
Performance increase in 3 MW class

BALANCING ENERGY FROM WIND  ____ ENERCON wind farms prequalified for market participation
RETURN TO INDIA  ____ ENERCON signs agreement with local service providers
REPOWERING IN SPAIN  ____ ENERCON renovates Malpica/Galicia wind farm with 7 x E-92/2.35 MW
Dear customers, business partners and employees, dear readers,

The wind energy sector is confronted with increasing cost pressure. In important key markets – and above all in our domestic market of Germany – changes to framework conditions are bringing about far more destructive competition which has a direct impact on the pricing situation. The tendering system introduced by the German Federal Government in the spring is a striking example of this. In the first two onshore rounds, it caused remuneration rates much lower than those previously seen and inflamed the competition and the price war within the industry.

Those market developments, which can be observed across borders, mean there is now no more demand than ever on manufacturers to provide long-term answers to the growing challenges presented. In our opinion, dubious dumping and inferior low-cost solutions are not the answer.

Instead, ENERCON will continue to focus on technological developments, innovation and maintaining quality standards, in order to stay competitive as a partner with long-term interests even under the tighter framework conditions and to offer its customers efficient, cost-effective and, above all, long-lasting wind energy converters of the highest quality at the best prices. For us, providing highly advanced technology at the proven ENERCON standard of quality and attractive prices does not represent a conflict of objectives.

Quite the contrary, as demonstrated by our two new 3 MW platform WEC types (see cover topic): in these new developments we are providing our customers, particularly in the highly competitive markets, with compact, efficient onshore WECs which deliver an enhanced overall performance, and which have been further optimised to ensure efficiency in Production, Transport & Logistics, Installation and Commissioning processes. We also demonstrate this in our consistent use of an advanced design version of our WECs in this size category. The tried and tested ENERCON concept consisting of direct drive, separately excited annular generator and advanced technology of the highest quality, however, can still be found inside the new compact nacelle. Our objective to supply our customers with the highest-quality wind energy converters on the market remains unchanged.

In addition to the technological conditions, the further political course set for our industry will be equally important in determining which direction the energy transition will take in the future. We can only hope that voters will carefully weigh up the climate and energy change policies of the parties and candidates before casting their vote in the Bundestag election in September.

We hope you enjoy this issue!

Hans-Dieter Kettwig
Managing Director of ENERCON

Simon-Hermann Wobben
Managing Director of ENERCON

Optimising costs and meeting high quality standards presents no conflict of objectives for ENERCON

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Process once again significantly oversubscribed – almost all bids accepted for unapproved projects.

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Managing Director of ENERCON

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18. Second round of tendering results in further price drop

Process once again significantly oversubscribed – almost all bids accepted for unapproved projects.


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Large onshore expansion in the first half of the year

Offshore wind energy in Germany has recorded a large expansion in the transition phase of the new tendering system. According to the German Wind Energy Association (BWE), a total of 2,281 MW (gross) were newly installed in the first half of 2017. This equates to 790 WECs. Expansion in the first half of this year is therefore 11 % higher than the level reached in the same period of the previous year. Repowering projects account for around a fifth of the installed power (449 MW/151 WECs).

The large expansion had been expected due to the change of the remuneration system to calls for tender. “The wind industry will be implementing the approvals granted to the end of 2016,” the BWE stated. This transitional effect will, however, cease in 2018. Due to the success of projects without approval in the first rounds of onshore tendering, the industry anticipates a period of great uncertainty in planning following the current expansion boom.

Photo: Repowering project, Timmeler Kampen/Region Aurich, East Frisia (5 × E-115/3 MW for 11 × E-66/1.5 MW).
ENERCON starts new training year with 74 apprentices

The ENERCON plants in East Frisia have taken on 74 apprentices for the new training year. The youngsters were welcomed by their instructors at the EEZ (Energy, Education and Experience Centre) in Aurich on 1 August. After a shared breakfast, a tour of the ENERCON plants as well as a safety briefing, fire safety and IT training were on the agenda. Once again electronics engineers for building systems as well as electronics engineers for machines and WEC construction were the training professions which dominated this year’s intake. Along with the industrial/technical training, ENERCON is yet again training in commerce and dual training programmes, in a total of more than 20 professions in the industrial/technical and commercial fields. ENERCON places great importance on training its own skilled workforce. It is an important step toward producing the next generation of skilled and specialised workers.

The ENERCON company employees donate to charity

ENERCON employees and management have made a donation of 2,500 Euros each to five charities from the East Frisia region. As part of the 2016 Christmas celebrations in Aurich, employees collected donations and suggested recipients. Management then added its own contribution. Of the employees’ suggestions, the German Teddy-Stiftung in Esens-Bensersiel, the Förderverein Kinderklinik in Leer, the Kinnerwark e.V. club in Aurich, Ronald McDonald House in Oldenburg and the Aurich Youth Fire Department were selected. The dominant selection criteria were that the donations go to people in the region, with the organisations or initiatives supporting children.

The German Teddy-Stiftung provides emergency services with comfort bears for children to take their minds off bad experiences after an accident. The Förderverein Kinderklinik in Leer wants to create a worry-free and healthy atmosphere at the local children’s clinic and fit out the treatment rooms with child-oriented clocks. The Kinnerwark club is supporting the establishment of special “Reading Islands” for primary school children in Classes 1 and 2 (ages 7 and 8 respectively) who have difficulties reading and writing. Ronald McDonald House in the grounds of the Elisabeth Children’s hospital in Oldenburg provides accommodation and a safe haven for parents of very sick children while the children are in hospital. The Youth Fire Departments in Aurich hold camps for around 800 young people aged between 10 and 18 every three years. These donations were given to their recipients at the start of July at the visitor centre in ENERCON’s EEZ.

ENERCON buys electric vehicles for French plants

ENERCON is now on an electric course in France too. A total of three Renault Zoe electric vehicles have been purchased as pool cars for ENERCON’s plants in Longueil-Sainte-Marie, Nantes and Valence. The compact cars, which have a range of 150 to 300 kilometres, are being used to travel to customer and business meetings in the region.

At the same time, ENERCON Service in France received four electric Renault Kangoo zero emissions, which will be used for service activities with straightforward demands for materials and equipment use. In order to charge the new electric vehicles, ENERCON has installed its own charging columns at the French plants.

The electric vehicles are a part of the project to gradually convert its fleet to electricity. ENERCON already uses e-cars at its location in Aurich as environmentally friendly pool cars. Further plans to convert the in-house fleet to electricity are currently being tested.

“KITA Wirbelwind”, ENERCON’s company kindergarten in Aurich, has had an additional building constructed. The building was constructed opposite the existing kindergarten building at 3a Boomkampsweg in the Sandhorst part of Aurich, and has provided space for 25 kindergarten children as well as a cross-age group for children aged three to Class 4 (age 10) since 1 August. An additional infants group was established in the existing building during the expansion. Alongside each group’s room, the new building has an area for homework supervision as well as a creative and research centre, a library, an activities room and a kitchen with an adjoining dining room. The new care provision at KITA Wirbelwind is intended for children of ENERCON employees as well as parents from Aurich who do not work in the company.
Performance increase in 3 MW class

The 3 MW segment is one of the most important power categories for onshore wind turbines. ENERCON has always had a strong presence in this class: it has installed 2,000 WECs (E-101 and E-115) worldwide since entering the market in the 3 MW class in 2011 with the E-101, and the E-115 is currently the WEC type which is approved most frequently in Germany. However, new demands are being placed on the WEC technology in this high-volume segment as a result of changes to the framework conditions. ENERCON has responded to this by developing two new WEC types on the basis of the EP3 platform: the E-126 EP3 for wind class IIA and the E-138 EP3 for wind class IIIA locations.

“We are significantly increasing the overall performance with these machines”, says Arno Hildebrand, Head of System Engineering at ENERCON’s research and development company WRD. "This increase in efficiency is primarily achieved by enlarging the working surface and increasing the nominal power”. The E-126 EP3 will therefore have a rotor diameter of 127 metres and a nominal power of 3.5 MW. It will be designed for locations with average wind conditions of class IIA (IEC). The E-138 EP3 will boast a rotor diameter of 138 metres and will also have a nominal power of 3.5 MW. It will be designed for class II A (IEC) low-wind sites.

"The new E-126 EP3 will thus achieve a yield more than 13 percent higher than our current E-115 at locations with an average wind speed of 8.0 m/s at hub height", says Hildebrand. Annual yields of more than 14.5 million kilowatt-hours (kWh) are forecast for a typical wind class IIA location (8.0 m/s) at a hub height of 135 metres. For the E-138 EP3 – a completely new type of WEC in the EP3 portfolio, which does not yet include a low-wind converter – the developers are expecting annual yields of more than 13.2 million kWh at a typical low-wind site with an average wind speed of 7.0 m/s at 131 m hub height.

On top of this, both types of WEC will be refined in all aspects to improve efficiency. All processes, ranging from Production to Transport & Logistics, Installation and Commissioning, will be optimised. “Our aim is to shorten and simplify all of our processes, and ultimately to make them cheaper in line with the tougher market conditions and competition”, explains Hildebrand. “As far as technology is concerned, we are choosing to take the approach of developing a machine which is compact and efficient in every respect, something which becomes evident when looking at the assemblies and components.”

**Rotor blade**

The E-126 EP3 and the E-138 EP3 will be fitted with newly developed rotor blades made from glass-fibre reinforced plastic (GRP). Both blades are one-piece versions which are produced in a mould using a vacuum infusion process. They will have new flatback profiles and, in order to optimise production and transport, will not feature the characteristic ENERCON spoilers in the trailing edge section close to the hub. The rotor blades can therefore be constructed more quickly and easily and the shallower profile depth makes them easier to move from place to place. Certain aerodynamic disadvantages are compensated for by the use of vortex generators in the area close to the hub. Noise-reducing trailing edge serrations are standard, as is the application of the Impact Absorption Layer technology ENERCON has developed together with a supplier. Here, a protective film is laminated into the rotor blade leading edges to provide durable erosion protection.

**Tower**

ENERCON will offer both the E-126 EP3 and the E-138 EP3 with various tower options. Hybrid and steel towers are planned with hub heights ranging from 81 to 160 metres. “We will be offering our customers flexible solutions”, says Arno Hildebrand. They will therefore be able to choose from a wide range to find the ideal tower/WEC configuration for their sites, whether coastal or in the hinterland.

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**E-138 EP3 power curve**

<table>
<thead>
<tr>
<th>Wind speed v at hub height (m/s)</th>
<th>Power P (kW)</th>
<th>Power coefficient Cp [-]</th>
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<tbody>
<tr>
<td>0</td>
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<td>0.0</td>
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<tr>
<td>5</td>
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<tr>
<td>25</td>
<td>5,000</td>
<td>0.5</td>
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Hub and machine construction

Both of the new EP3 versions will have a newly developed hub with compact bearing. Up until now, the hub bearing in ENERCON 3 MW class turbines has been integrated in the hub. “With the new spherical hub this is no longer the case”, explains Arno Hildebrand. “The bearing is separated from the hub and is pushed further back towards the generator.”

One advantage of this separate hub bearing unit is a more compact design. It also creates more space for installations inside: for example, the pitch control boxes are housed inside the hub, making them easier to access for the Service technicians during maintenance. The pitch module which was previously located at the front in the spinner in ENERCON 3 MW class wind turbines is no longer included. Furthermore, the Service technicians will no longer have to reach the front part of the WEC through the locked generator, but rather from the tower through the main carrier and an accessible axle pin.

This in turn enables the machine house to be more compact as a whole, which offers advantages during transport to the construction site, where adverse weather conditions often prevail, as far as possible.

Another new feature is the complete enclosure of the generators to protect them from weather and other external influences. This in turn enables the machine house to be more compact as a whole, which offers advantages during transport to the construction site, where adverse weather conditions often prevail, as far as possible.

Form-wound coils of the ENERCON generator prototype.

Generator

ENERCON is developing new generators with a nominal power of 3.5 MW for the E-126 EP3 and E-138 EP3. The proven ENERCON concept of the annular generator with separate excitation will remain. But, for the first time, ENERCON will be using form-wound coils made of aluminium in series for both wind turbines (see technical excision). Instead of continuous windings made of copper wire, which are placed manually in the grooves of the stator support ring, mechanically formed and then secured, the new generators feature coil elements made of lightweight aluminium prefermented by machines. Following placement in the grooves, the contact ends simply have to be connected to one another. The use of form-wound coils in generator production results in many advantages, including shorter production times and the possibility of automating this production step. A reduction in weight can also be achieved, as aluminium is significantly lighter than copper. Another new feature is the complete enclosure of the generators to protect them from weather and other external influences.

Electrical system and control system

Significant changes will also be made to the electrical system and the control system in the new EP3 machines. For instance, new inverters and rectifiers which work with a higher level of voltage are envisaged. The control system will be given new hardware and new software. At the same time, the Service concept will also be updated for the new EP3 machines. Both versions will be designed for a service life of at least 25 years.

“We are confident that in the new EP3 machines we are developing high-performance products which can be produced faster and more easily, are easier to transport and faster to install and commission – and all of that with the proven ENERCON quality and reliability”, summarises Arno Hildebrand. “With this, the construction side is making a contribution to reducing costs and increasing profitability – two things which are demanded more and more from onshore wind energy in relevant markets.”

“Our aim is to provide our customers with the E-126 EP3 and the E-138 EP3 in good time for their projects.”

Stefan Lutskemeyer, ENERCON Sales Director

An ambitious schedule

ENERCON has set itself an ambitious schedule for developing its EP3 innovations and launching them on the market. The plan is for the E-126 EP3 prototype to be installed in the third quarter of 2018 at the latest. Series production is set to begin as early as the end of 2018. The installation of the E-138 EP3 prototype is planned for the fourth quarter of 2018, followed by a number of pre-production machines in 2019 which will also be used for testing and measuring purposes. The start of series production is scheduled for the end of 2019.

“Our aim is to provide our customers with the E-126 EP3 and the E-138 EP3 in good time for their projects”, ENERCON Sales Director Stefan Lütkeemeyer reiterates. “We want to offer them attractive framework conditions. This does not only apply to Germany with its new tendering system. We see great potential for our new EP3 products in many international markets in particular.”
Form-wound coils for new EP3 generators

TO FURTHER IMPROVE ITS GENERATOR CONCEPT, ENERCON USES ALUMINIUM FORM-WOUND COILS IN THE STATOR ON THE NEW TYPES OF WEC FOR THE EP3 PLATFORM. THEY PROVIDE IMPORTANT BENEFITS IN TERMS OF PRODUCTION, QUALITY AND TEMPERATURE BEHAVIOUR.

ENERCON’s WEC concept is based on a directly driven, separately excited annular generator. In the annular generator, kinetic energy from the wind is converted into electric energy by electromagnetic induction. The wind causes the hub and generator rotor to rotate. Electric voltage is induced in the generator stator’s windings by the rotating magnetic field produced by the generator rotor.

The windings are located in the slots in the generator stator. Up to now ENERCON had used copper wire bundles for this purpose, which brings us cost benefits too”, continues Dorenbusch.

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ENERCON establishes a recycling centre

THE CENTRAL COLLECTION AND SEPARATION POINT FOR RECYCLABLE MATERIALS FROM THE PRODUCTION PLANT SITES IS PART OF THE OVERALL STRATEGY TO OPTIMISE RESOURCE EFFICIENCY.

ENERCON is establishing a recycling centre at its production site in Aurich. With the new central collection and separation point for recyclable materials accumulated in the course of manufacturing WEC components, it is anticipated that the number of transport journeys and the disposal processes at the site will be optimised. The recycling centre is a part of our overall strategy to improve resource efficiency and recycling when manufacturing ENERCON wind energy converters”, explains ENERCON’s Environmental Management Representative Kerstin Dorenbusch. “Our main objective is to avoid waste. However, any waste in the production process which cannot be avoided should be recycled as much as possible.” Via the recycling centre at the “Industriehafen Nord” industrial estate in Aurich-Sandhorst, waste materials from surrounding ENERCON production facilities will in future be collected centrally, separated depending on their material and subsequently disposed of in cooperation with certified disposal service providers. In covered sorting facilities and large waste containers, scrap metal, cardboard, film, GRP residue, glass and wood will be sorted, if necessary pressed, and collected in containers to be taken away.

“Crucial advantages in setting up the new site are that pressure is taken off the factory collection points and our disposal partners only have to travel to one address, which in turn reduces the number of tonnes, transport journeys and the burden they place on the environment. That means we can maintain an optimal infrastructure guaranteeing high standards of safety in a confined area”, says Kerstin Dorenbusch. Another advantage is the access to the recycling processes. Most of the materials accumulated in production and collected in the recycling centre are not waste but “valuable” materials for which the disposal service providers issue credit – as long as the materials are correctly separated.” Optimised sorting therefore brings us cost benefits too”, continues Dorenbusch.
ENERCON wind farms take on greater system responsibility

MARKETED BY THE ENERCON COMPANY QUADRA ENERGY, THE FIRST WIND FARMS WITH ENERCON TECHNOLOGY HAVE NOW BEEN PREQUALIFIED IN GERMANY TO ENTER THE BALANCING POWER MARKET. IN FUTURE THEY WILL BE ABLE TO PROVIDE NEGATIVE BALANCING POWER TO THE GRID WITHIN THE MINUTE RESERVE.

ENERCON wind farms in Germany are set to take on greater responsibility for grid stability and supply reliability. For the first time, they will take part in the balancing power market through the virtual power plant of the ENERCON company QUADRA Energy and make negative balancing power available to the grid on demand within the minute reserve. For this, the transmission network operator (TNO) Amprion has prequalified the first selected ENERCON wind farms in its control zone.

Balancing power serves as an instrument to compensate for power fluctuations in the grid on a short term basis. The goal is to keep production and consumption balanced so as to guarantee system stability, or more precisely a stable frequency. An imbalance is levelled out by injecting more power (positive balancing power) or taking power out of the grid (negative balancing power). A scheme established by the TNO determines at which time a windfarm should intervene when there is an imbalance in the grid: during primary control within seconds, during secondary control within a period of seconds to minutes or during tertiary control within minutes. This balancing power is therefore known as the minute reserve. Up to this point these system services were almost exclusively provided by conventional power plants. With permission/prequalification by Amprion, ENERCON wind farms can now demonstrate their proficiency in providing minute reserve power.

Before a wind farm or power station can share in the balancing power market, it is inspected. Prequalification is the authorisation process for wind farms to share in the balancing power market. The balancing power providers in this process – in this case QUADRA Energy as TNO partner – must prove that their provision and IT concept matches the requirements for each type of TNO balancing power and that the wind farms fulfil the practical requirements. After permission has been granted the balancing power provider may participate in auctions in which the balancing power put out to tender is awarded to the lowest bidder in that case. Whoever receives the bid must regulate their plants if requested by the TNO in cases of negative balancing power. Several ENERCON wind farms have now been prequalified and others should soon follow. Reducing power to control frequency has nothing to do with so-called inertia: in management which grid operators can control independently during technical grid bottlenecks.

The requirements differ greatly depending on the type of balancing power. QUADRA Energy and ENERCON have also now decided to configure the IT concept for the secondary balancing power as well as the minute reserve. This way the control system and corresponding IT connections can be used immediately for other types of balancing power with corresponding authorisation from the TNO.

"The prequalification is an important interim step for us", says Andreas Linder, Project Manager Balancing Power for ENERCON Sales Grid Integration. "It proves that our wind farms control negative balancing power. Technically, however, they can already do a great deal more than they are currently permitted or is economical for the operators/owners. This includes all types of balancing power including positive balancing power. However, the applicable market regulations still do not allow renewables non-discriminating access to system service markets and especially the markets for secondary and primary balancing power. In spite of the constantly increasing proportion of renewables in generating energy, the system service markets are still dominated by conventional power generation.

The logical potential of optimising wind farm grid integration is far from being exhausted."

ENERCON wind energy converters have several advantages for providing system services. "We can point to a very quick and accurate controlling of our WEGs' power output. Furthermore, the WEGs and wind farm regulators' control code can be adjusted to new requirements with software updates", explains Andreas Linder. ENERCON has also developed a special process for regulating wind farms, which ensures the input power is precisely set to the balancing power target value set by the TNO. This way it enables the TNO’s requirements for wind energy converter prequalification to be met or bettered.

By contrast in some countries the market design and the technical requirements are more advanced. In Ireland and Northern Ireland, it is irrelevant which technology provides necessary system services for system stability – what matters is that power is provided. Whether this comes from conventional or renewable power plants is of no consequence. A criterion that should form the basis for the German market in future, according to Andreas Linder: "It should always be a question of performance and not technology."

ENERCON is also campaigning further for market design adjustments to system services. The market should make the provision of diverse grid-friendly services economically attractive for providers in future. The minute reserve is a first step. Other types of balancing power will follow. Without sufficient economic incentives, operators/owners will neither install, nor provide these features. "On this point the Federal Network Agency and politicians have to set appropriate conditions so that the market design keeps advancing towards renewables", says Andreas Linder. "Even if the market isn’t going the necessary signals at present, ENERCON as a leader in technology demonstrates with the prequalification that the technological potential of optimising wind farm grid integration is far from being exhausted."
Second round of tendering results in further price drop – almost all bids accepted for projects without approval

THE SECOND ROUND OF TENDERING FOR ONSHORE WIND IN GERMANY WAS ONCE AGAIN SIGNIFICANTLY OVERSUBSCRIBED. WITH BID VALUES OF BETWEEN 3.5 AND 4.29 CT/KWH, THE PRICES DROPPED BY A FURTHER CENT IN JUST ONE ROUND. PROJECTS IMPROPERLY DEVELOPED AS COMMUNITY-OWNED ENERGY ARE EVIDENTLY INTENDED TO RAID THE MARKET AND PUT PRESSURE ON WEC MANUFACTURERS.

Community-owned projects already made up more than 90% of the winning bids in the first round of tendering. In the second round, the dominance of the projects without approval has been intensified once more to reach more than 95%. One project developer alone managed to secure 660 of the 1,000 MW put out to tender through citizen projects established at short notice with limited partners from its own company. The implementation of these projects is uncertain and we will have to wait until this time period is up. “This result is a huge blow, not only for the wind industry itself but also for its credibility in politics and in the eyes of the public”, explains Enercon Managing Director Hans-Dieter Kettwig. “As in the offshore tendering process, the tenderers submitted speculative low tenders, in order to possibly implement their projects several years later with wind energy converters which are not currently available.” Indeed, one single project developer was able to win high market shares by misusing the community-owned energy essential for the energy transition and the entire wind energy sector will bear the resulting damage. There is a risk of a severe decline in wind energy expansion in 2019 and 2020, despite the fact that the legislator aimed to prevent exactly this disruption with its two-year realisation period for all projects awarded. This is something which should be amended following the Bundestag election.

However, the exception became the rule. The big problem here is that projects which have not yet been approved are much less likely to be implemented. After all, the BImSchG approval is the crucial hurdle on the path to having a project ready for construction. As a result, the industry envisaged that the corridor for wind energy expansion would be tactfully halved – there are no plans set out in the Renewable Energy Sources Act 2017 to add failed projects to the tendering volume again. Moreover, the community-owned projects also received an extension to the realisation period, pushing it back to four and a half years. This means we are faced with the prospect of a sharp decline in wind expansion in 2019 and 2020, despite the fact that the legislator aimed to prevent exactly this disruption with its two-year realisation period for all projects awarded. This is something which should be amended following the Bundestag election.

The request put forward by the industry that all tenderers require a BImSchG permit has been heard by the parliamentary groups in the Bundestag. As of 2018, only bids from approved projects will be possible. The only fly in the ointment is that the last round of tendering set to take place this year will still allow for bids from community-owned projects which have not yet been approved. There is a risk of extremely low bids from project developers, in the hope that the construction-ready projects can now be completed and connected to the grid. The maximum price for 2018 is allowed to be set at the most eight percent higher than the average from the last three rounds of tendering. This may well mean it is set to be very low. //

Only bids from projects ready for building as of 2018


The surprisingly high amount of community-owned projects in the first round of tendering – in itself a positive result – had one major flaw: The majority of these projects have not yet been granted a permit from the German Federal Immission Control Act (BImSchG). By relaxing the regulations, the legislator wanted to ensure that regional community-owned projects would still have the opportunity to contribute to the energy transition in the tougher competition of the call for tender system. Such participants are able to bid with no more than a secured site and a reduced security deposit. This was intended to remove the long period of uncertainty associated with costly planning up to the BImSchG.

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REGULATIONS PROPOSED BY THE EU COMMISSION ARE INTENDED TO INCREASE FLEXIBILITY ON THE ENERGY MARKET. THE MAIN AIM FOR THE RENEWABLES IS TO ACHIEVE TERMS AND CONDITIONS OF ENTRY WHICH TAKE INTO ACCOUNT THEIR SPECIFIC TECHNICAL PROPERTIES.

The European Commission devotes several provisions to the subject of capacity mechanisms in its winter package under the concept of “resource adequacy”. Mechanisms of this type for provision and remuneration of capacity have already existed in various forms for several years now in EU member states. France and Great Britain opted for a capacity market, while other countries have transformed particular power plants to become strategic reserves. Up until now, however, there has been widespread uncertainty as to whether the various models are compatible with European law.

The capacity mechanisms aim to ensure the security of the power supply in an emergency in energy systems with a high proportion of fluctuating power generation. In the process, however, such mechanisms actually ensure the continued operation of conventional power plants, the energy from which is too expensive to have a chance on the spot market. Capacity markets therefore not only bar the way to a rapid decarbonisation of the energy sector, but also exacerbate the problem of overcapacities on the energy market and the associated fall in prices. National capacity markets also present a clear obstacle in the creation of a single European energy market. And yet there are alternatives for securing the power supply which make much more sense. Ideally, price signals on the energy-only market should provide for the necessary investments in new power plants. A functioning balancing energy market also offers the grid operator access to connectable and disconnectable loads within a very short time in an emergency – up to primary control. On top of this, a cross-border energy market and the expansion of the grid infrastructure in the EU are already reducing the volatility in the energy supply today.

With all this in mind, it is disappointing that EU member states will be allowed to keep capacity markets or introduce new ones at all in the future. However, according to the concept put forward by the European Commission, from 2026, participation in a capacity mechanism will only be open to power plants which emit less than 550 g CO₂/kWh. This would exclude the vast majority of coal power stations found in the EU today from participating in capacity mechanisms, and, in most cases, it would no longer be viable to continue operating these power plants. The Commission’s proposal has thus already been analysed on occasions as an approach to phasing out coal in Europe. The European Parliament has signalled its support for this proposal in an initial statement. Nevertheless, resistance from those EU member states which still back coal-based power generation is programmed, meaning the proposal will no doubt provide for controversial discussions in the further negotiations on the winter package.

Since the end of 2016, the European Commission’s winter package has been the talk of the town, and not only in Brussels. The EU Commission put forward eight new legislative proposals, bringing the page count up to several thousand in total. In addition to a directive for renewable energies and a governance structure, the winter package also includes a regulatory framework for a future European electricity market design. This covers the introduction of markets for balancing energy, balancing group responsibility, security of power supply and much more. One of the EU Commission’s main objectives is to increase market flexibility, with the aim of integrating higher and higher proportions of power generated from renewable energy sources into the market. As some important parts of the market design come in the form of an EU regulation, they will have to be applied immediately in all member states once they have come into force, leaving governments with little leeway during implementation.

In principle, the renewable energy sector welcomes the EU Commission’s initiative. Since the existing market regulations are often still based on the centralised fossil generation technologies of the past decades, the adjustments should lead to a market which is better prepared for renewable energies. The challenge, however, will be creating the same conditions for all market players without disregarding the technical and physical properties of the various power generators. One example from the winter package illustrates this perfectly: due to the volatile feed-in of wind and solar energy to the grid and the inaccuracy of long-term forecasts, it must be possible to take part in the electricity market on a very short-term basis. Ideally, products would be traded around 15 minutes before they are actually delivered. Parts of the European Parliament call for a regulation of this kind.

It is important that EU institutions bear the safeguarding of legal certainty in mind when adapting the design of the electricity market in Europe. Abolishing supposed privileges for renewable energies, as is demanded in some cases for WECs which already exist, would be a blatant violation of the provision to safeguard existing systems and the legitimate expectations of investors. The Council of the European Union and the European Parliament are the two bodies responsible for making a decision on the proposals. Varying preconditions in the individual EU member states mean we will be waiting with bated breath to see how the dynamics of the negotiations on the market design develop.
Return to India:
ENERCON signs agreement with local service providers

INDEPENDENT SERVICE PARTNERS WILL SUPPORT THE REPAIR AND MAINTENANCE OF WIND ENERGY CONVERTERS BASED ON ENERCON TECHNOLOGY. COURT JUDGEMENT ALLOWS A NEW START UNDER NEW CONDITIONS IN INDIA.

ENERCON has begun a new chapter in its collaboration with India. As a first step, ENERCON concluded non-exclusive cooperation agreements with three independent Indian service providers at the start of July. The aim of the collaboration is to support the repair and maintenance plus further training and service provision for wind energy converters that have been erected in India with ENERCON technology.

"Many Indian WEC operators rely on our technology. Unfortunately, there was no reliable service provision there in the past. We could no longer stand by and do nothing, so in spite of all the legal disputes in the last few years, we decided to take this step in supporting the operators/owners. We will ensure quality oriented services for all who want reliable maintenance, seek proven and tested capabilities and require spare parts", explains ENERCON Managing Director Hans-Dieter Kettwig. "Together with our Indian Service partners, we will protect the interests of wind farm operators, investors and banks who finance wind energy projects in India."

In the time that followed, legal disputes prevented ENERCON activity in India. These are now resolved. A recent court judgement creates legal certainty and clears the way for a new start. The International Court of Arbitration (ICC) in London, recognised as a competent authority by the Indian Supreme Court, delivered a comprehensive and binding arbitral verdict in favour of ENERCON. The ICC verdict puts an end to a series of disputes, in particular the use of ENERCON’s intellectual property and permits the company to return to the Indian market under new conditions.

"Many Indian WEC operators rely on our technology."

Hans-Dieter Kettwig, Managing Director of ENERCON

More than 6,700 wind energy converters are operated with ENERCON technology in India. These have the capacity to produce a total of 4.8 gigawatts of electricity. They are therefore significant to India’s energy security. Hundreds of these wind energy converters are no longer operational due to insufficient maintenance and missing spare parts. This affects the country’s power supply and creates risks for wind energy producers, wind farm investors and the banks financing the projects.

With the return to India, ENERCON has re-established ties with its long-standing history in the country. ENERCON joined the Indian market in 1994 as one of the first WEC manufacturers with local production facilities. Enercon (India) Ltd (EIL) grew successfully until 2007, at which point the German majority shareholder was forced out of the company by a joint venture partner and ENERCON lost its previous subsidiary. This was later renamed Wind World India Ltd (WWIL).
INTERNATIONAL

Efficient land consolidation in Galicia

ENERCON HAS ERECTED 7 NEW E-92/2.35 MW IN PLACE OF 69 DISUSED OLD WECs WITH ITS REPOWERING PROJECT IN MALPICA, NORTHWESTERN SPAIN. IN SPITE OF THE CONSIDERABLE REDUCTION IN WECs THE WIND FARM’S OUTPUT HAS BEEN MAINTAINED AND THE ENERGY YIELD HAS DOUBLED.

The contrast between the two landscape images is impressive. In the older photograph, Malpica’s former wind farm can be seen with its 69 wind energy converters. The small wind energy converters dating back to the 1990s are spread over the entire headland, which protrudes into the Atlantic from Spain’s north-west coast. In the current image, this WEC “forest” has disappeared. In its place only seven individual modern ENERCON E-92/2.35 MW wind energy converters now stand on the headland. “The Malpica project is a very clear example of how the landscape can be consolidated by repowering”, says Eric Breckwoldt, Regional Sales Manager for Spain and Portugal in ENERCON Sales International. And the consolidation was also extremely efficient. This is because – in spite of the reduction in WECs – the power output measurements remain the same and the annual energy yield has doubled.

The original wind farm in Malpica was set up in 1997 with 67 Eco 28/225 kW WECs with hub heights of 30 metres. It is located in the province A Coruña, about 50 km west of the provincial capital of the same name, in the region of Galicia. Two further WECs arrived in 2002, model Eco 48/750 kW and hub height 45 metres, giving the wind farm a power output of 16.6 MW and an annual energy yield of 33 GWh. After the repowering 20 years later, the power output of the wind farm is more or less the same at 16.5 MW. However, due to more efficient WEC technology, the annual energy yield has doubled to 66 GWh.

“The wind conditions on the site are superb”, says Eric Breckwoldt. “In recent years, we have regularly measured peak wind speeds of over 50 m/s. Such conditions are not rare here. When the operator Enerfin planned to renovate its wind farm, it needed a robust and tested WEC. ENERCON could provide this with the E-92.” The E-92’s grid feed system (which is already prepared for the imminent grid protocol in Spain) and the tested ENERCON storm control (which has a positive impact on the weak grid structure in the region) were also advantageous for the German market leader as a WEC supplier. The seven E-92 WECs were erected on steel towers with hub heights of 78 metres this year over the summer months when winds are weaker. Enerfin began with the dismantling of the old WECs and renaturation of the old WEC site in November 2016.

The renewal of the Malpica wind farm is the first wind energy project that Enerfin has set up in Spain since the abolition of the feed-in tariff. It is also Enerfin’s first wind farm to manage without additional allowance. The kilowatt-hours fed in are only recompensed by variable market prices. Eric Breckwoldt sees a general trend in this in terms of onshore wind energy in Spain. “After the most recent auctions for renewable energy and the unattractive results with lower remunerations, more and more players seem to be turning their backs on the government and its auction system. In spite of variable revenue, more and more customers are planning their projects as pure marketing projects without the support of the government model. Very windy sites, of which there are many in the coastal regions of Spain, are particularly suitable for this new business model.”

Spain also has considerable potential in repowering. “A great many WECs were installed in Spain 20 years ago”, says Eric Breckwoldt. “These WECs are now reaching the end of their service life. They need to be replaced with newer, more efficient technology. As a manufacturer with reliable WEC technology guaranteeing high availability to operators and optimally supporting functional grids with grid services, this in turn enabling additional revenue to be generated, ENERCON is in a very good starting position in this market.”

REPOWERING IN SPAIN

With the Malpica wind farm project, the 100MW repowering power mark has been exceeded in Spain. Up to now, a total of around 114 MW has been renewed. ENERCON is a market leader in repowering in Spain. Over 90% of the renewed power has been supplied by ENERCON technology. In these cases, ENERCON has always replaced the technology of other manufacturers.
INTERNATIONAL

Green energy from Handalm

With an exposed location at 1,800 metres above sea level and an average wind speed of 7.7 m/s, the Handalm mountain in Styria is an ideal location for generating wind energy. ENERCON has installed a wind farm of 13 × E-82 E4/3.0 MW for its client Energie Steiermark on the high ridge of the border with Carinthia.

The 13 wind class IA WECs on steel towers with a hub height of 78 metres were erected over a distance of four kilometres on a high ridge. Due to the short time window available to build on the Alpine site, the construction was split into two phases: The foundations were cast in summer 2016 and in the summer months of this year the WECs were assembled, with measures initiated to start commissioning.

Although the site conditions are highly advantageous for energy production, they nevertheless entailed some challenges for the construction process. WEC components had to be reloaded onto special transporters in order to be transported up to the construction site. For this purpose ENERCON set up a transfer point in the valley. For moving the rotor blades, an alpine transport frame was used that is able to raise the 38.8 metre rotor blades to a near-vertical position when riding round narrow bends.

Another special feature of the project logistics concerned the supply line for one part of the WEC components. ENERCON’s rail company e.g.o.o. sent material cargo via block train from Germany. The spinner caps, aluminium nacelle casings and blade pipe extensions were only loaded onto lorries and transported the remaining distance for delivery to the wind farm construction site once they had reached Graz. Using the special train, e.g.o.o. cut out the need for 22 lorry loads with a journey distance of 1,200 km.

Due to the harsh weather conditions on Handalm, particularly during the winter months, the E-82s were supplied with cold climate components and were fitted with ENERCON’s rotor blade de-icing system and a new ice detection system. Using sensors installed on the blade, the ice detection system detects, among other things, the type of ice formation and the blade surface temperature, thereby making it possible to accurately control the de-icing system.

Thanks to the outstanding wind conditions the operator/owner expects an annual energy yield of 76 million kilowatt-hours. Energie Steiermark can say with pride, “This makes the project bigger than all other wind farms in southern Austria so far”. The green energy being produced is therefore sufficient to supply 21,000 households for a year.

Special equipment for rotor blade transport: The alpine transport frame is able to raise rotor blades to a near-vertical position on serpentine roads.