LAUNCH OF E-141 EP4

Impressive start for ENERCON’s new flagship

START-UP SUPPORT FOR ELECTRIC MOBILITY
ENERCON develops quick charging solution

PARTNERSHIP IN TENDERING SYSTEM
ENERCON offers medium-sized investors its support

PROJECT LOGISTICS BY RAIL
ENERCON’s e.g.o.o. transports tower segments
Dear Readers, Customers, Business Partners and Employees,

who would ever have dreamed that global climate protection would once again be called into question like this? It seemed to be a matter of general consensus that climate change represented a serious risk to man and the environment. Even if the international community disagreed about the scope and timing of measures, there was general unanimity about the necessity of climate protection measures. In the autumn of 2015, more than 200 nations signed up to the Paris Agreement on climate change, which aimed to limit global warming.

But following the election in the US, many things are uncertain. The politicians in the United States with responsibility for such matters place their personal economic interests above all else, dismiss climate change and environmental protection out of hand, and openly back the fossil fuels of coal, oil and gas. After just a few weeks in office, the new administration is radically pruning what we consider to be essential climate protection measures. There are signs of unexpected back-peddling – a disastrous omen for other countries and a bitter setback for global climate protection strategies.

Sadly, a few political camps in our country are also on the wrong track, as evident from a glance at their party manifestos. So we have our own good reasons for concern. Moreover, the Federal Government in Germany has introduced a tendering system for renewable energy with an upper limit. This presents our sector with fresh challenges. Our market environment is changing, and competition is getting tougher, including between different types of energy production. Plus the Federal Government is punishing the onshore wind industry for the failure of grid operators to expand the grid sufficiently, by designating certain regions as ‘grid expansion areas’, whose installation volume is dwindling even further. These measures are stoking down the restructuring of the energy system, which is badly needed for climate protection, and are putting a question mark over the targets agreed in Paris.

Parliamentary elections are being held in Germany and other European countries this year. As a result, crucial foundations will be laid for our sector, among others. As far as the ongoing German election campaign is concerned, there is a risk that the energy transition, as well as climate and environmental protection, will be pushed aside by other concerns. In an age dominated by the fear of terrorism and the refugee crisis, renewables find it hard to get a hearing from the electorate. However, this should not deter us from keeping up the pressure. Quite the contrary: we must do something to combat the declining interest in climate protection. We need to advocate the cause of the energy transition with resilience and commitment, and we must do so at every level: internationally, nationally, locally, in politics, in conversation with business partners, and amongst our circle of family, friends and acquaintances. We have to make a convincing case and promote a positive perception of onshore wind energy.

This will help us to keep our key message on the agenda, even in an excitable election year: climate protection is essential and there simply is no alternative; meanwhile, we are doing our bit towards solving the climate problem with our technology and our system solutions. But we must also be very clear about one thing: we are part of a development which we ourselves are pushing forward. We are confronting this situation and the industrial challenges it represents with all of the expertise we have gained in renewables, and with the aim of achieving a positive and sustainable outcome.

Hans-Dieter Kühne
ENERCON Managing Director

Keeping climate protection on the agenda
In terms of new installations, 2016 was the second-best year ever for ENERCON. The installation teams erected a total of 1,547 wind energy converters around the world between January and December with an installed power totalling 3,832 MW. Of these, 677 WECs with a total power of 1,841 MW were built in ENERCON’s home market of Germany. This result saw ENERCON improve its installed power by 711 MW over the previous year, and was only slightly less impressive than its personal best of 3,937 MW globally (including 2,039 MW in Germany) which it achieved in 2014. ENERCON’s share of the German market was 39.8 percent in 2016; the figure for Europe was 24.7 percent.
ENERCON can use the specialist equipment the vehicles transporting the components an angle of up to 60 degrees and allows them port frame customised for ENERCON rotor be impossible for conventional semi-trailers. mountainous areas – and where access would to construction sites where the conditions are used to transport rotor blades, steel sections excess of 320 tonnes. The 210 hp vehicle is used to transport E-101 rotor blades to the Trabelsdorf Wind Farm in Bavaria (2 x E-101/3 MW).

“Specialised transporters enable us to deliver our rotor blades more flexibly, quickly and economically where having our own vehicles allows us to respond alongside a tower crane, especially at loca-“

From now on, ENERCON will be labelling concrete tower segments produced at its French plant as components guaranteed to seat bas manufactured locally. They will bear the ‘Origine France Garantie’ seal of approval from ‘L’association Pro France’. In early February, ENERCON received official confirmation of certification from the French ministry for the concrete technology, an independent certifying body. The quality mark is intended to enhance the reputation of French pro-”

AUSTRIA

Austria

Modification of the Environ frame Austria, which was launched earlier this year, is represented by the rotor blades series of E-101 to E-115. An adapter is on order for rotor blades designed for the new E-103 EP2, E-126 EP4 and E-141 EP5 WECS; soon, it will be possible to deploy the specialist transporter for these projects too.

The specialist transporter fills a gap in the fleet of ENERCON’s Energieanlagenmontage GmbH, where it joins ENERCON’s own large cranes, mobile cranes, flatbed trucks, and other specialist transport equipment. There are also three comparable self-propelled vehicles, although these are not equipped with the blade transport frame. In the past, ENERCON resorted to using external service providers for specialist blade handling. “We will continue to work with third parties in this field in the future”, says Ludger Janssen, Managing Director of Energieanlagenmontage GmbH. “We will be using our own equipment to create additional transport capacity as we engage in an increasing number of projects at challenging sites. The self-propelled vehicle is also particularly well suited to working alongside a tower crane, especially at loca-”

The new public utility company Stadtwerke Aurich (SWA), which was launched earlier this year, is represented by the rotor blades series of E-101 to E-115. An adapter is on order for rotor blades designed for the new E-103 EP2, E-126 EP4 and E-141 EP5 WECS; soon, it will be possible to deploy the specialist transporter for these projects too.

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The quality mark is intended to enhance the reputation of French products at home and abroad. It may only be used for products when at least 50 percent of the manufacturing costs originate in France and the most important stages of production are performed there. All of the concrete tower segments produced at the French plant as components guaranteed to seat bas manufactured locally. They will bear the ‘Origine France Garantie’ seal of approval from ‘L’association Pro France’. In early February, ENERCON received official confirmation of certification from the French ministry for the concrete technology, an independent certifying body. The quality mark is intended to enhance the reputation of French pro-
ENERCON NEWS

e.g.o.o. takes delivery of new electric locomotive with ‘Last Mile’ function

ENERCON's rail company e.g.o.o. mbH is deploying an additional electric locomotive for its freight services. The Bombardier TRAXX F140 AC3 LM goods locomotive has an electric drive with a so-called ‘Last Mile’ function. It is fully-electric in mainline operation, but also has an auxiliary diesel engine to perform shunting work on non-electric tracks. This means that e.g.o.o.’s preferred option of electric traction is made possible in a wider range of scenarios. Just like the electric locomotives of the Vectron series which are being used for the Ems-Isar Express (EIX), the e.g.o.o. is operating the new TRAXX with a neutral impact on the environment, using 100 % green energy. The new locomotive joined the e.g.o.o. fleet in early March. It will initially be timetabled to operate three times a week transporting gravel from Sprotta in Saxony to Emden, a service which e.g.o.o. took charge of in 2017. The new locomotive is expected to have a long-term impact on costs, increasing the availability of train services. It will be used to replace shunting locomotives that have been working since the early 1990s, allowing e.g.o.o. to utilise less fuel and produce fewer emissions.

ENERCON builds power-to-gas plant in Aurich

ENERCON is working alongside partners in Aurich to build a power-to-gas plant (PtG) as a pilot project for the integrated energy concept to improve system stability. The project at Aurich-Haxtum sewage treatment plant is intended to demonstrate that PtG plants using the biological methanation process can be integrated into the grid as controllable loads and used effectively for system stabilisation. The PtG plant makes possible the efficient long-term storage of surplus electricity from solar and wind energy plants as completely CO₂-neutra- nal natural gas. This can reduce the costs involved in grid expansion. A higher proportion of renewables in the energy system is to be achieved by building new wind energy converters. Flexibility is required in order to ensure system stability and security of supply in the long term. Storage systems can be used as flexible consumers to store surplus energy, which can then be made available on demand returns. By converting electricity to gas, excess energy can be stored in the natural gas network in the long term. During the PtG process, electric energy is converted into hydrogen, a chemical energy source, through electrolysis. At the next stage, during the PtG process, electrical energy is converted into hydrogen, the synthetic natural gas is generated in a biolog- ical methanation plant which, like PEM electrolysis, allows for a dynamic mode of operation. Micro-organisms, so-called Archaea, systematically metabolise the hydrogen which has been generated and the carbon dioxide from the digester gas sourced at the sewage treatment plant to produce synthetic methane. The efficiency of the entire system is about 50 %. When operating at full capacity, the PtG plant can generate about 50 m³ of synthetic natural gas every hour. That is enough to supply about ninety households a year with renewable gas. The system is part of a major project called enera, and is being built by ENERCON and Viessmann, both partners in the enera consortium. The biological methanation plant comes from the Viessmann subsidiary MicroEnergy. Integration and commissioning of the system is scheduled for autumn. Standard operation is expected to begin in spring of 2018.

ENERCON exceeds 20 GW mark for installations in Germany

ENERCON has installed more than 20 GW worth of wind energy ca- pacity in Germany. It reached this milestone for the construction of onshore wind energy converters (WECs) at the Ellwanger Berge Wind Farm in December. This project in the district of Ostalbkreis, Baden- Wuerttemberg, saw ENERCON erect a total of ten E-115/3 MW WECs on precast concrete towers with a hub height of 149 m near the A7 motorway for W1-I-N-D Energien GmbH. “We take great pleasure in this continuing success story, which we have now been writing with the help of our customers in Germany for more than thirty years”, says ENERCON Head of Sales Stefan Lütke- meyer. “It means that together we have made a substantial contribu- tion towards the decentralised energy transition. Our installed power is sufficient to make twenty nuclear power plants redundant. This shows us that we are on the right path when it comes to restructuring the energy supply system to 100 % renewables. We will continue to advance the cause of energy transition in the years ahead.”

EPK including direct marketing available for new turbines

The extended direct marketing package (EPK-E) will be included in the EPK full-maintenance concept with immediate effect, which means it will automatically be included in the range of services covered by future contracts. EPK-E is taking this step in response to the increasing complexity of planning, financing, constructing and operating new ENERCON wind energy converters as a result of the stringent regulatory requirements embodied in the Renewable Energy Sources Act (EEG). It will allow operators to benefit from a high standard of service and financial security during the crucial commissioning phase.
AFTER PUTTING ITS PROTOTYPE INTO OPERATION, ENERCON IS OFF TO A FLYING START WITH THE NEW E-141 EP4. THE FIRST IN A SERIES OF PROJECTS HAVE ALREADY BEEN BUILT OR ARE UNDER CONSTRUCTION. ANOTHER EIGHTY MACHINES ARE TO FOLLOW BY THE END OF THE YEAR.
I t is pitch black in the fields near the village of Coppanz, and the air is freezing cold. The reading on the thermometer is minus eight, and the weather forecast is for snow. The conditions are definitely not conducive to hanging about outside late at night. It is only on the construction site at the edge of the wind farm that there is plenty of hustle and bustle to be seen: in the beam of the floodlights, installation technicians from Team 6 of ENERCON’s Energieanlagenmontage GmbH are busying themselves with a rotor blade. Two are untightening the screws on the transport cradle, and a telescopic handler is standing by, ready to swivel it to one side. The blade is already suspended from the hook of the truck-mounted crane, which is idling, waiting for the command to hoist its cargo. Despite the cold, the men are highly-motivated, because they are on a special mission: they are erecting the first prototype E-141 EP4, ENERCON’s new flagship, and they want to complete their task that night.

When the 66.7 m long and 32.4 tonne E-141 rotor blade is freed from the transport cradle, team leader Ralf Boekhoff can be heard issuing brief instructions into his radio. The crane engine revs up and the rotor blade begins to move. It disappears, one metre at a time, into the night sky. When it has nearly ascended to a hub height of 129 m, the snow starts to fall. “The weather and working at night don’t bother us”, reckons Ralf Boekhoff. “We are proud to be installing this prototype. We are all very excited about this particular machine. That makes it easy to put the harsh conditions to the back of your mind.”

The most productive ENERCON wind energy converter

The E-141 EP4 has been designed especially for good to very good locations (Wind Class IIa). It is ENERCON’s most productive wind energy converter so far. The nominal power of the E-141 EP4 is 4.2 MW, and it has a rotor diameter of 141 m. At sites with average wind speeds of 7.5 m/s at a hub height of 129 m, it generates an annual energy yield of roughly 16.4 million kilowatt hours. This also means that it ranks among the most productive onshore wind energy converters anywhere in the world.

The prototype is located at Coppanz in the district of Saale-Holzland, near the Thuringian town of Jena. The landscape is hilly, with woodland nearby and average wind speeds of 6.05 m/s – typical onshore conditions, in other words. “Challenging as far as the wind conditions are concerned”, says Jan Hanssen, the Sales Manager responsible for the project at ENERCON Sales Germany. “But the E-141 is also very well suited to these locations.” Estimates are that it will generate an annual energy yield of 11.14 million kilowatt hours.

This was one of the main reasons why the customer, Denker & Wulf AG, plumped for ENERCON’s E-141 EP4, as board member Thorsten Levensen explains. “We preferred the price-performance ratio of this wind turbine to that of other wind turbine types”, says Levensen. “We expect to make much higher profits with the E-141 EP4 at this site.” So when ENERCON asked Denker & Wulf if it knew of a suitable site for the prototype, it said yes at once, and modified its existing plans for Coppanz, where another type of ENERCON wind turbines already had the go-ahead, opting instead for the E-141 EP4. “We are delighted to be taking delivery of this E-141 EP4 so early on, and will now be able to make our field evaluations jointly with one another. Because we are planning to deploy this wind turbine at other sites too.”

The final night shift of Team 6 in Coppanz goes smoothly. The third rotor blade is mounted exactly according to plan, and shortly before midnight the installation of the E-141 EP4 prototype is complete. “A fantastic achievement”, comments ENERCON Sales Manager Jan Hanssen. “Everything went like clockwork.” Team leader Ralf Boekhoff also gives a positive appraisal of how things went. He speaks warmly of the high level of cooperation with ENERCON’s Project & Logistics Management (PLM) and with the engineers from ENERCON’s research and development division, WRD. He also talks of a good working relationship with the customer and with the external service-providers, and Thorsten Levensen backs him up from a customer’s perspective.

And the service technicians too are genuinely enthusiastic about the new wind energy converter. “It is very well planned and engineered. The handling of the components on site works well.”
"The new wind energy converter is very popular with our customers", reports Wolfgang Lübbe, Senior Sales Manager at ENERCON Sales Germany, who is responsible for the Lehe project. "More than 90 percent of scheduled projects in Emsland alone operate with the E-141 EP4." Wolfgang Lübbe believes that the machine is exactly the right ENERCON wind turbine for the new tendering system in Germany. "The E-141 EP4 is the most powerful ENERCON machine — with lots of benefits which improve our competitive edge over the large converters of our competitors", says the sales engineer.

In addition to its efficiency, he considers the E-141 EP4’s main advantages to lie in the area of wind farm planning: since their lower rotational speed causes less wake turbulence, E-141 EP4 converters can be positioned closer together than other types of machine. In addition, at 105.5 dB(A), the sound power level emitted by the E-141 EP4 is very low. "This means that the available sites can be used to optimum effect."

When they completed their installation work in Coppenz, Ralf Boekhoff and his installation team headed straight to the next E-141 EP4 site, because ENERCON began to tackle its first serial projects with the new wind energy converter as early as in the spring. In Lehe near Papenburg, in the district of Emsland, Lower Saxony, Team A is currently erecting four E-141 EP4s on precast concrete towers with a hub height of 129 m, just like in Coppenz. As part of a repowering project, the converters will be replacing five old TWT 600 A type Tacke wind turbines. The E-141 EP4s at this site are each expected to generate some 13.9 million kilowatt hours per annum. At the same time, another team at Flörsheim near Aachen is installing an E-141 EP4 of the same configuration.

But the 129 m tower version is only the first stage in the launch of the E-141 EP4. Other projects will be installed on ENERCON’s new precast concrete tower with a hub height of 159 m from the summer — for instance, in Ahaus, North Rhine-Westphalia, and in Hassmoor, Lower Saxony. ENERCON plans to erect a total of some eighty E-141 EP4s by the end of 2017 — an ambitious programme, given that it has only been launched on the market this year.

ENERCON WEC type for new tendering system
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Talking of which, ENERCON’s development engineers have also used the first few weeks of operation of the E-141 EP4 prototype in Coppenz to optimum effect, as they analyse how the machine behaves under real-life conditions. "We are very satisfied with the results", says Arno Hildebrand, EP4 programme manager at ENERCON’s research and development division, WRD. "The machine has been through every operating mode, and has already experienced the entire spectrum of wind conditions, including the intense low-pressure systems in the spring. And it fulfilled every single one of our expectations."
ENERCON quick charging solution –
start-up support
for electric mobility.

ENERCON HAS DEVELOPED A QUICK CHARGING SOLUTION FOR ELECTRIC VEHICLES, BASED ON ITS INTERFACE TECHNOLOGY FOR CONNECTING ENERGY STORAGE SYSTEMS TO THE GRID. IT HAS A CHARGING CAPACITY OF UP TO 350 KW PER CHARGING POINT, WHICH MEANS IT IS ALREADY SUITABLE FOR THE NEXT GENERATION OF ELECTRIC VEHICLES.

The most important technological preconditions for the success of electric mobility include sophisticated batteries which guarantee an adequate range for the vehicle and are quick to charge, as well as a comprehensive infrastructure of rapid charging stations. No driver would be content with always having to factor in detours to find the nearest charging point halfway through a journey, or being compelled to take lengthy breaks while the vehicle was recharging. Whilst battery technology has made some progress in recent years, the network of charging stations still leaves something to be desired: it is still not nearly as dense as it needs to be in Germany. According to information released by the Federal Association of Energy and Water Industries (BDEW), as of December 2016, there were 7,407 public charging points throughout the country, only 292 of which were quick charging stations.

Yet it is also the case that most ‘quick’ charging points only offer a charging capacity of 50 kW (DC), meaning that charging and thus waiting times still exceed one hour. Only the upcoming standard known as ‘High Power Charging 2’ (HPC 2) with a charging capacity of up to 350 kW (DC) is genuinely quick; it allows vehicle batteries to reach a charge of eighty percent in just a few minutes. The quick charging solution developed by ENERCON already meets this advanced standard. In addition, the technology has many grid-friendly characteristics which are also features of ENERCON’s existing wind energy converters.

ENERCON’s quick charging solution is based on the company’s interface technology for connecting storage systems to the network. Their key components are ENERCON inverters, which are integrated into every ENERCON wind energy converter. “The rapid charging solution can achieve almost everything that an ENERCON wind energy converter can do in terms of the grid”, explains Alfred Beekmann, Head of Control Technology at ENERCON’s research and development division, WRD. This includes the intelligent control of feed-in behaviour and the highly dynamic provision of reactive power.

“That’s the main thing that makes our charging solutions different from others: our quick charging system doesn’t just consume lots of electricity from the grid, but can at the same time also contribute to network stability.”

And that is a feature which will become increasingly important as the number of electric vehicles rises and the quick charging infrastructure is extended where it is most needed: when several electric vehicles are charging their batteries at the same time using HPC 2, for instance at motorway services, then the service station must have a suitably dimensioned grid connection – which requires considerable investment or else use smart technology to ensure that grid stability is guaranteed. Because the use of HPC 2 quick charging by several vehicles at once draws considerable capacity from the grid, resulting in a drop in voltage and jeopardising grid stability. ENERCON’s quick charging solution solves this problem by, for instance, making reactive power available as required to support the level of mains voltage during charging. It is also possible to combine the charging technology with a pre-charged battery storage to relieve pressure on the grid during charging. Battery-exchange stations are another idea under consideration.

“During charging, our power electronics draws power from the grid very gradually”, as Alfred Beekmann explains the process. The current flow from the supply grid used to charge vehicles is sinusoidal. This is what is known as active rectification, and is much better for the grid than conventional methods; it minimises harmonic effects during quick charging. Reactive power is fed into the grid in parallel to this, as necessary. “Our system is compatible with global grid guidelines and requirements relating to grid feed-in quality”, says Alfred Beekmann. “Connection is possible at a low or medium-voltage level. The system is a container-based solution and can be extended as required in modules of 350 kW.”

Another advantage is that the technology is downward compatible, and can also be used to charge electric vehicles not designed for quick charging. A flexible charging configuration is also possible: this means that a rapid charging unit with 600 kW charging capacity can provide a rapid charge to two vehicles simultaneously (300 kW) or to four vehicles (150 kW), can charge six vehicles in normal mode (50 kW), or can even charge vehicles at different rates: one in HPC 2 mode (350 kW), one at 150 kW and two at 50 kW. Electric commercial vehicles can also be charged.

There are synergy effects for ENERCON on the production side, as the inverters required for quick charging come from the same source as those for ENERCON wind energy converters. There are other synergies when it comes to maintenance, as the components can be serviced by ENERCON Service. And last but not least, ENERCON is able to supply the environmentally-friendly green electricity used to charge the vehicles from ENERCON wind energy converters.

“We are pursuing two main goals with the quick charging solution”, says Jens Winkler, who is responsible for energy management at ENERCON. “Firstly, we want to create a sales outlet for wind energy in another sector and thereby contribute to the changes which the transportation sector will have to undergo to meet climate protection targets. Secondly, we would like to promote the commercial operation of charging poles for electric mobility and open up new areas of business with our product. This will be done in accordance with our system concept, whereby we – as a system supplier for renewable energy – provide value-creation solutions on the periphery of our core product: wind energy converters.”
Hub rotating device for EP4 rotor blade installation

FOR SINGLE-BLADE INSTALLATION ON WECS OF THE EP4 PLATFORM
ENERCON USES A SPECIAL ROTATING DEVICE FOR THE PRE-INSTALLED ROTOR HEAD: THE SO-CALLED BALLAST ARM, AN INSTALLATION AID DEVELOPED BY ENERCON.

In the future, ENERCON service technicians will be able to perform both mechanical and electrical work on wind energy converters. But first they will need to pass the new in-house qualification for ‘Elektrofachkraft Industrie’ (electrically skilled person for industry). A total of twelve service technicians have already completed the course and received their certificates; they will now be able to take on additional duties when maintaining ENERCON wind energy converters.

As ENERCON switches over to a new service concept, combined mechanical and electrical maintenance will take place in the twice-yearly master maintenance for ENERCON wind energy converters. Thanks to the new qualification on offer, the service technicians who were previously in charge of mechanical maintenance will also take responsibility for the necessary electrical work. Rodger Glesmann, the Regional Manager for Germany, and Dirk Peter Brandt, who is Head of the Training Department (TRD) in Göttingen, were the driving forces behind the certified training scheme. ‘The new qualification is our response to the growing demands made on service teams during master maintenance, and will allow us to put teams together more efficiently and with the emphasis on the needs of the customer’, says Rodger Glesmann. This measure also presents our Field Service staff with attractive career development opportunities at ENERCON.

The qualification comprises a three-month full-time certificate course provided by the Chamber of Commerce and Industry as well as two in-house specialist training units. There is also a six-month field service, to enable the service technicians to put what they have learned into practice whilst maintaining ENERCON wind energy converters. Once they have successfully completed the programme, graduates have documentary evidence of their qualification to work as electricians in industrial enterprises on their own cognisance in accordance with Provision 3 of the DGUV (German Statutory Accident Insurance). Special training specific to ENERCON also equips service technicians with the skills to perform electrical work on wind energy converters.

The new training concept has been very well received by the workforce, with the result that in 2017, ENERCON will be conducting another two certificate courses for qualification as an ‘Elektrofachkraft Industrie’. The next course, on which twelve service technicians were enrolled, began just a few weeks after the first certificates were awarded. In order to assure customers that they will continue to be offered the highest possible standard of service, the aptitude of the participants will always be assessed in advance in the course of a multi-stage selection process.

ENERCON’s installation concept for EP4 platform wind turbines requires rotor blades to be installed individually, making it possible to use smaller cranes with lower hook heights. This gives ENERCON greater flexibility on the construction site and means costs can be cut. However, a special installation aid is required for single-blade installation, in order to turn the installed rotor hub into the correct position for installation: the ballast arm developed by ENERCON. This is a 23 m long, 2.3 m wide and 2.9 m high lever, which is fitted with ballast weights at one end to generate the torque required to align the rotor. It has a total weight of 58 tonnes.

ENERCON installs the rotor blades of its wind turbines in the three o’clock and nine o’clock positions. When installing the first rotor blade, the respective blade adapter is already at three o’clock. After installation, the technicians release the rotor brake of the wind energy converter and allow the dead weight of the installed rotor blade to cause it to descend until the free blade adapter has turned to nine o’clock, ready for the second blade to be installed. The rotor brake is then reactivated. The ballast arm is needed to turn the wind turbine through another 60 degrees after the second blade has been installed.

With the help of the installation cranes, the angled flange of the ballast arm is introduced into the last free blade adapter, which is in the one o’clock position, and bolted into place. The rotor brake is then released again, and the counterweight of the ballast arm rotates the wind turbine until the blade connection reaches three o’clock. The rotor is locked once again, and the ballast arm detached and let down so that the third rotor blade can be installed.

ENERCON already uses similar installation aids for wind turbines of the EP2 and EP3 platforms. The ballast arm for the new EP4 platform was redesigned and adapted by the ENERCON company SKET in Magdeburg.
ENERCON starts using wind energy in the regions

ENERCON is demonstrating by means of a series of innovative projects that the integrated energy concept is not just a slogan, but that it can bring added value and job creation to rural areas.

Since the new Renewable Energy Sources Act (EEG) came into force in Germany, it has put a damper on the expansion of wind energy, most especially in high-wind locations near the North Sea and Baltic coasts: because the transmission network was not expanded sufficiently in time, the volume of tenders accepted has almost halved in the coastal districts euphemistically referred to as the ‘grid expansion areas’, which are to be found in Lower Saxony and Mecklenburg-Western Pomerania as well as throughout Schleswig-Holstein. Projects which make regional use of some of this wind energy for local initiatives, leading to a considerable reduction in the use of scarce grid capacity, have even been excluded from the tendering process. Hardly a promising beginning for the integrated energy concept.

But now the respected Berlin think-tank Agora Energiewende has published a study which singles out decentralisation as being crucial to the energy transition. It may sound like basic common sense, but an analysis of Agora Energiewende’s previous stance and in particular of political discussions with the Ministry of Economic Affairs reveals that this is a genuinely new idea for them: up until now the comprehensive expansion of the grid was regarded without question as the optimum way for the economy to ensure reliability of supply and a genuinely competitive electricity market.

A storage project in the Faroe Islands is demonstrating how much is to be gained for the regional utilisation of wind energy. As part of the Húsahagi project, lithium-ion batteries with a nominal power of 2.3 MW and a capacity of up to 700 kWh mitigate the effect of feed-in peaks. “The storage system was essential for ensuring stable operation of the grid on the island in cooperation with the wind farm”, explains Jens Winkler, who is responsible for energy management at ENERCON. “Moreover, renewable energy which would otherwise have been wasted can be used to supply power.”

If the integrated energy concept is to be successful, power-to-X plants must also be recognised as storage systems.

One of the customers for renewable natural gas is the car industry, which will have to meet stringent EU requirements for fleet emissions of CO₂ from 2020. That is why Audi, for instance, is already operating a power-to-gas plant in Werlte, Lower Saxony, and will be putting its faith in renewable natural gas in the future to operate cars with gas engines. The Austrian tractor manufacturer Steyr is following a similar route. One new prototype can even be fuelled with wind-generated gas – providing CO₂-free mobility right on the doorstep.

But as things stand, the production of hydrogen from wind energy hasn’t progressed much further than a few pilot projects. The brains behind it require support from politicians – because otherwise, limits will be put on the amount of wind energy produced at the coast in the future rather than making use of it. Currently, wind turbine operators do actually receive compensation for switching off their converters when there is congestion in the grid – but it is only this power which may be converted in the electrolyser. Yet the few hours of negative prices and grid disconnections during the year do not suffice to make an electrolyser financially viable. So if advances are to be made in hydrogen storage, an alternative EEG feed-in or electrolysis unburdened by levies would have to be authorised all year round. At present, an EEG levy is payable on electricity converted into wind-generated gas, as well as a cogeneration levy and electricity tax. Together with the network charges, this makes wind-generated gas a commercial no-no! Which is a shame, because it unnecessarily denies power-to-gas its place as a crucial pillar of the energy transition. Storage systems which re-convert their stored energy back into electricity – such as batteries – are, on the other hand, exempt from all levies. If the integrated energy concept is to be successful, power-to-X plants must also be recognised as storage systems, even if they feed their wind-generated gas into the natural gas network. Up until now, however, they have been deemed to be ‘end consumers’, and have been burdened with overly lavish and duty going.

A joint project at the sewage works in Aurich is also producing hydrogen from wind. The genius of this technique is that the sewage works produces digester gas, a mixture of methane and CO₂. This CO₂ can be synthesised with the hydrogen generated by wind to make methane, which can then be fed directly into the natural gas network. The special advantage of this combination plant is that the climate-damaging element of the digester gas from the sewage works can be used to feed twice as much methane into the network”, explains Jens Winkler. “This means we can reduce our reliance on gas from fossil fuels and heat our homes from renewable sources without having to build new pipelines, to give just one example.” However, here too it remains a fact that these projects are unlikely to be commercially viable as long as an EEG levy is payable on the wind energy used.

Wind farm Húsahagi/Faroe Islands with 13 x ENERCON E-44/900 kW and integrated battery storage.

### Integrated energy concept at sewage works in Aurich

- **bio methane can be used elsewhere (gas network)**
- **surplus energy from renewable sources**
- **CO₂ is synthesised with hydrogen to make bio methane**
- **sewage works in Aurich**
- **digester gas**
  - 50 m³/h bio methane
  - 200 m³/h hydrogen
- **electrolysis**
  - 1 MW/h

30 m³/h bio methane for CHP plants
Questions raised by EU Commission proposals

The EU Commission's 'Winter Package' comprises 4,000 pages of new regulations on renewable energies. The wind industry would do well to study the proposals in detail.

The EU renewable energy directive, which is currently in force, will soon be due for replacement. The expansion targets for renewable energies have to be met throughout Europe by 2020. But what will happen then? As long ago as in 2014, the Heads of State and Government of the EU member states reached crucial decisions about the new arrangements to be made for the period 2021 to 2030, and instructed the European Commission to submit suitable proposals.

In response, the Commission published the 4,000-page long 'Clean Energy Package' in November 2016, a legislative proposal containing various guidelines and ordinances on renewable energies, energy efficiency and a new market design. There are to be new centralised rules, for instance, on the priority to be given to renewables as a power source, which is no longer to continue to operate in its current form, and on the closely related new compensation ruling which will apply in the event of wind energy converters being disconnected.

By the same token, the question of an ambitious expansion target for 2030 is of particular relevance, because the Commission's proposal takes into account the views of the member states, and envisages a somewhat unambitious goal of 27 percent renewable energies. Since the proposal – unlike the previously existing law – does not specify any binding national expansion targets, it will also be particularly interesting to see how a shared EU goal can be achieved.

As the proposals of the EU Commission will have a direct impact at a national level, the European Parliament and the member states must now take a closer look at the package and discuss it together. And the wind energy sector too would be well advised to look at the proposals in depth and to stand up for its own interests.

“We are creating a competitive power system based on market principles”

With its 'Clean Energy Package' the European Commission causes discussions among the renewable industry. The windblatt asked Maroš Šefčovič, Vice-President of the European Commission in charge of the energy union, about the new guidelines’ impacts on investment security, priority dispatch and sector coupling.

windblatt: The national energy and climate plans are non-binding. How can investment security be achieved under such uncertain conditions?

Maroš Šefčovič: The European Commission’s proposal obliges Member States to present their national energy and climate plans by 2019 and progress reports regularly thereafter. There are at least three investment security bedrocks as part of our Governance proposal.

First, the national energy and climate plans will provide clarity on the way towards the 2030 targets (and beyond), especially concerning renewables and efficiency targets and long-term low emission strategies. Member States will be obliged to maintain the baseline share of renewables from 2021 onwards. Second, we proposed a robust annual surveillance process. The Commission’s responsibility will be, inter alia, to provide Member States with a constructive feedback and concrete recommendations for fitting their plans into the larger EU picture. Third, should the Commission consider that the collective achievement of the Member States does not add up to the EU targets, it will be entitled to close the ambition gap by stepping up action at EU level. For instance, the concerned Member State will be requested to contribute to the Commission’s financing platform, which would be used for renewables deployment. Contributions can originate from Member States’ annual emission allowances under the EU Emission Trading System.

In a nutshell, national energy and climate plans will boost transparency and predictability for investors.

We propose a mandatory priority dispatch for small-scale renewables production and emerging technologies, capped at 15 % of installed capacity. Furthermore, any existing installations, constructed under priority dispatch rules, will keep a priority dispatch, in order to safeguard investment.

Other than these cases, priority dispatch might lead to higher system costs and more frequent negative prices that reduce the profitability of all players in the electricity market. This would disincentivise investments in new capacities and thereby create higher needs for subsidies. What more, we cannot endlessly immobilise the most mature renewable generators from competition that drives their costs down. Instead, we are creating a competitive power system, based on market principles and producing some of the best renewables technologies in the world.

windblatt: Electrification of the heating/cooling and transport sector is an important topic at the ‘Clean Energy Package’. What are your expectations in this area in the coming years?

Maroš Šefčovič: Heating and cooling accounts for half of the EU’s annual energy consumption and constitutes two thirds of all its gas imports. Meanwhile, less than one fifth of the sector’s energy originates from renewable sources and a large amount of energy is wasted. Changing our energy mix towards sustainable sources is therefore vital. We are also prioritising energy efficiency as a ‘source’ at its own right, given its ability to reduce primary energy needs. Heat pumps and other technologies are equally needed in order to make this shift. In fact, they are no futuristic dream but already commercially available. We also launched a Heating and Cooling Strategy for making renovations of buildings easier. They will allow to better integrate electricity systems with district heating systems and with industrial sites for waste heat. The Eco-design and Energy labels will ensure this shift is driven by informed consumers. Finally, the Energy Performance of Buildings Directive (the EPBD) introduces building automation and control systems as an alternative to physical inspections. It encourages the roll-out of the required infrastructure for e-mobility. It also introduces a smartness indicator to assess the technological readiness of the building to interact with their occupants and the grid so they can manage themselves efficiently.

This is where the heating and cooling sector enters into interaction with the transport sector which will also see increasing electrification. The 2030 energy efficiency and renewable targets are there to safeguard a high level of ambition.

The fast-paced development of electric, connected and automated vehicles as part of a mobility system will probably present the most significant paradigm shift in mobility ever since we moved from horses to cars. Mobility can once again become environmentally friendly. The car industry is a major employer, traditional driver for innovation and a hallmark of European industry. We want it to remain this way. But in order to do so, Europe must continue in producing the best cars in the world. In order to support this change, 2017 will be a year when we propose new emission standards and many other measures conducive to the larger uptake of electric vehicles. This trend must go hand in hand with decarbonisation of power generation, which is why we aim to have 50 % of consumed electricity originating from clean sources by 2030. Synergies with the building sector are equally important when it comes to availability of recharging stations as one of the most critical components for consumer acceptance. We have proposed in the review of the EPBD that one in every ten parking spaces in new non-residential buildings will be required to have recharging points. At the same time, all new residential buildings are to have the pre-cabling in place. We are going to follow-up on this with measures to support the deployment of alternative fuel infrastructure in Europe later this year.

POLITICS_
The Federal Government brought about a fundamental change in the way in which electricity from renewable sources is funded with its Renewable Energy Sources Act (EEG) 2017. Since January 2017, a tendering system has been used to determine the level of funding for all renewable technologies. For medium-sized planners and developers as well as regional energy producers in particular, the requirement to submit a bid to establish the level of funding one will receive under the EEG could represent a major hurdle. For this reason, ENERCON offers support during the tendering process especially to these groups and stands by their side as a capable partner.

The biggest obstacle for this group of customers regarding the call-for-tender system is that a valid permit under the German Federal Immission Control Act (BImSchG) is required as a precondition for submitting a tender. This means that anyone who wishes to submit their project must spend money up front: they must bear the planning costs and pay for a large number of expert reports. Given the uncertainty about whether their project will actually be accepted, it will be difficult for small investors to raise this venture capital. Many prospective investors will hesitate, because if the project is not accepted, the lost project costs cannot be absorbed by a larger portfolio. This remains a concern despite the concessions made to community-owned energy companies under the Act, aimed at ensuring their participation in the process.

However, ENERCON strongly believes that the expansion of onshore wind energy must continue to involve community-owned energy companies, city utilities, farmers, energy co-ops and regional planners – in other words, people who come from the project regions. “Now as ever, ENERCON is an advocate for the decentralised energy supply with as much regional business involvement as possible,” declares ENERCON Managing Director Hans-Dieter Kettwig. “The reorganisation of the energy system will only be successful if ordinary people stand behind it.” Support for regional wind energy projects tends to be much easier to generate if people are able to get involved themselves. “Our aim is to work alongside our customers in developing a strategy for scheduled projects and preparing suitable funding and marketing programmes, so that the existing diversity of stakeholders in the renewable energy landscape can be maintained in the future”, says Hans-Dieter Kettwig.

For this reason, ENERCON offers its support particularly to small and medium-sized investors in the early stages of their projects in order to develop project-specific solutions and mitigate the financial risks. If desired, ENERCON will accompany customers at financial meetings as a project partner, establish contact with potential financiers and create a financing recommendation.

In addition, ENERCON will create a strategy for participating in the call for tender, support customers during the tendering process, and broker the required securities if necessary. This new offer includes extensive support during the project planning stage; creation of the BImSchG plan; and designing grid connections, transmission substations, access roads and crane platforms. It also includes the creation of risk evaluation reports; turbulence analyses; stability analyses; prognoses of yield, noise and shadow casting; and wind analyses. //
The latest amendment of the Renewable Energy Sources Act (EEG) brought about a fundamental systemic change in the way in which the production of renewable energy is funded in Germany. The entitlement to statutory feed-in tariffs which had applied in the past was practically abolished. Instead, all wind energy converters of more than 750 kW capacity which are approved from 2017 will have to participate in a tendering process if they are to receive funding under the EEG. Only suppliers who can produce a kilowatt hour of electricity for the lowest price will have their bid accepted.

Between 2017 and 2019, 2,800 MW of installed wind energy capacity will be put out to tender each year. From 2020, the volume for onshore wind will rise to 2,900 MW p.a. The amounts put out to tender are gross volumes; i.e. wind energy output which is commissioned during the same period will not be reflected in the tender process. Against this background and in the light of German climate targets and the greater use of electricity in the transport and heating sectors, the tender volume is completely inadequate. It is true that volumes put to tender, but not awarded will be considered in the subsequent round of tendering. However, if awarded projects are not completed on time, a scale of penalties will be payable, up to and including total forfeiture of the project awarded.

If bids for wind energy converters are to be admitted to the tendering process, the bidder requires approval under the Federal Immision Control Act, which must be recorded in the register of installations three weeks before the bidding deadline. In addition, all of the deadlines and procedural rules of the Federal Network Agency must be observed meticulously. Otherwise, the bidder is at risk of exclusion from the process.

In order to ensure a diversity of stakeholders, the authorities offer concessions to local community-owned energy companies. They are to be granted price certainty for their wind projects even before the concessions are granted. This is to focus on developing its technology. As a manufacturer, we must create the technological conditions that are needed to ensure we remain competitive. And we are pretty confident about that: with the new wind energy converters of the EP4 platform, we have the right products on the market to be successful even in the face of the tendering system. This is backed up by the positive feedback we have received from many customers who are entering the first round of tendering with EP4 machines. There is little doubt that the new design of the E-141 EP4 for Wind Class IIA sites is also a point in our favour. And apart from that, we have other developments in the pipeline across different performance classes.

The project partnership offers particular benefits when it comes to the tendering system: ENERCON is a stable, well-established company with a sound financial basis and is independent in its decision-making. We are able to share risks and guarantees, are financially strong, and have the liquidity to make advance payments when the occasion arises. Not to mention our well-qualified and committed workforce in the sales, planning and project development divisions, and the impressive technical knowledge and long years of experience they contribute to the various stages of our joint projects. To sum up, our customers are in good hands with us, tendering system or no tendering system!

One special feature of EEG 2017 is the designation of the grid expansion area, which extends over the entire territory of Schleswig-Holstein and Mecklenburg-Western Pomerania as well as the northern part of Lower Saxony and the city states of Hamburg and Bremen. In this area, the volume of onshore wind capacity that may be added in future is capped at 952 MW per annum. This upper limit is distributed evenly across the individual bidding deadlines of a calendar year. Maximum bids of ca. 390 MW will be accepted for the individual bidding deadlines in respect of locations within the grid expansion area.

In addition to the fundamental systemic change to the funding system, EEG 2017 also contains a series of statutory instruments which are currently under discussion at the Federal Ministry of Economic Affairs. The ordinances on joint tendering for wind and photovoltaics (600 MW p.a. from 2018) and innovation bids (50 MW p.a. from 2018) are basically being used to test the water for the future refinement of the EEG. But the only thing that is clear at present is that the volumes for which bids are accepted will have the effect of reducing the technology-specific tender volume.

### Overview of the new tendering system

**GERMANY IS TO LAUNCH A COMPETITION-BASED FUNDING SCHEME FOR ELECTRICITY FROM RENEWABLE SOURCES. THE FIRST ROUND OF TENDERING IS SCHEDULED FOR AS EARLY AS MAY.**

<table>
<thead>
<tr>
<th>Tendering schedule</th>
<th>Volume</th>
<th>Registration deadline for approval of WEES</th>
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</thead>
<tbody>
<tr>
<td>01 May 17</td>
<td>800 MW</td>
<td>10 April 17</td>
</tr>
<tr>
<td>01 August 17</td>
<td>1,000 MW</td>
<td>11 July 17</td>
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<tr>
<td>01 November 17</td>
<td>1,000 MW</td>
<td>11 October 17</td>
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<tr>
<td>01 February 18</td>
<td>700 MW</td>
<td>11 January 18</td>
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<tr>
<td>01 May 18</td>
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<td>01 June 20</td>
<td>950 MW</td>
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<tr>
<td>01 October 20</td>
<td>950 MW</td>
<td>10 September 20</td>
</tr>
</tbody>
</table>

1. As 1 May is a national holiday in Germany, the bidding deadline does not end until the next working day, i.e. 2 May.

### ENERCON’s strengths in the tendering system

**ENERCON HEAD OF SALES, STEFAN LÜTKEMEYER, EXPLAINS IN A WB INTERVIEW HOW THE GERMAN MARKET LEADER POSITIONED ITSELF FOR THE NEW TENDERING SYSTEM.**

**Stefan Lütkemeyer:** Many medium-sized investors would be unable to weather the tendering system without a strong partner by their side. They would be out of business, and even the concessions allowed for in the new EEG aimed at securing the participation of community-owned energy companies will not stop that. Our offer of cooperation is designed to help cushion the risks and allow these players to continue to be involved. We hope that this will ensure that as many community-owned projects as possible are able to come to fruition, and that the successful model of a ‘decentralised energy transition in citizens’ hands’ can continue to make progress.

**windblatt:** How has the change of system impacted upon ENERCON’s pricing strategy?

**Stefan Lütkemeyer:** ENERCON is a response to the tendering system and is to focus on developing its technology. As a manufacturer, we must create the technological conditions that are needed to ensure we remain competitive. And we are pretty confident about that: with the new wind energy converters of the EP4 platform, we have the right products on the market to be successful even in the face of the tendering system. This is backed up by the positive feedback we have received from many customers who are entering the first round of tendering with EP4 machines. There is little doubt that the new design of the E-141 EP4 for Wind Class IIA sites is also a point in our favour. And apart from that, we have other developments in the pipeline across different performance classes.

**windblatt:** How well is ENERCON positioned in the light of the tendering system?

**Stefan Lütkemeyer:** ENERCON is positioned as a German market leader and offers particular benefits when it comes to the tendering system. ENERCON is a stable, well-established company with a sound financial basis and is independent in its decision-making. We are able to share risks and guarantees, are financially strong, and have the liquidity to make advance payments when the occasion arises. Not to mention our well-qualified and committed workforce in the sales, planning and project development divisions, and the impressive technical knowledge and long years of experience they contribute to the various stages of our joint projects. To sum up, our customers are in good hands with us, tendering system or no tendering system!

**windblatt:** What role is played by ENERCON’s new offer of project partnership?

**Stefan Lütkemeyer**, ENERCON Head of sales
Following a successful trial run, ENERCON railway company e.g.o.o. has launched a regular service for the transportation of concrete tower segments.

Transporting multi-tonne weights of concrete tower segments for wind energy converters is a headache for any logistics department. ENERCON railway company e.g.o.o. mbH is an environmentally-friendly and faster alternative to heavy-duty trucks when it comes to transporting these components – and is now to schedule a regular service. Following a successful trial run on the line between the WEC Emden concrete tower factory and the strategic temporary storage depot in Mannheim, e.g.o.o.’s heavy-duty flatbed wagons have been transporting the concrete tower segments by rail for ENERCON since the spring. “We are putting our guiding principle of green logistics into practice with every load we shift from road to rail”, says Christian Stavermann, authorised officer and Head of Transport at e.g.o.o.

e.g.o.o. already transports rotor blades and generator and rotor blade components by rail on block trains from East Frisia to Mannheim, as well as to the port of Brunsbüttel in Schleswig-Holstein. The parts destined for wind farm sites in the region are stored there temporarily before being taken the last part of the way to the construction sites by HSV. And now the concrete tower segments can also be added to the project logistics portfolio of e.g.o.o. It was the height of the tower segments which presented a particular challenge. To ensure sufficient clearance and make it possible for them to be transported by rail, e.g.o.o. bought heavy-duty flatbed wagons and adapted them for the purpose.

“Transporting the components most of the way by rail offers a huge potential in terms of project logistics”, says Thijs Schless, Head of Procurement Logistics at ENERCON Logistic GmbH. “Compared to road transport, rail is quicker, much more reliable, and above all environmentally-friendly.” The crumbling infrastructure of Germany’s roads and bridges is making the transportation of heavy loads by truck ever more challenging and, as a result, more time-consuming too. “We expect the situation to deteriorate even further in the future, which makes it all the more important for us to establish new innovative transport concepts here,” adds Thijs Schless. “Together with inland waterways, rail will be a central pillar in our future strategy in terms of supplying our project sites.”

Transportation by road not only has a negative impact on the climate; the costs can also mount up rapidly. If a lorry has to spend the night parked up because there are no police escorts available or there are delays on the roads, for instance, the parts will not arrive at the construction site on time. The repercussions of this can be very costly. Using rail for the preliminary leg largely sidesteps this problem. Another advantage of rail is that it can carry greater loads. While a heavy-duty truck can only move one concrete tower segment at a time, several heavy-duty flatbed wagons may be coupled behind a locomotive at once. This means that on a single journey, up to fifteen tower segments can be transported to the temporary depots, also known as ‘hubs’.

The temporary depot in Mannheim can even be reached by freight transport overnight. “It only takes a single night from Emden, no escort vehicles are required, and the road traffic situation is irrelevant,” says Christian Stavermann. This means that in comparison with inland waterways or the use of several heavy-duty trucks, the railway can bring the components to the construction regions much faster and more reliably. Trucks are then required only for the final stretch between the hubs and the construction sites.

Thanks to its expertise, e.g.o.o. is now the ideal partner when it comes to the logistical challenges of transporting WEC components which are extra-wide or have special dimensions. “With our know-how in the field of heavy goods transportation and the handling of excess loads and dimensions, we at e.g.o.o. have specialised in this segment and are one of only a very few rail companies to transport these special cargoes by rail”, says Ursula Vogt, CEO of e.g.o.o. “Our aim is to further expand our transportation of excess loads and dimensions for construction projects – as well as offering other shipping agents a genuine alternative to the roads.” At the end of the day, rail transport can offer greater reliability to project managers during the planning stage – with the added bonus that it leaves behind a smaller carbon footprint. e.g.o.o. is planning to integrate additional hubs into the rail network, so that in future it can also serve other construction regions and external shipping agents.

When securing the concrete tower segments, e.g.o.o. must comply with the strict requirements of project and logistics management, and may only use the specified anchorage points.
First ENERCON wind energy converters in South Korea connected to the grid

ENERCON HAS SUPPLIED THREE E-92/2.35 MW WIND ENERGY CONVERTERS TO EACH OF THE CHEONBUK AND GANGDONG WIND FARMS ON THE COUNTRY’S EAST COAST. A THIRD WIND FARM TO BE EQUIPPED WITH THE SAME TYPE OF WEC IS CURRENTLY UNDER CONSTRUCTION. PLANS FOR FOLLOW-UP PROJECTS ARE PROGRESSING FULL STEAM AHEAD.

S teffen Brauns can study the map of South Korea with a certain degree of satisfaction. The Regional Sales Manager for Asia-Pacific at ENERCON Sales points to the wind energy converters marked on the east coast of the country. “Those are our first two projects in South Korea – Cheonbuk and Gangdong – each with three E-92/2.35 MW converters. When we handed over the WECs to our customers this spring, it represented the successful completion of our entry into the market. We now have two reference projects operating in the region. That is a fantastic start for us.” And Brauns believes that there will be further positive moves to follow. His and his team still have plenty of plans for South Korea.

ENERCON has had a presence in Asia since 1998. That is the year in which the first WECs were delivered to Japan. In 2001, it entered the market in Taiwan, followed by South Korea in 2010. The company is currently investigating the possibility of getting involved in other Asian markets.

To date, ENERCON has erected 305 wind energy converters in Japan with a total installed capacity of 0.19 MW. In Taiwan, the figures are 271 and 0.78 MW respectively. Altogether, ENERCON has installed 518 WECs in Asia with a total capacity of 970 MW.

At present, ENERCON employs roughly 85 staff in Asia. In the second quarter of 2017, an office was opened in Taipei, Taiwan, as a base of operations for the entire development region. It is from here that ENERCON will be managing its activities throughout Asia in future.

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ENERCON has high expectations of the new market. The obligatory trade in certificates for renewable energies means that operators can achieve a good return for their kilowatt hours. And with large energy consumers in Korea having to comply with ever increasing regulations, it is safe to assume that there will continue to be price stability in the years ahead too. Many energy consumers conclude long-term agreements with wind farm operators, providing both sides with planning security. An additional benefit for ENERCON is that some Korean manufacturers have pulled out of the business, and that investors in general are very interested in wind energy technology which is "Made in Germany".

Now the German market leader also has a presence in South Korea, with wind energy converters currently in operation. It was ENERCON which supplied the WECs for the wind farms of Cheonbuk and Gangdong in North Gyeongsang Province near the city of Pohang. The company Dongkuk S&C Co. Ltd., with which ENERCON has already been doing business for years in relation to the supply of tower components to Asia, is acting as the general contractor for engineering, procurement and construction (EPC). Dongkuk also supplied the steel towers with a hub height of 85 m for the first Korean projects. The end user is the company GS Power. One special feature of the project was that ENERCON had to apply in advance for local type certification for the E-92 from the Korean authorities. This certification was issued in late 2016.

Meanwhile, a third ENERCON project is now in construction in South Korea. The Daegi-ri Wind Farm lies further to the north, also in North Gyeongsang Province, and will have two E-92/2.35 MW wind energy converters on steel towers with a hub height of 85 m. ENERCON is also creating a service infrastructure for South Korea in parallel to this. A service centre is being built in Busan, which will initially be staffed by three local service engineers who have received special training from ENERCON. "The service side is important to us, as the WECs are covered by EPK contracts," says Steffen Brauns.

There are some challenging wind conditions in many parts of South Korea. "Many locations tend to have relatively low average wind speeds and high turbulence intensity", says Sjoerd Feenstra, Country Manager of South Korea at ENERCON Sales Asia-Pacific. They generally lie in the ranges between 5.5 and 7.5 m/s. In addition, many sites are in mountainous areas, making transport, logistics and site development more difficult.

That is why investors are very interested in ENERCON’s new WEC type, the E-141 EP4. "The E-141 EP4 offers an outstanding solution to the prevailing conditions in South Korea”, says Sjoerd Feenstra. "It delivers high yields also at low wind speeds and can cope with high turbulence intensities. Its divided blade concept also makes it much easier to transport to difficult locations.” Plans for projects using the E-141 EP4 WEC are already underway, and Steffen Brauns is hopeful that he will soon be able to pin the locations of new wind energy plants on his map of South Korea. //
Installation on the industrial estate: space was very restricted at the construction site for the E-70s.

Strange bedfellows: the two ENERCON E-70s have been erected right next door to the diesel power station in Lanzarote.

Clean energy for the desalination of seawater

ENERCON HAS INSTALLED TWO E-70/2.3 MW WIND ENERGY CONVERTERS ON Lanzarote. The energy they generate is used for water treatment on this island in the Canaries. This prevents the release of more than 4,000 tonnes p.a. of climate-damaging CO₂-emissions on Lanzarote.

If you gaze over Punta Grande bay on Lanzarote, you will see a prime example of the progress being made by the energy transition: right on its edge you can still see the sooty chimneys of the old diesel power station which generated electricity for the Canary Island for decades, at the same time releasing countless tonnes of climate-damaging exhaust fumes. Behind them, the rotors of two new wind energy converters rise up. The E-70s turn sedately in the fresh breeze which blows here on the east coast of Lanzarote. They are symbols of the environmentally-friendly energy system which the regional government is keen to establish on the island by the year 2020.

ENERCON commissioned the two E-70 WECs at the start of the year: the first of their kind on Lanzarote. They were erected on steel towers with a hub height of 64 metres for the Lanzarote Water Consortium. The company operates a seawater desalination plant in Punta Grande in the island capital of Arrecife – the Diaz Rijo Desalination Plant, which is the largest consumer of energy on the island. The industrial plant requires 12 MW. Until now, this energy came from the neighbouring diesel power station. Now the E-70s are feeding their environmentally-friendly wind energy into the grid of the desalination plant and improving its environmental footprint considerably: more than 4,000 tonnes of climate-damaging CO₂-emissions will no longer be released every year, and 50,000 of Lanzarote’s inhabitants will benefit from drinking water produced with a neutral impact on the planet.

"The Punta Grande Wind Farm is a fantastic project", Mila Prego, the Sales Manager at ENERCON Sales who is responsible for the project, is only too delighted to point out. "Firstly because it is such a visible example of the energy transition in the Canaries. And secondly because it brought with it a few challenges, all of which our team succeeded in overcoming to the satisfaction of our customer." For instance, the wind energy converters had to be constructed while the desalination plant was still in operation. Moreover, the sites where they were to be built were right in the heart of the industrial estate, surrounded by the desalination plant, diesel power station, water depot and fuel tanks. Coordinating construction with the everyday operation of the plant as well as the very confined space available to work in at the site placed particular demands on the project management and construction teams, making Punta Grande an extremely complex endeavour.

And there is yet another reason why Eric Breckwoldt, Regional Sales Manager for Spain and Portugal at ENERCON Sales, is happy about the project. The Punta Grande Wind Farm is just the first in a series of new wind farms to be constructed by ENERCON in the Canaries this year. "After a long period during which the entire Spanish wind energy market was in the doldrums, things are finally moving forward again here", says the Regional Sales Manager. He believes that ENERCON is well primed for the better days ahead in the Canaries. "Our greatest advantage is our longstanding presence in the area. We built our first wind farms in the archipelago in the 1990s. We have loyal customers in the area who have had very positive experiences with our technology for decades, and who will once again be putting their trust in us for their new projects. We find that particularly gratifying."

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ENERCON recently reached the 1 GW mark of installed power on the Irish market (Republic of Ireland and Northern Ireland). This significant milestone was achieved at the end of 2016 when the Long Mountain Wind Farm was installed in County Antrim in Northern Ireland.

For this project, ENERCON erected 12 x E-70 E4/2.3 MW wind turbines on 64 metre steel towers for their customer and operator, Energia. “The project is a great example of our successful commitment in Ireland,” says Robin Borgert, ENERCON Regional Sales Manager Northern Europe. “Our customers have continued to place their trust in us again and again. With Energia, we have already installed seven wind farms in the last few years and with our customer, Gaelectric we’ve installed quite a few more. We intend to maintain this commitment and continue to offer our customers the best possible support for their projects.”

ENERCON has been in Ireland since 1998. The first ten E-40/500 kW wind energy converters were installed at the Crockhenny Wind Farm in County Down. In 2005, ENERCON Windfarm Services Ireland was founded, providing Ireland with its own service company. The same year, ENERCON connected the largest wind farm in Ireland so far to the grid: Ballywater Wind Farm with 21 x E-70/2.0 MW WECs in County Wexford, south of Dublin. In 2011, ENERCON opened an office in Dublin to have a local presence for sales and project management.

Currently, ENERCON’s market share in Ireland is roughly 30 percent of the installed power. This makes ENERCON the market leader. In total, ENERCON employs a workforce of 225 in Ireland. The registered Irish Service office and a warehouse located in Tralee in County Kerry as well as eleven service centres throughout the island guarantee customers quick response times.

In Ireland, more than 20 percent of electricity is generated from wind energy. The volume of installed wind energy capacity on the island is 3,174 MW. A total of 450 wind energy converters have been erected in the Republic of Ireland and Northern Ireland.

ENERCON has been the market leader in Ireland, with a market share of around 30 percent.

IRISH INSTALLATION TEAMS REACHED THIS BENCHMARK WITH THE COMPLETION OF LONG MOUNTAIN WIND FARM IN NORTHERN IRELAND. ENERCON IS THE MARKET LEADER IN IRELAND, WITH A MARKET SHARE OF AROUND 30 PERCENT.
Visit ENERCON, the German market leader in the wind energy sector,
at the HANNOVER MESSE 2017

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