

WINDBLATT

ENERCON Magazine *for wind energy*

01/12

New ENERCON E-92

ENERCON introduces the new E-92/2.3 MW wind turbine. This wind class IIA machine is especially designed for sites located far inland.

Components on the ice road

ENERCON erects 4x E-70/2.3 MW wind turbines for a Canadian diamond mine in the far-flung Northwest Territories – special challenges for the logistics.

Multimegawatt project

ENERCON has completed the first section of the Werder-Kessin-Altentrep-tow wind project. This wind farm will be one of Germany's largest.



8

E-92

WINDBLATT 01/12

Cover

- 8 **New ENERCON E-92 wind energy converter**
ENERCON expands its product range with the new E-92/2.3 MW. This efficient wind class IIA turbine is especially suited for sites far inland.
- 10 **Interview with ENERCON Managing Director Hans-Dieter Kettwig**
ENERCON is well prepared for implementing the energy change and further wind projects at sites far inland. Nonetheless, dependable political framework conditions are necessary.

Politics

- 11 **Renewable energies in Europe**
Slow permit-granting procedures, a lack of investment protection, and a continuing debate about harmonisation are putting in jeopardy the European goals for renewable energies.



14

Picture: Diavik Diamond Mines Inc.



16

Picture: WIND-projekt/Markus Hass

Politics

- 12 **Renewable energies and power price debate**
Discussions about the costs distort the view of the opportunities the energy revolution brings.

Practice

- 14 **WEC components on the ice road**
ENERCON faces special challenges transporting four E-70 to a diamond mine in northwestern Canada.
- 16 **Werder-Kessin-Altentreptow Project/Mecklenburg-West Pomerania**
ENERCON completed first section of one of Germany's largest wind farm.
- 18 **e.g.o.o. mbH offers new transport service**
ENERCON's railway opens up new business opportunities with goods transports for third parties.

International

- 19 **ENERCON in Southeast Europe**
ENERCON erected first E-82 wind turbines in Greece.

- 4 ENERCON News
- 7 ENERCON Fairs
- 13 ENERCON Addresses

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Illustration of new ENERCON E-92 wind energy converter.

ENERCON NEWS

ENERCON achieves 60 percent market share again in 2011

ENERCON maintained its pole position on the German market last year. Achieving a market share of 59.5 % of newly installed power in 2011, the Aurich-based wind turbine manufac-

turer is once again well ahead of its competitors. Vestas holds second place with a 21.0 % share, followed by REpower Systems (9.7%) and then Nordex (3.9%). These figures were published by the German Wind Energy Institute (DEWI) based in Wilhelmshaven. It should be noted that these statistics also include figures from offshore installations which ENERCON is not involved in.

According to DEWI, a total of 895 new wind turbines with an overall rated power of 2,007 MW were installed in Germany in 2011 (2010: 1,551 MW). Out of these, ENERCON alone installed 552 turbines with a total rated power of 1,189 MW. «We are very pleased with these results,» says ENERCON Sales Manager, Stefan Lütkemeyer. Concentrating on our core business in the German market has definitely paid off for ENERCON, he adds.

Lütkemeyer also sees the extensive development in southern Germany as a favourable sign. According to the DEWI survey, the German states of Rhineland-Palatinate (258 MW of newly installed power) and Bavaria (164 MW) are currently ranked in 3rd and 5th position among the German states. Lower Saxony holds first place (431 MW) followed by Schleswig-Holstein (299 MW).

«With these developments, prospects are looking good for the current year, too,» says Lütkemeyer. In 2012, ENERCON expects continued wind energy growth at inland sites. Among the major contributing factors for the increase in installations in Southern Germany are the taller towers offered by the German market leader, says Lütkemeyer. Taller towers make inland sites more viable.

Tall tower types for wind energy projects in Southern Germany: ENERCON E-101 with 135 metres hub height at the Breidenbach site in Hesse.

With its latest model, the 3 MW E-101 turbine (99m and 135m hub height), ENERCON is well equipped for this trend. The first E-101 machines are already up and running also in Bavaria.

And Lütkemeyer expects even more favourable prospects with an additional tower version that will be available for the E-101 as of 2013: A new precast concrete tower with 149 m hub height will then round off the E-101 tower portfolio. This tower consists of 28 concrete segments and 3 steel sections and reaches a total height of 146.7 metres. The total height of the wind turbine will thus be 199.5 metres above ground.

ENERCON Service sets up new logistics hub in Gotha

ENERCON is setting up a new logistics hub in Gotha in the central German state of Thuringia. The new centre will support the company's worldwide service activities. It is currently scheduled to take up operation as early as mid-2012. It will support the logistics centre in Aurich, Germany, that has so far alone been responsible for supplying ENERCON service and installation teams with equipment, materials, and spare parts.

By setting up a second logistics hub, ENERCON Service is responding to ENERCON's continuing growth. Today, the Service organisation maintains more than 19,200 wind energy converters worldwide. This means that ENERCON's decentralised Service network is also growing: Today, more than 3,500 service and installation technicians in Germany and abroad depend on timely deliveries of equipment and materials. In the past years, the weekly output of goods at the Service logistics centre in Aurich has nearly tripled, and the tendency is growing.

«More wind energy converters, more staff, more materials, and a greater range of turbine types

to maintain – all this means more resources are needed for materials logistics,» says project manager Jochen Hilfers on the reasons for setting up a second logistics hub. The new facility will be built on the well-connected 14-hectare former site of VEB Gummiwerke Thüringen, a now-defunct rubber factory. In the spring, ENERCON will remodel part of the old factory buildings to use for material shipments. The finished facility will also include a returns department and a component repair department.

In addition, ENERCON Service plans to set up a training centre at the new Gotha site over the coming years. It will provide training to service and installation technicians in the areas of wind turbine maintenance, occupational health and safety, and first aid. These activities will at first be using rented premises in Gotha.

By 2013, the Gotha facility will see the creation of more than 55 new jobs in the area of materials management, and more than 20 jobs in the training centre. «Our operations in Thuringia underline once more ENERCON's commitment to expanding its worldwide decentralised Service network to keep up with growing demand and ensure our customers continue to receive the best-possible service,» says Volker Kendziorra, Managing Director of ENERCON Service Deutschland GmbH.

Normal operation: Weser hydropower plant started 2nd turbine

After the successful completion of the test phase at the Weser hydropower plant in Bremen, ENERCON started up the second turbine. That means the plant now runs in normal operation, and so far without any problems. «Everything is going according to plan,» says Nicole Fritsch-Nehring, WKB management and authorised officer of ENERCON GmbH, expressing her satisfaction with the project outcome. «The two



Second turbine on the grid: After completing several weeks of testing, ENERCON successfully started normal operation at the Weser hydropower plant.

turbines run fully synchronously, which is proof of the extreme accuracy achieved in the design, manufacturing, and installation of the system.» The two ENERCON generators and the electrical systems are also running trouble-free.

And ENERCON is even ahead of its own schedule: The original plan was to put the second turbine into service in March. But since the test programme ran so smoothly, the second turbine was able to go on the grid two months early.

The two S-pipe turbines that form the core of the power plant were developed by ENERCON who operates the plant jointly with Bremen-based swb AG. The water flows directly through the four adjustable runner blades. The position of the blades and the rotational speed are adjusted automatically to the flow and fall of the water. They drive two 5 MW generators from ENERCON's series production for wind energy converters. This is the same direct-drive system with variable speed that is used for the wind turbines, which makes a more efficient use of the tide-induced water level changes at the weir.

During the several weeks of test operation, all safety tests were passed successfully under the supervision of the Bremen Waterways

and Navigation Authority. This includes the mandatory emergency shutdown feature that ensures that within a few seconds, heavy steel bulkheads interrupt the water flow through the flow channels, and the turbines come to a stop. «The ENERCON-designed heavy steel hydraulic structures successfully passed the functional tests,» confirms Fritsch-Nehring. The same applies to the fish pass created specially for the Weser hydropower plant. The fish have accepted the fish ladders that allow them to pass upstream and downstream around the power plant.

ENERCON offers best customer service of all manufacturers

ENERCON continues to offer the best customer service of all wind turbine manufacturers. In a survey conducted by the German WindEnergy Association (BWE), the German market leader earned a grade of 2.10 which put it again in the top spot. Second place went to REpower (2.38), followed by GE-Wind Energy (2.68), Nordex (2.86), Vestas (3.00) and Siemens (3.37). This is a continuation of the results from previous years where ENERCON also came in first among the manufacturers in terms of customer service.



Groundbreaking ceremony for ENERCON's new R&D Centre (from the left): ENERCON Production Manager Klaus Peters, ENERCON Managing Director Aloys Wobben, Lower Saxony's Minister President David McAllister, Aurich's Mayor Heinz-Werner Windhorst and ENERCON Managing Director Hans-Dieter Kettwig.

Groundbreaking ceremony for new ENERCON R&D Centre

At the groundbreaking ceremony held on 26 March in the presence of Lower Saxony's Minister President, David McAllister, ENERCON launched the construction of its new Research and Development Centre. The future Wobben Research & Development (WRD) facilities will be providing spacious new offices and state-of-the-art test stands for the engineering and development staff. Located in the Aurich North Industrial Park near ENERCON's production facilities, the building will be made up of an office wing and a testing facilities building divided into four bays. The new centre is scheduled to be operational by mid-2013.

With 16,000 m² of floor space the office wing will be able to accommodate up to 400 R&D employees. And the 11,000 m² testing facilities building will be equipped with ultra-modern test bays for generators, systems engineering and

rotor blades as well as sophisticated equipment for testing new fibre-reinforced composites and manufacturing techniques.

Besides expanding its R&D facilities, ENERCON also intends to take on even more research engineers and specialists. «We are investing heavily in research and development in order to live up to our reputation as the technological leader in the wind industry,» says ENERCON Managing Director, Hans-Dieter Kettwig. This investment is a major element in ENERCON's sustainable growth strategy. Innovation is the key to providing customers with unequalled service.

At the ceremony, Minister President McAllister applauded ENERCON not only for its role as a pioneer in the wind energy sector but also for the economic boost the green industry has given to the economically weak region of East Frisia and the city of Aurich along with all the benefits for its residents – a commendable and impressive achievement.

Delegation of experts from Japan visits ENERCON

A delegation of experts from Japan visited ENERCON last December to learn about wind energy. 45 representatives of research facilities, industrial companies, and power utilities received a tour of ENERCON's production facilities in East Frisia. The agenda also included background talks with ENERCON managers and ENERCON sales staff. The visit was part of a fact-finding mission during which the delegation visited several facilities of the wind energy industry in Northern Germany. The delegation's goal on this trip was to investigate the options and opportunities for renewable energies in Japan after the Fukushima nuclear disaster.

The reactor meltdown has prompted Japan to rethink its energy policy. Instead of striving for a massive expansion of nuclear energy in the coming years, greater emphasis is placed on renewable energies – wind energy in particular. Last August saw the passing of a Renewable Energy Sources Act modelled on the German example. Its implementation is scheduled to begin mid-2012. This is another important factor that makes Japan an interesting market with considerable potential for ENERCON. ENERCON's share of the Japanese market is currently around 11 percent. With improved framework conditions, the company might well be able to increase its market share.

Construction for ENERCON's concrete plant in Austria started

In early March a groundbreaking ceremony officially launched the construction work of ENERCON's new concrete factory in Zurndorf (Burgenland), Austria. The plant is ENERCON's first production site in Austria and is scheduled to start producing precast concrete tower segments for wind energy projects in the entire republic as

well as Hungary, Romania, Croatia, Poland and Southern Germany by the end of this year. The approx. 17,000-square-metre tower factory is expected to process up to 200,000 tons of concrete annually. This comes to a production capacity of ca. 200 precast concrete towers.

First blade transport for E-82 with alpine frame

ENERCON completed the first transport of E-82 rotor blades using their special alpine rotor blade frame. The blades, measuring 39.7 metres in length, were taken up the hairpin turns to the «Hollandskopf» site near Borgholzhausen (North-Rhine Westphalia) by an automated special truck. In the narrow turns, the blades were lifted diagonally. Otherwise, they could not have made it to the site located at an elevation of 307 metres in the Teutoburg Forest mountains.

«This example shows that ENERCON is well equipped to build wind energy converters also in the low mountain ranges,» says Rainer Kleemann, ENERCON logistics specialist. The same transport equipment had already been used successfully when installing an E-70 machine in the Swiss Alps (see Windblatt 4/2011). The E-82/2.3 MW in Borgholzhausen replaces two E-40/500 kW machines from 1996.

Oldenburg solar farm with ENERCON inverters on the grid

After the solar farms of Sonnenberg near Cuxhaven and Oranienburg in Brandenburg, a third project with ENERCON solar converters was inaugurated in Oldenburg (Lower Saxony) in early March. It is ENERCON's largest solar project so far. For this 13.9 MW solar farm, ENERCON supplied seven inverter stations from its series production for ENERCON wind energy converters as well as 112 generator terminal boxes.

The inverters transform the direct current generated by the roughly 50,000 solar modules into grid-compliant alternating current that is then fed into the power grid operated by regional utility EWE AG. The 26.7 hectare Oldenburg solar farm is located on the site of a former military airfield. The project developer was IFE Eriksen AG. The company expects an annual energy yield of 11.4 million kilowatt-hours, enough to supply around 3,500 four-person households with green energy.

E-82 rotor blade on the alpine transport frame that was previously used successfully in the Alps.



ENERCON Fairs

Hannover Messe 2012
(Hanover/Germany)
Exhibition on renewable energies
23 - 27 April 2012
www.hannovermesse.de

ICCI 2012
(Istanbul/Turkey)
International exhibition on energy and environment
25 - 27 April 2012
www.icci.com

All Energy 2012
(Aberdeen/Great Britain)
British energy fair & conference
23 - 24 May 2012
www.all-energy.co.uk

Eolica 2012
(Rome/Italy)
10th International wind energy fair
5 - 7 September 2012
www.zeroemissionrome.eu

Husum WindEnergy 2012
(Husum/Germany)
Leading wind energy trade fair
18 - 22 September 2012
www.husumwindenergy.com

RENEXPO 2012
(Augsburg/Germany)
13th International energy fair
27 - 30 September 2012
www.renexpo.de

CanWEA 2012
(Toronto/Canada)
Annual wind energy fair and conference
14 - 17 October 2012
www.canwea.ca

RenewableUK 2012
(Glasgow/Great Britain)
Renewable energy fair and conference
30 October - 1 November 2012
www.renewable-uk.com

EuroTier 2012
(Hanover/Germany)
Fair section Decentral BioEnergy
13 - 16 November 2012
www.eurotier.com

New wind turbine type for inland sites

ENERCON presents E-92/2.3 MW

New wind class IIA wind energy converter yields up to 15 percent more compared to E-82/E2 2.3 MW. First prototype to be installed later this year.

ENERCON has expanded its product portfolio by adding the new E-92/2.3 MW wind energy converter. The new turbine type is specially designed for less windy inland sites. The E-92 will make its debut at the Hannover Messe trade fair. The first prototype is to be installed by the end of this year. The current timetable foresees the start of series production and the installation of the first customer-owned turbines in 2013.

The E-92 is based on the successful E-82 series and uses the same major components such as generator, main carrier, grid feed system, and WEC control system. «Our goal was to use the E-82 model as development platform as much as possible,» says Arno Hildebrand, R&D Director at Wobben Research & Development (WRD), ENERCON's R&D organisation. Adopting the tried-and-tested WEC configuration not only ensures cost-effectiveness in manufacturing, transport, and installation, it also allows ENERCON to draw on years of experience which means the new model can be put on the market quickly. «The E-82 is

a series-produced machine with a mature design and has been built by ENERCON for a long time already, all of which benefits the E-92,» explains Arno Hildebrand.

The E-82 has enough reserve capacities to serve as basis for the E-92, adds Hildebrand. That means that the mechanical structure can remain the same. And tests with the generator have shown that the component can thermally tolerate the slight reduction of the rotational speed compared to the E-82 without requiring significant changes.

New design for rotor blades

The rotor blades, on the other hand, have a new design: Not only are they five metres longer – the E-92 has a rotor diameter of 92 metres as opposed to the 82 metres of the E-82 –, they also have a new profile to achieve optimum load distribution while reducing the weight of the blades. «The aerodynamic profile has been modified in such a way that it minimises stress on the machine and increases energy yields at the same time,» explains Alexander Hoffmann, Engineering Manager of ENERCON's rotor blade division.

The internal structure of the blades has also been redesigned, not least supporting optimised manufacturing processes. The

Nacelle components of E-92 exhibit for Hannover fair.

Picture to the right: Computer illustration of new ENERCON E-92 wind turbine.



GRP blades are manufactured using the same successful half shell design and vacuum infusion method used for the E-82 rotor blades. The diameter of the connection flange with the rotor hub is also the same. Other new features include optimised details for greater ease of transport and faster installation.

The E-92 is rated as wind class IIA turbine. The biggest change in the E-92 compared to the E-82 is its greater efficiency. Compared to the E-82/E2 2.3 MW, the E-92 produces 10 to 15 percent more energy yield. According to ENERCON Sales Director Stefan Lütkemeyer, the new machine is the logical next step to follow the E-82: «The new E-92 will definitely defy one or another wind turbine with 100 metre rotor diameter of our competitors.»

An important reason for designing the E-92 was that ENERCON is focusing more and more on less windy sites located far inland. «The E-92 is also a response to the ongoing development of the onshore wind energy market,» says Lütkemeyer. The new machine complements the product portfolio between the E-82 and the E-101, providing ENERCON customers, sales, and project planners with more configuration options for future wind energy projects. In the class between 2 and 3 megawatts, they can now choose from among the E-70, E-82, E-92 and the E-101. The E-92 is available with hub heights between 85 and 138 metres. 🚧

■ INFO E-92

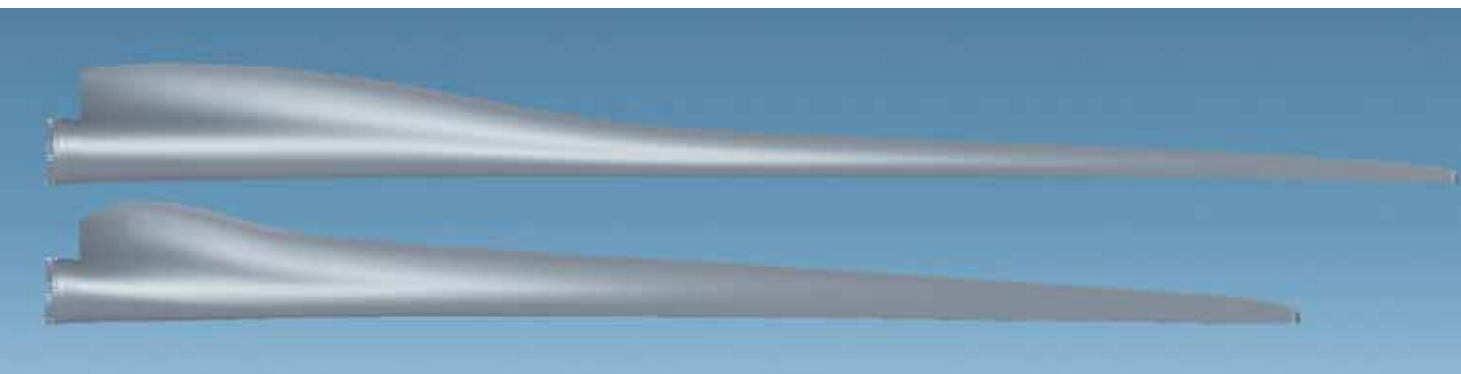
Rated power: 2,350 kW

Rotor diameter: 92 m

Hub height: 85 m / 98 m / 104 m / 108 m / 138 m

Wind class (IEC): IEC/EN IIA

WEC concept: gearless, variable speed, single blade adjustment



E-92 (above) and E-82 rotor blade in comparison: ENERCON designed a new aerodynamic profile to achieve optimum load distribution and higher energy yields.



Interview: ENERCON Managing Director, Hans-Dieter Kettwig

Well-positioned for expansion onshore

The development of wind energy on land is a major contributing factor to achieving an energy change. ENERCON is well-prepared, explains Hans-Dieter Kettwig in an interview.

WINDBLATT: What role does onshore wind energy play in achieving the energy objectives set by the German government?

Hans-Dieter Kettwig: Wind energy on land is the major contributing factor to the energy change. No other form of renewable energy is so predictable and comparatively quick to realise than onshore wind energy.

WINDBLATT: What are the opportunities for expanding wind energy in Germany, in particular much further inland?

Kettwig: Germany still has a lot of potential for developing wind energy. This is particularly true for central and southern Germany where demand has increased due to improved framework conditions brought about through political changes. With ENERCON's efficient turbine technology and options to choose higher hub heights, there are still a lot of locations where profitable and cost-effective onshore wind energy can be developed. Another essential factor is that with the current framework conditions, onshore wind energy is capable of making a decisive impact on the energy change in the medium term.

WINDBLATT: How prepared is ENERCON for expanding wind energy onshore?

Kettwig: ENERCON is very well-armed. Our turbine technology is reliable and the E-82 as well as the recently introduced E-101 are excellent models for sites with slightly less wind. And with the new E-92, customers will have yet another efficient wind turbine to choose from. This machine is equipped with yield optimised rotor blades and is designed for Wind Class IIA so it is also an interesting option for onshore wind projects.



ENERCON
Managing Director
Hans-Dieter Kettwig.

WINDBLATT: How important are the political framework conditions for the advancement of wind power?

Kettwig: Dependable framework conditions are the key factor in realising wind projects. They guarantee investment security and ultimately contribute to securing existing jobs and creating further employment in our sector. An outstanding example of this is the German Renewable Energy Sources Act (EEG) which has given a boost to renewable energies, especially wind energy, and has proven to be an excellent dissemination instrument. Site-based feed-in tariffs guarantee the chance for the expansion of wind energy onshore and at the same time avoid the windfall gain effect at top sites.

— Dependable framework conditions vital —

WINDBLATT: What would be the consequences if this energy policy were to change direction?

Kettwig: If we turn away from the current policy, it would be nearly impossible to attain the necessary objectives set for renewables because investors and financiers need a certain initial security before they commit to something. It would also considerably hold up other wind projects and that is definitely not the intention of politics and the people. ❌

Renewable energies in Europe

Reliable framework conditions needed

Slow permit-granting procedures, a lack of investment protection, and a continuing debate about harmonisation are putting in jeopardy the European goals for renewable energies.

The wind energy industry should be full of hope. Wind energy is the most cost-efficient renewable energy with huge potentials at inland sites, and it lends itself to quick expansion. Yet the mood on many European markets is muted, primarily because of the uncertainty of the political framework conditions. Without a strong push for more wind energy at inland sites, many countries and the EU as a whole will not be able to reach their goals for 2020.

Long-term, stable political framework conditions are essential for the continuing development of wind energy. Most European countries therefore rely on feed-in tariffs similar to the German Renewable Energy Sources Act.

— Political support declining —

A purchase guarantee for the electrical power in combination with a long-term remuneration is what makes the feed-in tariff a success. For a long time, Spain played a pioneering role in developing wind energy thanks to a feed-in tariff remuneration system. However, the current uncertainty about how the legal situation will continue after 2012 has been a major roadblock to further expansion. The planning period required for wind projects is currently longer than the timeframe of the law. But without applicable laws, investors lack protection for their investments.

The Polish market is also slow to grow, in spite of high potentials and a remuneration system that ought to be favourable. Long-winded and time-consuming permit procedures present obstacles to quick expansion. This is compounded by an investment uncertainty caused by a remuneration system using quotas in combination with tradable certificates. And even this already unreliable incentive scheme is put further in question by an on-going debate about a ceiling for the overall remuneration volume.

In combination, these factors mean that the level of investment still lags far behind the potential this market has to offer.

At the European level, too, the political tailwind has weakened – which is particularly hard to understand in view of the binding targets for developing renewable energies by 2020. At this level, it is the recurring discussion about harmonising national incentive schemes that is causing uncertainty. In recent months, EU Commissioner for Energy Günther Oettinger in particular has placed this goal high up on the agenda. However, the concept of harmonisation, based for example on quota models, runs counter to a decentralised and renewable energy supply system that boosts the economy at the regional level. In addition, there are only a few countries where quota systems have led to any dynamic growth of installed power – many good reasons not to push for a system change. Instead, the promotion of renewable energies should remain in the hands of the individual countries. It is at this level that the best decisions concerning locations and remunerations can be made and deadweight effects be avoided. Only decentralised projects allow local communities to benefit from wind farms and other renewable energy facilities, as is already the case in Germany.

It is therefore urgent that the European Commission abandon its harmonisation initiative, and governments should agree on stable political framework conditions. This is the only way to ensure an efficient growth of the wind energy sector and thus to reach the political goals and restructure the energy supply system. ❌

Darzyno wind farm in Poland. There has been a tangible decline of political support for renewable energies in some EU countries.





Wind energy is the backbone of the energy change – no other form of renewable energy is as predictable and comparatively quick to realise and at the same time as cost effective.

Renewable energies and power price debate

Argument distorts focus on energy revolution

Political discussions throughout Europe are dominated by reports about the high costs of renewable energies which are allegedly to blame for rising power prices.

When the EU decided two years ago to transform the energy system, the response from the member states was predominantly positive. But today, more and more critical voices are heard. The euphoria about the new focus on renewable energies has been replaced by worries about rising power prices, allegedly caused by the costs of renewable energies, and about the additional drain on public finances that are already strained. But aside from the fact that this conclusion is incorrect, the debate about costs also distorts the view of the opportunities the energy revolution brings.

The simplest proof that renewable energies in Germany and Europe are not to blame for rising industrial power prices: Large consumers do not actually have to pay the levy for renewable energy promotion. Instead, the German Renewable Energy Sources Act (EEG) introduced significant exemptions for energy-intensive industries. That means that large consumers no longer

have to contribute to the energy revolution but still benefit from the lower price at the electricity exchange – a price which is after all significantly mitigated by wind, solar, et al.

At the German energy exchange, this so-called merit order effect is visible every time a stormy weather system passes over the country: If a lot of wind power is injected into the grid, the price for electricity at the Leipzig exchange drops. In 2009, this price-lowering effect amounted to 0.6 ct/kWh, meaning a total of 3.1 billion euros for all of Germany. This in itself provides savings for the energy-intensive industries that are greater than any costs they would incur due to the EEG levy, since more than 90 percent of the power price paid by energy-intensive industries is determined by the power acquisition costs which in turn are tied to the electricity price at the exchange. For this reason, the position of German companies in international competition is mainly affected by the development of the wholesale prices.

In addition, energy-intensive companies that consume more than 10 GWh of power or where the share of energy costs of the gross value-added exceeds 15 percent are charged a reduced EEG levy of 0.05 ct/kWh – meaning they can enjoy almost the entire benefit of the price mitigation.

The renewable energies themselves however do not benefit at all from their role as price busters at the electricity exchange. That is because currently, the EEG levy – the proportional amount that is added to each kilowatt-hour of electricity sold – is calculated by comparing the average EEG feed-in tariff with the average price at the exchange. The price-mitigating effect is neglected in this calculation – instead, the difference between the profits from exchange trading and the EEG feed-in tariff makes the renewable energies appear particularly expensive. Just how skewed this calculation is becomes particularly obvious when considering the feed-in curve of photovoltaic energy: It always peaks around noon when the sun is highest in the sky. At the same time, the demand for electricity also peaks because commercial and institutional kitchens as well as private households start using their electrical appliances to prepare hot meals. In the past this used to cause considerable pricing spikes around noon; these have been largely levelled because the high demand is now met with a significant supply of solar power. Even this huge savings effect is not considered, however, because the cost calculation simply compares the price at the exchange and the EEG feed-in tariff.

Macroeconomic effects are overlooked

Macroeconomic effects are another factor that is left out in the added-cost calculation of renewable energies – and these effects are quite significant. According to calculations by the German Institute for Economic Research (DIW), new investments into renewable energy plants rose to 26.6 billion euros in Germany in 2010. In total, plant operation and maintenance as well as exports boosted demand in the German economy to the tune of 35.5 billion euros. The positive effects for the economy were also visible in the number of people employed in the German renewable energy sector. This figure rose from about 340,000 in 2009 to about 370,000 in 2010. According to a study conducted by the Institute for Ecological Economy Research, the construction and operation of renewable energy plants in 2010 boosted the economy for local communities by 10.2 billion euros in the shape of company profits, incomes, and municipal tax revenues.

And thanks to renewable energies, Germany is gaining more and more independence from coal, natural gas, and oil. In 2010, renewable energies replaced imports of fossil fuels of about 6.7 billion euros; out of these, 2.5 billion euros in the electricity sector alone. 🇩🇪

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Transport of WEC components through the Canadian tundra.

Special logistics project in Canada

Heavy loads travelled 400 kilometres on ice

ENERCON is installing four E-70 wind turbines for the Diavik diamond mine in North-western Canada. To get there, the components were transported via ice roads.

After the transport control centre gives the all-clear, the convoy of heavy-goods trucks slowly sets itself in motion. Truck after truck carefully rolls over the ramp onto the road. Their loads: Rotor blades for four ENERCON E-70 wind energy converters.

On the face of it, nothing special – ENERCON's logistics team runs countless such transports worldwide every day. But this transport through Canada's Northwest Territories is a first: The trucks will drive about 400 kilometres on ice. Their destination: Diavik, located 220 kilometres south of the arctic circle.

Diavik is one of Canada's largest diamond mines. It is located on an island, about 20 square kilometres in size, in Lac de Gras lake northeast of Yellowknife, the territory's capital. Diavik took up diamond production from open-pit mines in 2003 but plans to soon move to underground extraction of the kimberlite rock that contains the diamonds. The mine employs more than 1,100 workers and stated production figures of 3.1 million carats of rough diamonds in the first half of 2011 – roughly 0.62 tonnes.

In order to gain greater independence from diesel fuel – their only source of energy so far – mine owners Rio Tinto and Harry Winston Diamond Corporation decided to set up a wind farm on the island. Four ENERCON E-70/2.3 MW turbines with a total installed power of 9.2 MW are to reduce Diavik's diesel consumption by about four million litres per year. This corresponds to about 10 percent of the entire diesel consumption and would reduce the mine's CO₂ emissions by about 12,000 tonnes.

In realising this project, ENERCON is creating the first large-scale wind farm in the territory. And this included a first for ENERCON's logistics specialists, too. To get to Diavik, there is an airstrip on the island large enough for planes up to the size of a Boeing 737. But Diavik's lifeline for supplies and heavy-goods transports is the Tibbitt to Contwoyto winter ice road, the only road in this region, which exists only during the winter months and is usable till about mid-March. Every winter, road construction specialists prepare the ice road that crosses about 600

kilometres of Northern Canada's tundra for heavy-goods traffic. After the route has been cleared of snow, they continually pump water onto the surface until the «pavement» reaches a thickness of more than one and a half metres. ENERCON had never before transported wind energy converter components on this kind of road.

To be able to make optimum use of the time window for freight transports via the ice road, ENERCON Logistics had already shipped the E-70 components to Thunder Bay harbour in Ontario province last autumn. Once the ice road became usable early this year, the components continued their trip on the road via Edmonton and Yellowknife to Tibbitt Lake, about 60 kilometres east of Yellowknife, where the ice road begins, and then crossed the ice in multiple convoys.

Strict speed limits on the ice

The straight driving time to Diavik is 19 hours. This is due to the strict speed limits for heavy-goods trucks on the ice road enforced by the authorities. To prevent damage to the ice, fully loaded trucks may only travel at 25 km/h. At the transition points from ice to land, they must even slow down to a crawl. If the trucks drove any faster, they would create pressure waves beneath the ice which would cause cracks to form within the ice, or even make the ice layer burst.

How to deal with the transition points presented the greatest challenges for ENERCON's logistics specialists. En route to its

destination, the road crosses about 60 small islands. As the embankments were too steep for the rotor blades extending from the vehicles, the planners ensured that ice ramps with gentler slopes were put in place. In addition, the beginning of the ice road crosses a river. A bridge made from ice is specially constructed at this crossing. But since a truck carrying a generator would have exceeded the permitted total load by 20 tonnes, the generators had to be split in half and the halves loaded onto separate rigs.

At the end of the day, ENERCON's meticulous preparation paid off. Like other ENERCON transports, this one, too, reached its destination according to plan. Special cases like Diavik show the wealth of experience ENERCON can draw on when it comes to transporting their WEC components, says Mathias Moser, ENERCON Logistics Manager: «We are well prepared for any kind of special project.»

For most ENERCON projects, component transports are timed in close sequence with foundation construction and installation work. For Diavik, however, project planning had to use a different approach. After the components arrived on the mine's premises, they were first put into storage. Due to the harsh Canadian winter with temperatures up to 40 degrees below freezing, foundation construction and installation of the E-70 machines will not start until summer. By that time, the sun will long have melted the ice road, and the unusual highway across which the components travelled to their destination will have disappeared without a trace. 🚚

Giant holes in the snow: The large open-pit mines at Diavik are highly conspicuous from the air; this is how the diamonds are currently being extracted.



Multi-megawatt turbines under construction: ENERCON E-126/7.5 MW at WKA Project.

Werder-Kessin-Altentreptow Project/Mecklenburg-West Pomerania

First section for WKA wind project completed

Four ENERCON E-126 and five E-82 turbines already installed. Eleven E-126 and eight E-82 machines are yet to follow in the 140 MW wind farm.

The «Werder-Kessin-Altentreptow» (WKA) project is without a doubt one of the most ambitious wind farm projects in Germany – and one of the largest. ENERCON is installing a total of 15x E-126/7.5 MW and 13x E-82/2.3 MW machines for their customers, WIND-projekt, at a site in the district of Demmin north of Neubrandenburg (Mecklenburg-West Pomerania). The 140 MW wind farm is designed to provide 125,000 households with green energy. This corresponds to the energy demand of roughly 15 percent of all household in the northern German state. At the same time, WIND-projekt is also installing a wind-to-hydrogen fuel cell system to make use of any surplus wind

energy. In order to provide on-the-spot service and maintenance, ENERCON is also setting up a new Service station in Altentreptow. This station will be looking after servicing the turbines in Mecklenburg-West Pomerania. The first phase of the overall project has already been completed.

ENERCON installed four E-126/7.5 MW and five E-82/2.3 MW during this phase. «The project went smoothly and everything was completed right on schedule,» reports ENERCON project manager, Robert Boldt. This is a major feat, as the work was quite extensive. «It's a turn-key project», explains Boldt. ENERCON was in charge of the entire infrastructure, preparing hardstands for the cranes, building the access roads, installing the turbines, as well as commissioning and connecting the machines to the grid.

A lot of the work was being done simultaneously so the site was buzzing. «There were days when more than 100 workers

were on site and five giant cranes were operating at the same time for both tower installation and hoisting the machines onto the towers,» says Boldt. This meant that the installation teams and contractors (mainly local firms) had to be well coordinated. Furthermore the preparatory efforts of the customer – for instance where building permits and grid connections are concerned – were exemplary.

The logistics also had to be meticulously synchronized. Fortunately, the conditions for transporting the huge WEC components to the site were next to ideal. «The motorway exit is in close proximity to the site so for the trucks access was easy,» Boldt explains. Any problems occurred were solved with the authorities in an exemplary manner.


Meanwhile, the administrative building and service buildings which will be ENERCON's future Service and Tower Erection support centre were built by WIND-projekt. «ENERCON has already moved into the facilities and will be creating up to 50 new jobs which will bring the total number of employees up to approximately 250 persons in Mecklenburg-West Pomerania. For the North East region, ENERCON has become a significant employer,» reports Klaus Uhl, ENERCON Sales Manager for the North East. WIND-projekt also supplied a 110 kV transmission substation for the project. And ENERCON will be building an additional 380 kV substation during the second construction stage. In this project phase eleven more E-126 and eight further E-82 machines are to be erected.

Close collaboration

The customer is very satisfied with the progression of the project and work with ENERCON. «So far we are very pleased with the course of the project,» says Marcus Heinicke, Head of Department at WIND-projekt. «We are a well-oiled team and that makes for excellent collaboration.» For the project planners WKA is a unique project. «The project emanates a special energy. This is more than just planning a wind farm,» explains Heinicke. Some of the special challenges of this project are its vastness and the size of the multi-megawatt turbines. Another particularity is incorporating the hydrogen fuel storage cell in the system. «We hope to gain new knowledge on how we can improve the utilisation of the wind farm's grid capacity.»

While WIND-projekt is in charge of the actual storage cell system, ENERCON is responsible for contributing its know-how on integrating the wind turbines. ENERCON has extensive

experience in this field with its own stand-alone pilot projects and has already developed efficient control and integrations systems.

By integrating an energy storage system in the wind farm, WIND-projekt wants to be able to provide wind power at any time and as required. To do so, a 1 MW electrolyser transforms surplus wind energy into hydrogen which is stored in fuel cells. If, for example, more electricity is required than is being produced by the turbines on days with little wind, the hydrogen is burned off in a combined heat and power plant. According to WIND-projekt, the test plant will be able to cover the energy demand of the entire wind farm during low wind periods without any CO₂ emission. 



Rotor blade assembly on ENERCON E-126 turbine at WKA Project.



Picture: Oliver Heckmann

Gravel for East Frisia: e.g.o.o. carrying the first third-party loads in its new bulk freight cars which like the engines are painted in ENERCON's typical shade of green.

e.g.o.o. mbH offers new transport service

ENERCON railway carries goods for external companies

e.g.o.o. mbH plans to open up new business opportunities with goods transports for third parties. The railway cars will be added to the regular trains.

ENERCON's railway division is expanding its line of business. In addition to goods transports for ENERCON, railway operator Eisenbahngesellschaft Ostfriesland-Oldenburg (e.g.o.o.) mbH is now offering freight carrying to external companies. With this move, e.g.o.o. hopes to open up new business opportunities and at the same time increase the utilisation of its trains. Weekly gravel transports to East Frisia make the beginning.

Carrying freight for ENERCON will continue to form the «base load» of e.g.o.o. railway transports, according to e.g.o.o. business manager Ursula Vogt. In addition, the ENERCON railway operator offers single-car transports to external companies. For this service, the freight cars are taken to the nearest e.g.o.o. traffic junctions and then attached to the trains that run regularly between the transport hubs in Emden, Magdeburg, Hamm, and Ummendorf. Feeder transports to and distribution transports from the e.g.o.o. junctions are carried out by regional railway operators cooperating with e.g.o.o. If any of these transports cannot be carried out by train, lorries from cooperating haulage companies are used.

e.g.o.o. offers its customers a complete solution and takes care of the entire coordination and completion of the transport to its final destination. «We think there is a market for single-car transports,» says Ursula Vogt. e.g.o.o. found that customers with a small number of single cars are looking for a transport service that is flexible, fast, and reliable. «Our goal is to provide a reliable service,» says Vogt. The company's own flexibility and its own stable railway network provide e.g.o.o. with a great competitive edge; in addition, the company has great competencies when it comes to transporting heavy or abnormal loads.

e.g.o.o. offers reliable service

Currently, e.g.o.o. makes the trip between Emden/Aurich and Magdeburg up to six times a week. There are two weekly trips between Emden/Aurich and Hamm, and one weekly trip between Emden/Aurich and Ummendorf. A greater utilisation could mean more frequent trains on these routes. In addition, e.g.o.o. has started talks with other regional railway operators with the goal of setting up a transport network covering all of Germany. And the company is also looking across the borders: Once the ENERCON concrete factory currently under construction in France is connected to the railway system and receives freight transports by train, it may very well be possible to offer external companies freight carrying services to this neighbouring country. 🇫🇷



Location with excellent wind conditions: Kedros wind farm with six ENERCON E-82/2.3 MW.



Picture: Eunice Energy Group

ENERCON in Southeast Europe

First E-82 wind turbines installed in Greece

ENERCON commissions six E-82/2.3 MW turbines in Central Greece (Viotia) for the Eunice Energy Group – an exemplary project from start to finish.

Yet another site in Southeastern Europe was added to the map of E-82 locations around the world. ENERCON has installed and commissioned the first E-82 WECs in Greece. Installed for the Eunice Energy Group, the Kedros wind farm is located in Central Greece in the Prefecture of Viotia.

According to Frank Hensel, ENERCON sales representative for Greece, the project went extremely well despite the current economic difficulties in Greece. «ENERCON is committed to the Greek market,» confirms Hensel. «The wind conditions in Greece are excellent and the country still has a lot of potential

for wind energy,» says Hensel.

Work on the Kedros Project with the Eunice Energy Group was very pleasant for ENERCON. «Collaboration was outstanding,» praises Frank Hensel. The customer had already done a commendable job of planning as well as obtaining permits and financing for the wind farm. These are excellent conditions for prospective projects. «We are looking forward to cooperating in further projects.»

The recently commissioned wind farm is situated approximately 16 kilometres west of Livadia in an area touching on the communities of Distomo, Arachova and Antikyra and the aggregate rated power of the six E-82/2.3 MW turbines is 13.8 MW. Based on favourable wind conditions, the site perched at an altitude of 680 metres above sea level is expected to generate an annual yield of 27 gigawatt hours according to the operator's estimations – enough energy for up to 6,700 households. 🇬🇷

WINDBLATT

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