the decentralised energy transition at Knock is in full swing. “Step-by-step, we want to introduce all of the technology necessary to reliably fulfil our public service duties in the age of renewable energy.” //
Breeding seasons also have to be observed, imposing further restrictions. “On top of this, close coordination with Rijkswaterstaat is necessary throughout the entire project,” says Bram van Noort. This authority is under the Dutch ministry of Infrastructure and the Environment, and is responsible for coastal defence and flood control.

The 34 x E-115 WECs are being erected on hybrid towers each with a hub height of 122 metres. The first wind energy converter was already commissioned at the end of 2017. The last machine is set to be connected to the grid in spring 2019. At peak times, up to 150 workers are working on the extensive construction site for the large-scale project at once.

ENERCON has made a name for itself in the Netherlands over recent years with the installation of wind energy converters on dykes. ‘Noordoostpolder’ with 26 x E-126/7.5 MW WECs, ‘Zuidwester’ with 12 x E-124/7.5 MW WECs and, most recently, ‘Bouwdokken’ with 8 x E-126 EPA WECs are just the biggest projects that ENERCON has realised in the coastal country directly on important flood control structures or within close proximity of them. Another big reference project in the Zeeland province can now be added to the list.

ENERCON is installing 34 x E-115/3.0 MW wind turbines on the Krammer locks for the Krammer wind farm.

The Krammer locks are in Philipsdam, which is part of the ‘Delta Works’ flood defence system and separates the Krammer and Volkerak bodies of water from the Oosterschelde. The locks were installed for inland waterway transport during construction of the dam. They are 280 metres long, meaning larger push-tow units can also pass through without a problem. The wind farm is being developed around the locks, with the turbines being installed on the dykes of an island forming part of the dam.

The complex WEC locations make Krammer a special project, demanding unique solutions for installation. “Space at the installation sites is very restricted”, explains Bram van Noort, Country Manager for the Netherlands at ENERCON Sales International. “For this reason, we devised a sophisticated transport, logistics and installation concept in advance.”

This includes the provision of logistics areas for delivery and temporary storage of WEC components, pre-assembly areas, and the use of tower cranes for tower construction and WEC installation. During installation, this special technology ‘climbs’ up vertically in sync with the wind turbine, and therefore requires much less space than the crawler crane predominantly used for WEC installation otherwise.

ENERCON is installing 34 x E-115/3.0 MW WECs for the Krammer wind farm. They will be built on the Krammer locks which form part of the ‘Delta Works’ flood defence system in the Dutch province of Zeeland. The wind turbines are located on dykes, making close cooperation with authorities and the development of special solutions necessary for installation.

The Krammer wind farm is owned by two community-owned cooperatives with more than 4,000 local members. This makes Krammer the largest community-owned wind farm in the Netherlands today. The entire 102 MW farm is estimated to generate annual yields of around 390 gigawatt hours. In terms of figures, that would be enough energy to supply more than 100,000 households for a year. In this case, however, 95 percent of the energy generated by the Krammer wind farm will later be supplied directly to international commercial enterprises via Power Purchase Agreements (PPAs). The companies AkzoNobel, DSM, Google and Philips have joined forces in order to bundle their energy procurement and purchase the required kilowatt hours of renewable energy directly from the generating Krammer wind farm. “This is a great achievement. This collaboration is energy transition on a complete new level”, says Tijmen Keesmaat, Managing Director of the Krammer wind farm. “We are proud that we can play an important role in the new energy landscape.”
ENERCON sets new height record in France

ENERCON HAS INSTALLED 6 X E-115 E1 CONVERTERS WITH 135 M HUB HEIGHTS AT THE CHAMOLE WIND FARM: THE TALLEST WIND ENERGY CONVERTERS IN THE COUNTRY SO FAR. THE PROJECT IN THE BOURGOGNE-FRANCHE-COMTÉ REGION IS ONE OF THE FIRST COMMUNITY-OWNED WIND FARMS IN FRANCE.

Bourgogne-Franche-Comté in eastern France is a famous wine-growing region. More than 200 million bottles are produced in Bourgogne (Burgundy) alone every year. Some of the red Burgundies are among the most expensive red wines in the world. In Jura too – another famous wine-growing area in the region alongside Burgundy – traditional grape varieties and methods are used to cultivate and produce the wine. Vin jaune (‘yellow wine’) is a local delicacy with a long history. The region is also renowned for its cheese, for this is the homeland of Comté, a special hard cheese made from unpasteurised milk. And recently the region has been attracting attention for a very different reason: because it is here that one can find the tallest wind energy converters anywhere in France – six E-115 E1 converters, which were installed by ENERCON at the Chamole wind farm.

They were erected on hybrid towers, each with a hub height of 135 m, which means that the converters reach a total height of 193 m. Wind energy converters of this size have never been installed anywhere in France up until now. “In the past, no-one dared attempt it”, says Heike Voss, the Sales Manager responsible for the Chamole project at ENERCON Sales France. For many years there was a ‘psychological ceiling’ in France when it came to onshore wind energy, which stood at hub heights of around 100 metres. “Apart from locations where there are height restrictions because of military radar installations and air corridors, there wasn’t really any justification for these limitations”, explains Voss.

There were no such sensitivities when the Chamole wind farm was developed. It is the first wind energy project in the department of Jura, and was designed from the outset to be rooted in the community. This makes it one of the first community-owned wind farms in France, where such local participation is not as widespread as in places like Germany. The project was well received. “The dairy farmers and wine growers supported the project from day one”, notes Heike Voss. “Without the warm welcome it was given by the local population and the support it received from regional politicians, the project could not have got off the ground in an area with such a sensitive landscape.” Voss expects that other regions of France will now follow the good example set by this ‘flagship project’.

Located in a low mountain landscape, Chamole has an elevation of about 550 metres. The wind conditions are good, so yields of more than 45,600 megawatt-hours per annum are anticipated. Although the mountain location will be a plus during operation, it brought its own challenges during construction. The components could be delivered in an environmentally-friendly way as far as Strasbourg by barge. This meant a 15% saving in CO2 emissions. But from there, the components had to be transported through the mountains to the construction site by lorry. There was only one possible route, which had to be widened at a few locations to accommodate the abnormal load. It was then that ENERCON’s know-how and many years of experience in installing wind energy converters at complex sites truly paid off. Some of the tower segments were manufactured at the French concrete tower factory of WEC Mâts Béton, which is why they bear the label ‘Origine France Garantie’. This was another first: the plant has never before produced components for such tall towers.

Chamole wind farm in the region of Bourgogne-Franche-Comté, France, with its E-115 E1 wind energy converters.
The names Chernobyl and Fukushima are a tragic reminder of the life-threatening dangers of generating energy from nuclear power. In 1986 in the Ukraine and in 2011 in Japan, nuclear reactors exploded, huge amounts of radiation were released and large areas were radioactively contaminated. These nuclear catastrophes demonstrated to the world just how little control we have over the risky nuclear technology and revealed a fatal misjudgement in energy politics.

In Germany, Fukushima ultimately led to nuclear phase-out and helped to speed up the energy transition. The Japanese also began to rethink their policies following the catastrophe, and started to look to renewable energy in a way they hadn’t before. The effect of this rethink has now spread as far as the former disaster region, where the first wind energy converters were recently installed and commissioned. ENERCON supplied the wind energy converters: 4 x E-92/2.35 MW turbines, the first of their kind in Japan.

The E-92 machines were installed by ENERCON’s customer Hitachi Power Solutions (HPS) and four other companies from the region. They were erected on tubular steel towers at a hub height of 85 metres in the Minami Souma wind farm. The wind farm is directly on the coast of the Pacific in the Fukushima prefecture, and is located in the former evacuation zone where around 170,000 people had to leave their houses and apartments in 2011 as disaster struck.

Seven years after the reactor accident and following extensive decontamination measures, the region has been cleared by the authorities, although an exclusion zone spanning 20 kilometres around the exploded nuclear power plant still remains. Many of those who were evacuated have now returned to their homes. In order to be absolutely certain, any possible radiation risks were analysed by independent expert inspectors before installation work began. The experts assessed the work on the wind farm construction site to be safe for the technicians.

The wind farm will also play a part in improving the infrastructure and securing the energy supply in the former evacuation zone. Following the complete disconnection of the destroyed nuclear power plant from the grid at the end of 2011, there is a two-gigawatt gap of missing generation capacity that has to be filled. Renewable energies in particular are to be used to achieve this.

According to the Fukushima prefecture’s visions, anyway, Minami Souma is only the start of the energy transition in the region. The aim is that by 2040, 100 percent of the energy demand will be covered by renewable energies. Investigations to find further suitable locations for onshore wind energy projects are therefore already underway.