NEW LAGERWEY WECS: L147 LP4 and L160 LP4 for wind class II and III under development

START OF REPOWERING: ENERCON implements first repowering project in France

MARKET ENTRY IN VIETNAM: E-103 EP2 projects form basis for intensified commitment

E-126 EP3 prototype installed

Focus on international markets

necessary consequence for ENERCON

Dear customers, business partners and employees, dear readers,

The radical changes to the market conditions in Germany are now forcing consequences for ENERCON, too. In response to the unchanged decline in development in the domestic market, with increasingly uncertain orders, ENERCON has decided to focus its efforts even more intently on international markets. As well as expanding existing business, opening up new countries and further advancing its own technology, the move also unfortunately involves a reduction in contracts awarded in Germany.

The onshore installation figures from the past 3 years totalled more than 5,000 MW, but in 2018 only 3,300 MW will be installed and in 2019 less than 2,300 MW. This is cause for concern, as the ‘expansion cap’ is also set to take effect in 2019. There are many reasons behind this development, the main one being the overheating of the market which is now taking its toll and posing unfamiliar challenges for the renewables in the onshore and offshore sectors. Now the question is: can Germany no longer – or is it no longer willing – to demonstrate new technologies and the new energy world with all of its opportunities? We are working on the medium-term assumption that ENERCON will be generating the majority of its sales in international markets for the time being. This is where we will find the best prospects for growth in the next months. To do so we will have to overcome the entry barriers for the specific countries, particularly where the procurement of components in that country is concerned. For these reasons, a reduction in supplier contracts in the home market is unavoidable.

ENERCON has been warning for months that a development of this kind would be seen in Germany. In 2016, we demonstrated together in Berlin for saving the energy transition and maintaining stable and reliable framework conditions, and fought for the interests of our industry in countless discussions with decision makers. We are curious as to what future discussions amongst politicians and in associations will bring. But one thing is clear: Germany’s position as innovation pioneer will become increasingly weaker if we continue to threaten renewables expansion with arguments like ‘too expensive’, ‘too complicated’ or ‘not wanted’.

However, despite this new situation, we will not be bidding farewell to the German market. After all, although we have a partly new focus, we are the only WEC manufacturer to have such a high share of the German market. ENERCON will also remain committed to ensuring the continuation of the energy transition. The prerequisites for this are appropriate and fair framework conditions – in particular approvals having been granted, grid priority for renewable energies, and the political intention to restructure the energy system to regenerative. Under these prerequisites, Germany will remain vitally important for ENERCON in the future as a showcase for technology innovations and system solutions for regenerative energies.

In terms of technology, we are well equipped for the intensified internationalisation strategy as well as for the continued support of the German market: we are in the middle of launching our new EP3 wind energy converters on the market, which are already arousing great interest among customers. Together with Lagerwey, we are developing new EP3 platforms WEC types, which will further expand our joint product portfolio and improve our capacity to perform in highly competitive onshore markets. In addition, as a supplier of system solutions we are systematically developing new business areas, such as energy logistics, e-mobility and storage systems.

Pay us a visit at the WindEnergy in Hamburg (25 to 28 September) and get an impression for yourself. We look forward to seeing you there!

Hans-Dieter Ketrew
Managing Director of ENERCON

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18. Strong wind E-82 with energy backup

A storage system ensures that wind energy converters can be moved into a safe position at all times in extreme winds – even during network loss. Work on the energy storage control for system UPS for future EP2 series is in progress.

19. EP3 rotor blade concept

The functional and cost-optimised technology design adopted by ENERCON for its new EP3 wind energy converters even stretches as far as their rotor blades. They are made up of just one piece and function without the spoilers characteristic of ENERCON rotor blades until now.

20. Optimum project development secures win

It was partly down to ENERCON’s inhouse wind farm planning expertise that the company was awarded the ‘energy storage cabinet for control system UPS’ planned and opened up a new training construction.

21. First community-owned wind farm in Spain

ENERCON supplied an E-103 E2 for the ‘Vía de la casa de las ciudades’ wind farm in Catalonia. The project initiators hope that community-owned projects will gain more ground in Spain in the future.

22. Special tendering rounds remain absolute necessity – EEG still on the agenda

By the time the summer recess began, the government coalition partners had only got as far as a moratorium to ensure mandatory approval for all tender participants.

23. Argentina – E-92 wind energy converters were installed in the Cerro Grande wind farm.

This means ENERCON is now represented in 8 of the 13 Canadian provinces and territories.

24. EU decides expansion target for 2030

In dialogue processes the EU institutions agree on renewables target of 32 percent. Brussels is now calling for member states to come up with national climate and energy action plans.

25. First repowering project in France

ENERCON supplied 6 x E-82 EP2 WECs to repower the Ploubig wind farm in Brittany. This repowering project is the first one to be undertaken in France.

26. Market entry in Vietnam

Two projects with a total of 33 x E-103 EP2 WECs form the basis for ENERCON’s intensified commitment to the South East Asian country. The next step is to set up a Service station.

27. E-82 wind energy converters for Costa Rica

ENERCON installed 3 x E-82 EP4 WECs in the Rio Naranjo wind farm, which saw its share of the market rise to 23 percent. Follow-up projects with E-103 EP2 machines are already under construction.

28. First community-owned wind farm in Spain

ENERCON supplied an E-103 E2 for the ‘Vía de la casa del caserío’ wind farm in Catalonia. The project initiators hope that community-owned projects will gain more ground in Spain in the future.

29. Presence in another province

ENERCON has delivered WEC technology to New Brunswick in Canada for the first time: an E-92 wind energy converter was installed in the Cap-Pélican wind farm. This means ENERCON is now represented in 8 of the 13 Canadian provinces and territories.

30. Turnkey project connected to grid in Uruguay

22 x E-92 wind energy converters were installed in the Cerro Grandes wind farm. ENERCON was responsible for developing and financing the project, and supplying and installing the WECs. It operates the WECs as the owner.

31. First repowering project in France

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32. Market entry in Vietnam

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Cover page image: E-126 EP3 prototype at Kirch Mulsow site (Mecklenburg-Western Pomerania).
Demanding test programme

The E-126 EP3 test blade will soon be swinging up and down several million times at ENERCON’s blade test station at WRD in Aurich. The test programme will last four months, with the aim of verifying the calculated design service life of the new rotor blade. Like the previous static tests, in which the blade tip of the test blade was bent more than 11 metres, these dynamic tests are part of the certification process for the new E-126 EP3. The prototype of this new WEC type was installed in mid-August (see p. 10 et seq.).

With these tests, ENERCON is meeting the requirements of the IEC 62400-23 standard. A comparison will be made between the rotor blade design calculations made by the design engineers and the rotor blade properties in reality. The extreme loads and operating loads calculated from the simulation are imprinted on the rotor blade structure, in order to show that the structure can withstand these loads. The TÜV Nord certification body is accompanying this test programme.
ENERCON has successfully completed certification for the E-103 EP2. The measurements of the power curve and the sound and electrical properties for the slow wind series (wind class IIIa in accordance with IEC) confirmed the calculated values. The results of the power curve measurement were actually better than expected: they put the annual energy yield of the wind energy converters measured three percent higher than had been calculated.

The E-103 EP2 with a nominal power of 2.35 MW supplies annual energy yields of 8 million kilowatt-hours for a site with an average wind speed of 7.0 m/s at a hub height of 138 metres. The maximum sound power level is 105.0 dB(A).

Measurement campaigns were carried out at the E-103 EP2 prototype locations Pougny in Burgundy and Caulières in Hauts-de-France (Central and North France). Installing and carrying out measurements with prototypes in France was a first for ENERCON: there were no regulations for connecting WECS prototypes to the grid in France yet. Up until this point the grid operators had always requested grid certificates, which of course do not yet exist for a prototype. After conducting intensive discussions with the grid operator ENERGIE, ENERCON was granted permission to install the E-103 EP2 WECS despite this hurdle.

ENERCON installs first rapid charging stations for customers

Six months after the new ENERCON E-Charger 600 for ultra-rapid charging of e-vehicles was first presented, customer projects are now being executed. Together with grid operator EWE Netz GmbH, ENERCON is currently installing one of its innovative rapid charging stations in Oldenburg, Lower Saxony. Construction work on the second customer project in Nordhausen/Thuringia has also begun. At the same time, preparations for starting up three more customer projects before the end of the year are getting under way. The rapid charging technology is going down well on the market, reports Jens Winkler, Head of Energy Management at ENERCON: “We have already received more than 100 customer enquiries.”

The EWE site is on the premises of the EWE Netz GmbH county operation centre, directly next to the Kreyenbrück slip road for the A28 motorway. To begin with, the company will use a rapid charging point to charge its own service vehicles. EWE is currently switching its fleet over to e-vehicles. Three more charging columns will be installed in front of the premises at a later date, which will also be available for use by the public.

In order to gather experience of buffering peak loads, for example at times when several rapid charging procedures are carried out simultaneously, EWE is connecting a local grid storage system to the station. The energy stored in its batteries is intended to compensate for possible bottlenecks. The storage system is part of the grid lab for e-mobility resulting from the research cooperation between EWE and ENERCON.
ENERCON is updating the ecobalance assessment of its WEC series. The first new life cycle assessment – or LCA – is already available for the E-115. The 3 MW WEC with a 135-metre hybrid tower was examined here.

According to the LCA, an E-115 with a service life of 25 years at an IEC wind class II site produces up to 39 times more energy than it consumes throughout its entire product life cycle. In just 7.7 months, the WEC generates as much electrical energy as primary energy is needed to manufacture and operate the WEC. The LCA takes a holistic approach to considering the impact of the WEC on the environment across its entire product life cycle, from the procurement of raw materials, production, installation and usage to dismantling and finally disposal. In this way, various key figures relevant for the environment can be determined from the LCA.

Alongside the energy payback time, another one of the important key figures is the carbon footprint for each kilowatt-hour (kWh) produced. The result for the E-115 is 6.86 g CO2/kWh, which is confirmation that wind energy makes a significant contribution to climate protection. In addition, it enables ENERCON to improve its environment-related performance by analysing critical points concerning the WEC’s environmental impact and taking measures to improve the ecobalance. The LCA is already being carried out for the next WEC in the current product range, the E-126 EP3.

The requirements for developing new wind energy converters and wind energy projects are becoming more and more comprehensive. ENERCON’s development company WRD is preparing for this with the installation of a new high-performance computer. The ‘Taifun’ computer cluster comprises 11,500 cores and has a processing power of 500 TFlop/s. This equates to 500 billion computing operations every second. The computer cluster has been installed in the innovation centre in Aurich, the headquarters of WRD.

“We are massively expanding our computing capacity for future projects with the Taifun”, says Andre Altmikus, Head of System Aerodynamics & Acoustics at WRD. “This reinforces ENERCON’s aim to ensure technology and quality leadership.”

The new high-performance computer can be used in areas such as multidisciplinary WEC development (aerodynamics, structural dynamics, heat management), exclusion of technical risks with a virtual product image during development, site assessment for customer projects, optimisation of wind farm layouts, and meteoro-logical yield estimates for direct marketing of energy.

In early summer, ENERCON transported the components for the highest wind energy converters in Central America on its ‘E-Ship 1’. On its first voyage, the cargo ship powered by Flettner rotors had machine houses, generators, hubs, rotor blades and tower segments for six E-103 EP2 WECs on board. Components for three more WECs of this type were delivered on a second voyage a few weeks later.

The cargo’s destination was the El Cacao wind farm near Santa Cruz in Costa Rica. The wind energy converters are currently under construction. They are being installed on tubular steel towers at a hub height of 98 metres, and are set to be commissioned by the end of the year.
The new EP3 platform machines represent a radical cut in ENERCON’s wind energy converter design. They are compact and efficient with consistently optimised processes – from production, transport and logistics to installation. These are the key characteristics of the new WEC generation ENERCON has designed in response to new market requirements worldwide. At the Kirch Mulsow wind farm in Mecklenburg-Western Pomerania, the new technological focus becomes clear at first sight: ENERCON has now installed the first prototype of the E-126 EP3 at this site, directly next to an E-141 EP4. Old and new WEC designs are now operating side by side.

Prototype in Kirch Mulsow

While the EP4 stands out with its mighty egg-shaped machine house (9.37 metres high, 9.02 metres wide and 18.88 metres long), the new EP3 is significantly more slender due to the lack of a nacelle casing enclosure for all main components. “Compared to the EP4, the new machine appears almost filigree”, says Project Manager André Habel from ENERCON Project & Logistics Management. Just one look at the technical specifications is enough to confirm that this first impression is not deceiving: the machine house is only 3.90 metres high, 4.99 metres wide and 14.01 metres long. Only the generator protrudes like a collar between the machine house and the hub and forms a ring measuring 9.26 metres in height. The new compact design also has a significant effect on the mass of the nacelle head. While the E-141 EP4 weighs in at around 490 tonnes, the E-126 EP3 with its 256 tonnes is practically a lightweight.

The process optimisations for transport, logistics and installation were an interesting issue for the prototype team. The burning question was how they would work in practice. With its new EP3 machines, ENERCON’s approach is to use main components that are already finally assembled and tested for functionality at the factory. The machine house and the hub, for example, are delivered to the construction site as transport units ready for hoisting, meaning no extensive completion work has to be undertaken here. “The new concept worked very well”, reports André Habel. “We unloaded the compact nacelle from the truck and it was ready for hoisting after a preparation time of less than two hours.”

Installation of the other main components followed just as swiftly, owing to the fact loss assembly work is required with the new EP3 concept. The generator stator and rotor are divided to aid transportation. The stator is split into two halves while the rotor is split into one larger middle segment, bolted to the compact bearing and aligned at the factory, and two narrower outer segments. This division concept considerably speeds up the work at the construction side, reports Project Manager André Habel: “The generator was pre-assembled and at the top in the blink of an eye.” The installation team only needed four hoisting manoeuvres to install the main components. Four more were required to install the rotor blades. With more powerful crane technology, installation of the E-126 EP3 WEC can be carried out with just three hoisting operations. The stator and rotor are then hoisted in one package, and the hub and the rotor blades as one assembly, which reduces the installation time further.

EP3 training construction site in use

At the same time as the prototype was being installed in Kirch Mulsow, the ENERCON Training Department set up the new EP3 training construction site in Emden, which is now open and running. The aim is to prepare installation technicians for working with the new WEC technology. For this purpose, the training area at the port of Emden features an original E-126 EP3 machine house including a generator, hub and rotor blade, as well as a practice tower measuring 48 metres. In future, the tower will be used for grid connection and service hoist training. Training on prestressing and grouting work can also be carried out. Under the supervision of the certified trainers in Emden, installation teams from all over the world learn how to assemble the WEC components and how to dismantle them again. The technicians are presented with a certificate once they have completed the WEC training courses. They must meet this requirement before they are allowed to work on EP3 projects.

“We were given the second delivery-ready EP3 for use at the construction site”, says Site Manager Simon Gather. “Since the first customer projects with the new EP3 technology will be installed in the course of this year, we had to make sure that our training courses got under way quickly.” The first training courses have already taken place. The teams that have received training will install the first customer projects in Turkey from autumn onwards.

Simon Gather endorses the positive assessment made by the prototype team in Kirch Mulsow. “Straight away during test in-
ENERCON is planning a steep start-up curve for the entry of the E-126 EP3 onto the market. The first customer projects will start in Turkey in the autumn, immediately after commissioning of the prototype. Over 40 wind energy converters will be installed in a first phase in the Karaburun II and Cakil projects. Three more prototypes are planned in locations in Germany and Austria for the measurements necessary for certification. One of these machines will be given the modular steel tower (MST) developed by cooperation partner Lagerwey. ENERCON hopes that this element will help to further optimise transport, logistics and installation processes.

In addition, 42 wind energy converters are planned for a project in Sweden next year, which will also be installed with MST technology. ENERCON will also deliver a further 59 x E-126 EP3 wind energy converters for two more projects in Turkey starting in 2019. The project contracts with the investor Güris for the delivery of 236 MW for the Kocatepe and Yuvacik wind farms were signed in August. “We will therefore be delivering more than 100 x E-126 EP3 wind energy converters to customers in the very first year”, summarises ENERCON Sales Director Stefan Lütkemeyer. “And that is just the start for our EP3 programme.”

Further plans in the EP3 programme
At the same time, ENERCON is also pushing ahead with the EP3 sub-projects E-138 and E-115. The prototype of the E-138 EP3 designed for wind class IIA locations is to be installed by the end of the year, with the first series WECs to follow in 2019. The prototype of the newly developed E-115 EP3 strong-wind turbine is planned for the third quarter of 2019. On top of this, ENERCON will be presenting the E-138 EP3 E2 for wind class IIIA at the WindEnergy trade fair in Hamburg (25 to 28 September). “The aim of this development is to bring about a further significant reduction in energy production costs”, explains Stefan Lütkemeyer. The developers expect an energy yield approximately up to 10 percent higher than with the E-138 EP3 E1 at a mean wind speed of 7.5 m/s. The E-138 EP3 E2 will have a nominal power of 4.2 MW and a rotor diameter of 138.6 metres. Steel and hybrid tower versions with hub heights from 81 to 160 metres are being considered. The planned service life is 25 years. Installation of the prototype is scheduled to take place by the end of 2019. //
New Lagerwey LP 4 WEC types bring compact design to 4 MW-plus segment

ENERCON’s new cost-optimised EP3 platform WEC types have been extremely well received by customers and potential buyers the world over. “This overwhelming level of approval is proof to us that we are on the right track with our new radically functional WEC design,” says ENERCON Sales Director Stefan Lütkemeyer. “It is our technological response to the new market requirements, which a lot of customers were waiting to see.” Together with Lagerwey, ENERCON is therefore now looking to add to this success in another power class. The partners are working to develop the new L147 LP4 and L160 LP4 Lagerwey types for wind class IIa and IIIa sites (IEC). “With these turbines, we are bringing the compact design into the 4 MW-plus segment, and offering our customers around the world more attractive options for their projects,” says Lütkemeyer.

Both of the new WEC types are based on Lagerwey’s LP4 platform, which has a compact and cost-optimised design at its root similar to ENERCON’s EP3 platform. The wind energy converters are modelled on the L136 LP4, which has already been presented and installed as a prototype. It has a nominal power of 4.5 MW and a rotor diameter of 136 metres for strong-wind sites in IEC class 5. For the main part, its machine house will be adopted for the other two LP4 types. “Individual WEC components will be adapted to meet the specific requirements. Significant differences can be seen in the electrical engineering in connection with the generator power output, and in the rotor diameter”, says Jan de Vries, 4 MW Platform Manager at ENERCON’s research and development company WRD, which is assisting in both development projects. ENERCON’s cooperation partner Lagerwey is leading the LP4 programme.

The L147 LP4 will be given a permanent magnet generator (PMG) with a nominal power of 4.3 MW and a rotor diameter of 147 metres. The L160 LP4 will also be developed with a PMG which will have a nominal power of at least 4.0 MW. Its rotor diameter measures 160 metres. Both types of wind turbine will be directly driven. At sites with an average wind speed of 7.5 m/s, the L147 LP4 will produce annual energy yields of around 17.2 million kilowatt-hours. The aim for the L160 LP4 is an annual energy yield of at least 14.8 million kilowatt-hours at 6.5 m/s.

The series production version of the L147 LP4 will be available with steel towers and hub heights of 126 or 155 metres, and that of the L160 LP4 with steel towers and hub heights of 120 or 166 metres. The LP4 platform is the foundation for the new developments from Lagerwey and ENERCON. The L147 LP4 and the L160 LP4, like ENERCON’s new EP3 WEC designs, are based on a compact and cost-optimised WEC design in order to meet the tightened requirements in the competitive onshore wind energy markets worldwide.
One-piece design with no spoiler – cost optimisation for EP3 rotor blades

ENERCON rotor blades have always been equipped with a special feature known as a spoiler. These spoilers connected the rotor blade trailing edge to the hub in a line, causing an increase in yield. A disadvantage of this blade design was that the spoiler had to be manufactured separately, and sometimes installed later at the construction site. In order to optimise the rotor blade production and installation processes for the new EP3 wind turbines, ENERCON is dispensing with this feature. On top of this, the blades are now manufactured in one piece. Although they measure over 60 metres in length, the need to optimise production processes means dividing the blades is not taken into consideration.

These measures can be explained by ENERCON’s decision to design its EP3 WECs to be radically functional and cost-optimised in response to the changed market requirements. Without a spoiler or a blade joint, the EP3 blade production and installation processes can be implemented more quickly and easily. The components are also significantly lighter, resulting in a smaller nacelle head mass. As a consequence, the entire wind turbine structure including tower and foundation can be given more slender dimensions. The new EP3 blade design therefore also plays a part in achieving the necessary goals of lowering costs and reducing the time to market.

The new EP3 rotor blades also comply with the accepted ENERCON quality standards. The standard scope of supply includes trailing edge serrations (TES) for reducing noise, tips that also reduce noise alongside increasing performance, and durable erosion protection (Impact Absorption Layer, IAL) integrated in the leading edges. In addition, the EP3 blades are also equipped with ENERCON’s fully insulated lightning protection system. The blade profile comes from the ENERCON EC1 profile series for medium and low wind speed sites. It was optimised to meet the special requirements for EP3 wind energy converters, which also apply to spar booms and webs.

The webs had to make allowances for improvements to the flow properties inside the blade, for example, in order to enhance the efficiency of the blade heating system. At the same time as adapting the EP3 blade design, ENERCON is also making changes to its transport and logistics concepts. One example is the Alpine transport frame, which is fitted with an adapter designed for the EP3 blades so that they can be transported to difficult locations with self-propelled manoeuvrable special transporters.

The blade heating system and the new EP3 blade design ensure that the new blade can be remotely controlled in the event of network loss. In extreme wind conditions, the nacelle must always be positioned into the wind and assume a safe position at all times. The wind energy converters have to be typhoon-ready in specific locations. In addition, it must be possible to move the nacelle to a safe position at all times in extreme winds. The ability to turn the nose into the wind for the purpose of weathering a storm must be guaranteed at all times, even when the WEC is idling during network loss. ENERCON has therefore developed a backup for the yaw control of the strong-wind versions of the E-82.

The ‘energy storage cabinet for control system UPS’ contains a battery pack with converter as an emergency power supply, which is integrated in the E-module. The battery capacity is up to 20 kilowatt-hours. Along with this, there is a special emergency program that puts the entire WEC to sleep in the event of network loss. Only the hours along with this, there is a special emergency program that puts the entire WEC ‘to sleep’ in the event of network loss. Only the anemometer continues to be supplied with energy from the battery pack. If local wind conditions are registered that require a reaction, a signal is sent to ‘wake up’ the system and the battery supplies energy for the yaw control. The yaw gears re-orient the nacelle in accordance with the wind conditions, and the WEC then returns to sleep mode.

The first wind energy converters to be equipped with the ‘energy storage cabinet for control system UPS’ are the strong-wind E-82 WECs intended for the Japanese market. These WECs are designed for the ‘typhoon class’ and extreme wind conditions (50-year gusts) with wind forces of up to 90 m/s, and are based on the E-82 with new GRP rotor blades. The E-82 EA, designed for wind class IA, will be provided with a configuration of this type, too. This feature is also being prepared for installation in the E-70 and E-92 WECs.

In the coming months, ENERCON will install 36 of the new typhoon-ready E-82 wind turbines in various projects in Japan. Japanese projects with the corresponding E-70 machine are also in progress. The newly equipped E-92 will make its debut in projects in Taiwan.

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Two extra wind turbines for a successful bid

ENERCON HAS INSTALLED 12 X E-126 EP4 WIND ENERGY CONVERTERS IN THE OVELGÖNNE/FRIESCHENMOOR WIND FARM IN THE DISTRICT OF WESERMARSCH/LOWER SAXONY. THE COMPANY WAS AWARDED THE PROJECT THANKS TO OPTIMUM PROJECT DEVELOPMENT WHICH ENABLED TWO MORE ENERGY CONVERTERS THAN THE COMPETITORS HAD PLANNED TO BE INSTALLED ON THE POTENTIAL AREA.

Current market developments mean the wind energy sector is confronted with sharply rising cost and competition pressure in many regions. Tendering systems, such as the one implemented in Germany by the Federal Government in 2017, are one of the driving forces behind this. They ensure that only the most efficient and cost-effective WEC technology can come out on top of the competition. However, it is not only this technology criteria that is responsible for deciding whether a project is awarded or not. The project development also plays a significant role here. An example of this in practice is Ovelgönne/Frieschenmoor, which ENERCON helped to develop. The wind farm in the Wesermarsch district in Lower Saxony has 12 E-126 EP4 wind turbines.

“We won the project because our planning concepts were better, meaning we found room for two more wind energy converters on the potential area than our competitors did”, says Wolfgang Lübbe, the Sales Manager responsible for this wind farm from the planning department at ENERCON Sales National. “However, the plan had been designed according to the usual criteria. We quickly realised that our approach would allow us to use the area much more efficiently.”

In order to make optimum use of the potential area available for the project and allow for the largest possible number of WECs, ENERCON’s wind farm planners performed an individual turbulence analysis and stability inspection for every single WEC location. The results made it possible to significantly reduce the minimum distance between the wind energy converters, which is usually five times the rotor diameter in the main wind direction and three times the rotor diameter in the secondary wind direction. This gave ENERCON's quote the edge in the customer’s award procedure, Wolfgang Lübbe tells us: “It goes without saying that having two extra WECs in the potential area had a huge effect on the cost-effectiveness of our quote.”

The project planning benefitted from the in-house expertise offered by the planning department at ENERCON Sales National. “It puts us in a position to be able to supply our customers with everything they need from a single source, and offer them the best possible support with their project”, explains Wolfgang Lübbe. This claim is backed up by the customer: “In addition to the outstanding service offered by ENERCON, both in the planning phase and through the ENERCON PartnerKonzept, this was what convinced us that significantly more energy will be generated than with all of the other manufacturers”, says Andreas Neumann, Managing Director of the Windpark Ovelgönne Betriebs GmbH & Co. KG. Annual energy yields of 12.9 million kilowatt-hours are expected for each wind energy converter. The prerequisite for this is the use of the ENERCON E-126 EP4 wind energy converter, very well suited for the prevailing wind zone IV at the site and an extreme wind speed (50-year gust) of 43.05 m/s. “There were no wind energy converters to rival this one for the coastal location at the time”, says Wolfgang Lübbe.

Alongside ENERCON’s service portfolio, Jade Concept GmbH from Varel was also commissioned to offer support with planning and application processes and financing. “In this way, we could ensure that the project remains the property of the initiators and that the Jade Concept can provide the landowners with competent advice based on the experience gained from realising over 200 WECs”, says Leenert Cornelius, Managing Director of the Windpark Ovelgönne Betriebs GmbH & Co. KG. The ENERCON team worked closely together with the team from Jade Concept to compile documentation for the German Federal Immission Control Act approval application. As well as planning the set-up of the wind farm and performing an economic evaluation, ENERCON also took charge of creating the electrical infrastructure and the wind farm implementation plan. External partners supplied the transmission substation. The technical configuration of these WECs has a distinctive feature: ENERCON supplied the E-126 EP4s with its new BNK interface. The WECs are therefore ready to be connected to a needs-based nighttime marking system (BNK). The customer will install a system from an external supplier to which several wind farms in the region will be connected.

The sole partners of the Windpark Ovelgönne Betriebs GmbH & Co. KG are 18 owners and managers of the relevant land areas. “At the beginning of the planning period in 2009, all of the landowners and managers sat down together to discuss the idea and clarify who wanted to be financially involved in the project. At the time, a number of factors meant it wasn’t yet clear whether or not WECs could be planned for Frieschenmoor at all”, reports Andreas Neumann. “Back then eight landowners joined forces and pressed ahead with the planning. Seven limited partners joined them in 2015, when the plans became more concrete and more capital was needed. Three more limited partners came along just before the last WEC was commissioned. As a result, we were able to achieve the goal of ensuring that all of the wind farm’s added value remains in the community and the neighbouring region.”

For the initiators, it was important for their project to be placed on a broad footing and to get the community involved. “Transparent communication from the very beginning gave our wind farm planning its special character”, explains Leenert Cornelius. “In autumn 2009, we presented our dream of a wind farm to the public after sending out an invitation in the newspaper via the local rural population association. The response was positive but few were willing to invest risk capital. As a small group of locals, we have succeeded in persuading the landowners, the local council and the administrative district of the benefits of our project. Citizen involvement was one of our aims from the very beginning, including from an economic point of view. Thanks to savings certificates with good interest rates, we were able to achieve this.”

Contact ENERCON Sales National: vertrieb@enercon.de
By the time the summer recess began, the Federal Government coalition partners had only got as far as a moratorium to ensure mandatory approval for all tender participants, despite the urgent need for legislative proposals. There is still a lot of progress to be made!

The energy transition is running into problems. Following a number of years with a high level of wind energy expansion on land, the difficulties are now reflected in the installation figures: while an average of 4,600 MW of onshore wind power was installed in the years from 2014 to 2017, a mere 3,500 MW is expected for 2018. The German Wind Energy Association (BWE) even predicts a decline to a maximum of 2,000 MW in 2019. This spells bad news not only for climate protection, but also for the domestic wind industry. Such a dramatic collapse in sales figures for all parts of the value-added chain would put the companies and their employees under enormous pressure. It is possible that the recent job cuts at wind energy suppliers in various locations across Lower Saxony and Saxony-Anhalt will prove a harbinger of an inevitable development to come if the domestic market is paralysed for several years.

Tightened species conservation requirements are far from being the only reason that so many wind projects are derailing at present (see wb 2/2018). Delays in the compilation and adoption of regional plans are also to blame. As things stand in Schleswig-Holstein, for example, we cannot expect to see guaranteed land designation again until the end of 2019, or maybe even later. This means new approvals of wind energy converters are definitely ruled out until June 2019. A small number of exception permits only marginally softens the blow.

Bavaria will remain a state with no wind energy expansion at all for the time being. The ‘10h’ regulation introduced by the state government four years ago stipulates a general distance between wind energy converters and buildings so big that virtually no more projects are possible. What makes this go-it-alone approach more explosive is the way it is threatening to catch on. North-Rhine-Westphalia is not the only state to have recently pressed for a renewed state escape clause, which would give other federal states the opportunity for high distance regulations for wind projects across the whole state. The Minister President of Brandenburg has now gone as far as to call for an end to the privileged status of wind energy use in the ‘outlying area’. This could mean the multiple winner of the federal state award for renewable energies coming in last where the energy transition is concerned.

However, it is not only the federal states that need to do their homework – the Federal Government also has ways to create possibilities for more project developments. For example, the reference yield model that adjusts the feed-in tariff for awarded projects based on the site currently only differentiates up to a site quality of 70% rather than the previous 60%. Weak wind sites have to compete directly with better sites. For South Germany and its medium wind sites in particular, this signals the end for many project developments. Since they have no chance of winning a bid, they are not even touched. “A significant potential for expansion is being wasted here”, explains ENERCON Sales Director Stefan Lütkemeyer. “And these are regions where delays in grid expansion do not present an obstacle.” There is therefore an abundance of good reasons for politicians to put their all into tackling these issues after the summer recess.

On top of this, the wind industry has been working in communication with the federal states to create a broad initiative. The project has already got off the ground and aims to rectify the diverse causes for the rapid decline in project approvals we are currently seeing. The problems concerning land designation, excessive species conservation requirements and high general distance stipulations were brought to the attention of the federal states in a round of talks. It is now up to the responsible energy ministers to take measures to remedy this situation.

The coalition agreement of the Federal Government already contains a pivotal element: the SPO and CDU/CSU had agreed on a special volume of 4,000 MW for both wind and solar energy as they were forming a government. This was a way to make up for the special community-owned project arrangement that went wrong and primarily helped unstable long-term projects to win bids. Now, the Federal Government urgently needs to put its plans into action, so that the wind industry can regain its confidence and WEC manufacturers and planners can bring projects to fruition that will have a chance of winning a tender.
EU decides expansion target for 2030

The European Union has significantly increased its ambitions for the expansion of renewable energies by 2030 once more on the final stretch. In a trialogue process, the European Commission, Council, and European Parliament agreed on a target of 32% at the last minute. The new deal is therefore considerably higher than the 27% mark originally proposed by the European Commission. The agreement can be judged as a success considering the obstacles on their own doorstep.

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Unlike with past EU directives on renewable energy, there are no longer any nationally binding targets for the period until 2030. The EU member states now have a joint responsibility to ensure the EU-wide expansion target is reached. In order to coordinate the efforts to meet the target in the most effective way possible, the EU has developed a governance mechanism. Among other things, it provides a formula to calculate the individual national contributions to the EU target. It also illustrates options of how to bridge potential gaps between the national contributions and the EU target, including setting up an EU financing platform. Countries at risk of missing their targets can make a financial contribution to this platform, which is then used to finance tenders for renewable energies in the whole of the EU. The paying member state is credited with these expansion amounts as a ‘statistical transfer’. Countries with less potential for wind energy can exploit their potential and propose ambitious measures. It will not be enough to simply recycle national measures that already apply. The member states must illustrate the flexibilisation measures they propose in their national plans. Flexibility options include increasing electrification of sectors like mobility and heating, better control of loads and of course intensifying expansion of storage capacities.

The European Commission will review and annotate the individual national plan drafts. The member states would do well to fully exploit their potential and propose ambitious measures. It will not be enough to simply recycle national measures that already apply. The member states have to present their final plans to the European Commission by 31 December 2019.

Brussels calls for national climate and energy action plans

Within the framework of the governance regulation concluded in Brussels in June, the EU places the member states under the obligation to draw up and present national climate and energy action plans. The European Commission must have received a first draft by 31 December 2018. In their action plans, the member states are to demonstrate what they intend their specific contribution to the 32% EU expansion target will look like. This includes specifying expansion corridors for renewable energy, taking into account the amounts envisaged for repowering. The national plans should also focus on making the energy system more flexible to create more room for renewable energies. Against this backdrop, the individual member states must illustrate the flexibilisation measures they propose in their national plans. Flexibility options include increasing electrification of sectors like mobility and heating, better control of loads and of course intensifying expansion of storage capacities.

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Movement in European climate policy

Right in the middle of the summer recess, the EU Commissioner for Climate Action and Energy, Miguel Arias Cañete, surprised us with his call for the level of ambition in European climate protection to be raised. According to his plans, the EU is to achieve a 45% reduction in its emissions by 2030. A target of 40% had applied at EU level up until this point. Despite the unusual timing of his announcement, it is only logical. While the exceptionally hot summer with its heat and sustained drought has caused damage worth billions in Central Europe, the countdown has started for the next international climate summit in December in Katowice, Poland. There, the EU wants to seize its role as a pioneer in international climate protection once more. At the same time, the European Commission is also working on a road map to complete decarbonisation of the energy system for the time after 2030.

Given the climate protection balance at national level, which is in part disastrous, the member states are now called upon to act. In view of the international and newest European targets, we are now at a point where a quick reduction in the capacities of coal-fired power stations is more unavoidable than ever. International carbon pricing would also be an effective way to achieve the necessary reduction in emissions. A coalition of the pioneers in Europe ought to start implementing a carbon pricing system as quickly as possible.
The process of dismantling the old NEG Micon WECS also included removing the entire foundation. 98 percent of the machines dismantled were recycled. The rotor blades were shredded and used as fuel in a cement factory.

As a turnkey supplier, ENERCON not only assembled and installed the wind turbines, constructed the roads and got the wind farm infrastructure in order, but also dismantled the old WECS. “For us, the biggest challenge was preventing interruptions to the energy generation at the wind farm,” says Thomas Guibaud, the Sales Manager responsible for the ENERCON Sales France. The customer had specified that the old WECS were to continue producing energy right up until commissioning of the new ones. Thanks to detailed project planning, and a sound cooperation between the Electrical Engineering, Civil Engineering and HSE divisions at ENERCON and the customer’s project management team, it was possible for three of the old WECS to continue operating while the new-82 WECS machines were being installed.

The four E-82 WECS have a nominal power of 2.3 MW each and were installed on hybrid towers at a hub height of 98 metres. The concrete segments were produced by ENERCON supplier WEC Mâts Bâton at its plant in Lenguil-Sainte-Marie close to Compiègne. They bear the “Origine France Garantie” label, which certifies that 68 percent of the component added value has been generated in France.

The repowered wind farm was officially inaugurated at the end of May. Both the customer and ENERCON were pleased with the results of the first French repowering project. ENERCON Sales Manager Thomas Guibaud hopes that further repowering projects will follow across the country: “France may still have the potential to reach 20 percent of its energy from renewables by 2022. The 20 neurological projects that are planned in the country, and the wind farm is operated by Energie Plouyé, the site is located in the department of Finistère in the northwest. The new technology is able to provide four times as much energy as before. The key to detailed project planning, and a sound cooperation between the Electrical Engineering, Civil Engineering and HSE divisions at ENERCON and the customer’s project management team, it was possible for three of the old WECS to continue operating while the new-82 WECS machines were being installed.

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Market entry in Vietnam
with 33 x E-103 EP2 wind energy converters

ERENCOn is supplying the WEC technology for two wind farms. Follow-up projects are already being planned. Development of a service station is also underway. The prospects for onshore wind energy in the Vietnamese market are largely positive.

Reflecting its increased focus on international markets, ERENCON can boast success in another South East Asian country: the company is entering the market in Vietnam with two projects totaling 77 megawatts. “Over the past few months, we have been making careful preparations together with our customers for our launch in Vietnam”, reports Steffen Brauns, Regional Manager for Asia-Pacific at ERENCON Sales International. “We are pleased that our plans to enter into the market with a total of 33 x E-103 EP2 wind energy converters in two projects have been successfully realised. This gives us a basis from which to expand our activities in Vietnam – a country with good prospects for onshore wind energy.”

The E-103 EP2 wind energy converters were delivered for the Mui Dinh and Trung Nam wind farms. Mui Dinh (phase I) comprises 16 WECs, Trung Nam (phase I) comprises 17. The wind energy converters were installed on tubular steel towers at a hub height of 85 metres. The customer behind the Mui Dinh project is Eab New Energy GmbH, while Trung Nam Wind Power JSC is the customer for the Trung Nam project. According to energy yield estimates, both wind farms put together will generate around 200,000 megawatt-hours each year.

Vietnam is one of the countries in South East Asia with a growing demand for energy. This is due to the rapid economic growth, which in turn is leading to an increase in prosperity. “Renewable energies are a quick way to cover part of the energy demand”, says Steffen Brauns. That is why attention is currently turning to the renewables in Vietnam. “What’s more, there is now a general realisation that an energy transition is necessary.” Vietnam has made a start by abandoning its plans for further investments in nuclear energy. Wind energy is to be expanded instead. “Projects with a total capacity of 2,400 MW have already been registered”, reports Brauns. Plans for further expansion aim for another 800 MW to be added by 2020 and another 6,000 MW by 2030. To date, Vietnam has installed approximately 200 MW of onshore wind energy capacity.

“We can therefore assess the political framework conditions as positive”, summarises Steffen Brauns. The wind conditions represent another positive aspect: they tend to be good, with an average wind speed of 6 to 7 m/s at the sites in the middle and the south of the country. In the course of its first two projects, ERENCON gained experience of the business culture in Vietnam and in working with the authorities there. Following the founding of subsidiary ERENCON Vietnam Company Ltd. at the beginning of 2018, the next step is now to expand its presence in the country further. In addition to the registered office in Ho Chin Min City, a service station is currently being built up in the province of Ninh Thuan. The first members of staff have already been recruited and are being trained in Taiwan.

At the same time, ERENCON is already conducting discussions with both project customers on the next phases, involving the installation of a total capacity of 148 MW. ERENCON’s new international focus means Steffen Brauns’s team is able to pull out all the stops with regard to its product range. “We are already offering the new E-126 EP3 in our business talks detailing expansion of the wind farms”, says Brauns. //

Steffen Brauns, Regional Manager for Asia-Pacific at ERENCON Sales International

Three E-82 wind energy converters for wind farm in Costa Rica

THE WIND ENERGY CONVERTERS PROVIDED FOR THE RIO NARANJO PROJECT SEE ENERCON’S SHARE OF THE MARKET IN THIS CENTRAL AMERICAN COUNTRY RISE TO 23 PERCENT. INSTALLATION OF FURTHER WECs IS ALREADY UNDERWAY.

ENERCON has supplied three E-82 E4 wind energy converters for the Rio Naranjo wind farm in Costa Rica. The WECs are designed for strong wind sites and have a nominal power of 3.0 MW each. They were installed in the province of Guanacaste in the northwest of the Central American country, on tubular steel towers at a hub height of 78 metres. The customer is the Cooperativa de Electrificacion Rural R.L. energy cooperative, utility company for the region.

Due to the warm temperatures prevailing all year round at the site, the wind energy converters were delivered with hot climate features. ENERCON’s cargo vessel, the ‘E-Ship 1’, transported the components from Germany across the Atlantic, through the Panama Canal and up the coast of the Pacific to reach the Port of Caldera. The WEC components therefore covered a distance of more than 10,000 kilometres.

The wind farm is located close to the small town that shares its name, Rio Naranjo. Situated between the Tenorio and Miravalles volcanoes, the site offers excellent wind conditions: the average wind speed at hub height is 11 m/s. According to the energy yield estimation, the wind farm will generate more than 34 million kilowatt-hours per year. These WECs mean ENERCON now has a market share of 23 percent in Costa Rica. ENERCON is currently installing nine E-103 EP2 machines in another wind farm for the same customer. They are expected to be commissioned by the end of the year. //

Grid connection for first community-owned wind farm in Spain with ENERCON E-103 EP2

PROJECT PARTNERS ENERCON AND EOLPOP HOPE THAT THE PILOT PROJECT WILL LEAD TO MORE ATTENTION FOR COMMUNITY-OWNED ENERGY IN THE FUTURE. UP UNTIL NOW, COMMUNITY PARTICIPATION HAS BARELY BEEN CONSIDERED IN SPAIN’S RENEWABLE ENERGY EXPANSION.

Commissioning of the Catalonian wind farm ‘Viure de l’aire del cel’ with one E-103 EP2 wind energy converter gave both ENERCON and its customer, community-owned cooperative Eolpop, great cause for celebration for two reasons: the first was the successful completion of the project, and the second the fact that the first community-owned wind farm in Spain had been realised. Unlike in other countries such as Germany, community participation in Spain’s renewable energy expansion has been left almost completely unconsidered up until now. “We hope our wind farm will go on to set an example for other community-owned energy projects in Catalonia and other regions of Spain”, says Eolpop Project Manager Pep Puig.

ENERCON installed the E-103 EP2 wind energy converter on a tubular steel tower at a hub height of 85 metres. The site is close to the town of Pujalt, situated approximately 100 kilometres northwest of Barcelona. “Wind class III conditions prevail at the site, with an average wind speed of 6.2 m/s at hub height”, says Adrián Martínez, Sales Manager Spain at ENERCON Sales International. According to the energy yield estimation, the wind energy converter will provide around 5,600 megawatt-hours a year. It is the first E-103 EP2 to be installed on the Iberian Peninsula.

Pep Puig believes that the lack of significance ascribed to community-owned energy in Spanish renewable energy expansion can be put down to sociopolitical factors. They are responsible for the fact that Spain’s entire energy infrastructure has remained in the hands of the few for decades. This makes it all the more gratifying for the initiators that they were able to enforce their idea of a community-owned wind farm. More than 500 shareholders are involved in the Viure de l’aire del cel wind farm. “We need projects like this one to achieve the transition to a completely renewable energy supply by 2050”, Pep Puig reiterates. //
ENERCON starts in New Brunswick with E-92

THE CAP-PELÉ WIND FARM IS THE FIRST ENERCON PROJECT IN THE CANADIAN PROVINCE OF NEW BRUNSWICK. IT WAS RECEIVED BY THE COMMUNITY WITH GREAT ACCEPTANCE.

ENERCON has been very successful in Canada for numerous years, an important market amongst international markets. The company has installed more than 2.1 gigawatts since its market entry in 2001. However, no ENERCON turbine had been installed in New Brunswick so far. The turbine manufacturer has now completed its first project in this region: The wind farm Cap-Pelé with 1 x E-92/2.35 MW was installed for the client IFE Canada and will be owned by WKB Community Wind Farms.

The site is located close to the municipality of Cap-Pelé at the coast in the Eastern part of the province. The wind resource evaluation in this region is very good. The planning began in 2017, construction started in November of last year and the project was commissioned in August 2018. The project is part of the so-called Embedded Generation Program of the province. Approximately 50 participants from wind energy, biomass and hydro energy competed for a total of 20 MW. A local project partner and a connection to the distribution network is mandatory within the program.

Ram Sander has to make time for a long business trip when he wants to visit the Cerro Grande wind farm. The showcase project implemented by ENERCON in Uruguay is more than 14,000 kilometres from the company headquarters. 22 x E-92/2.35 MW WECs were installed close to the city of Melo in the northeast of Uruguay, around 60 kilometres from the Brazilian border. "We performed the entire value-added chain in this project – from project development and financing to WEC supply, installation and commissioning", explains the Regional Coordinator for ENERCON Uruguay. "And we are operating the wind farm as its owner." The turnkey project has now been connected to the grid.

ENERCON is supplying the energy from the 50 MW project to the local grid operator UTE within the scope of a Power Purchase Agreement (PPA) with a term of 20 years. The wind farm is connected to a strategic grid hub between Uruguay and Brazil, meaning the energy can reach physical loads in both countries. "The wind conditions at the location are excellent", reports Aram Sander. "The annual energy yield of Cerro Grande corresponds to the amount needed for us to supply around 80,000 households."

The E-92 WECs were erected on hybrid towers with a hub height of 98 metres. The concrete segments were manufactured locally during the construction phase in a centrally located mobile concrete tower factory. As a result, the local content share of the project is 56 percent and is currently in the process of being state-certified.

ENERCON worked on the project development with the partners SEG Ingenieria S.A. and sab New Energy Group (via its Brazilian subsidiary api Energia Projetos e Investimentos Ltda.). ENERCON acted as general contractor and provides a comprehensive service as part of its ENERCON PartnerKonzept. The developers SEG and sab provide technical operational management in a joint venture which complies with PPA guidelines regarding local content requirements.

Cerro Grande is already the second wind farm that ENERCON has installed in Uruguay. In 2014/15, ENERCON installed 50 x E-92/2.35 MW WECs with an approved total capacity of 100 MW in total for the Peralta project.