ENO 114

3.5 MW

enovation for efficiency

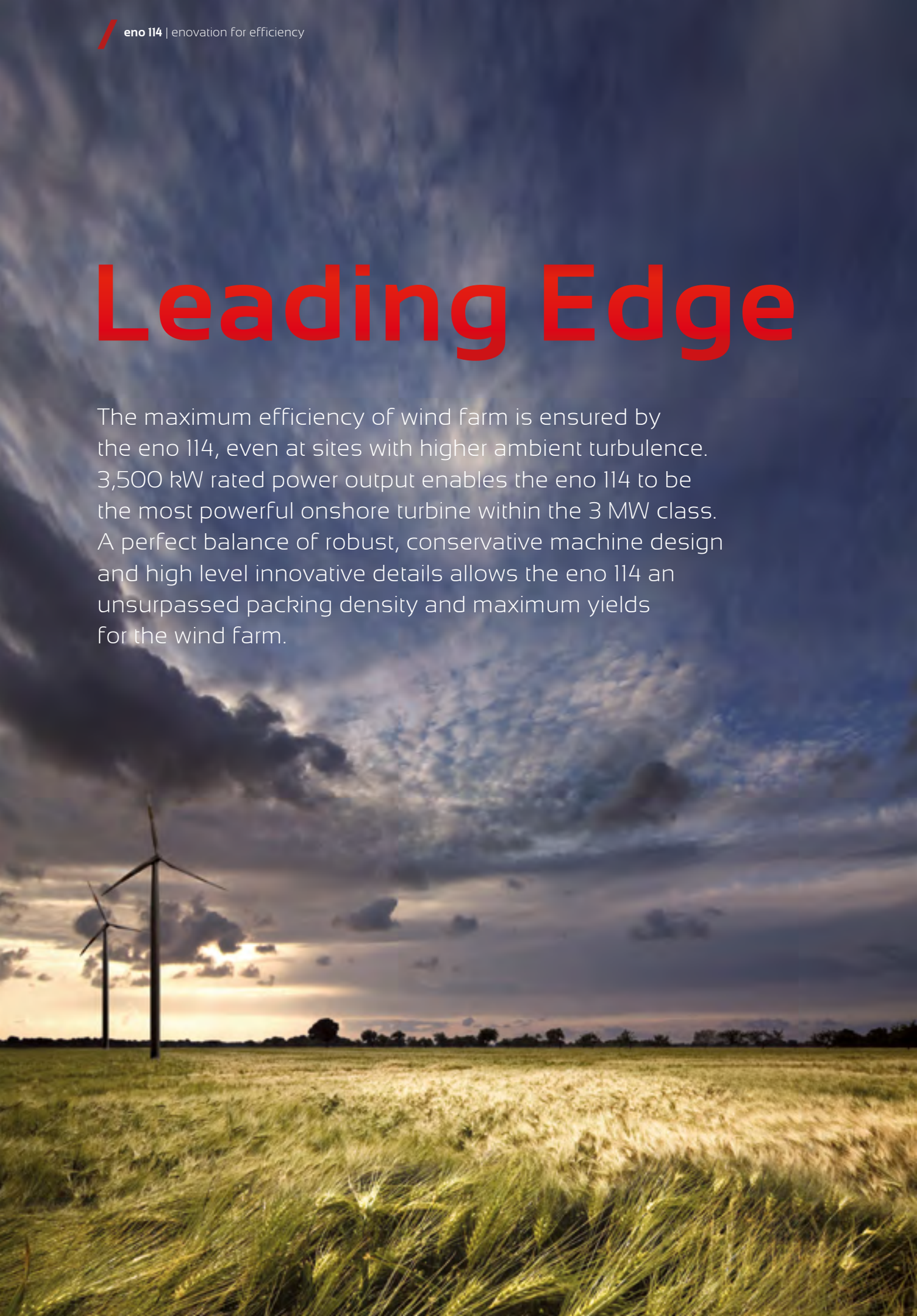
ENO ENERGY

Success with wind.

www.eno-energy.com

Leading Edge

The maximum efficiency of wind farm is ensured by the eno 114, even at sites with higher ambient turbulence. 3,500 kW rated power output enables the eno 114 to be the most powerful onshore turbine within the 3 MW class. A perfect balance of robust, conservative machine design and high level innovative details allows the eno 114 an unsurpassed packing density and maximum yields for the wind farm.



Sophisticated technology for high efficiency

Optimised yield

The eno 114 sets new standards in terms of the wind farm efficiency thanks to **eno.upsite®**. With the **eno.blade®** technology the rotor blades are specially designed for wind farm operation. In combination with a turbulence-resistant design of the bearing structure and drive train components, spacing between the individual wind turbine can be minimised and sectoral shutdowns can be reduced. The result is a maximum benefit of given space within a wind farm.

High availability

97%

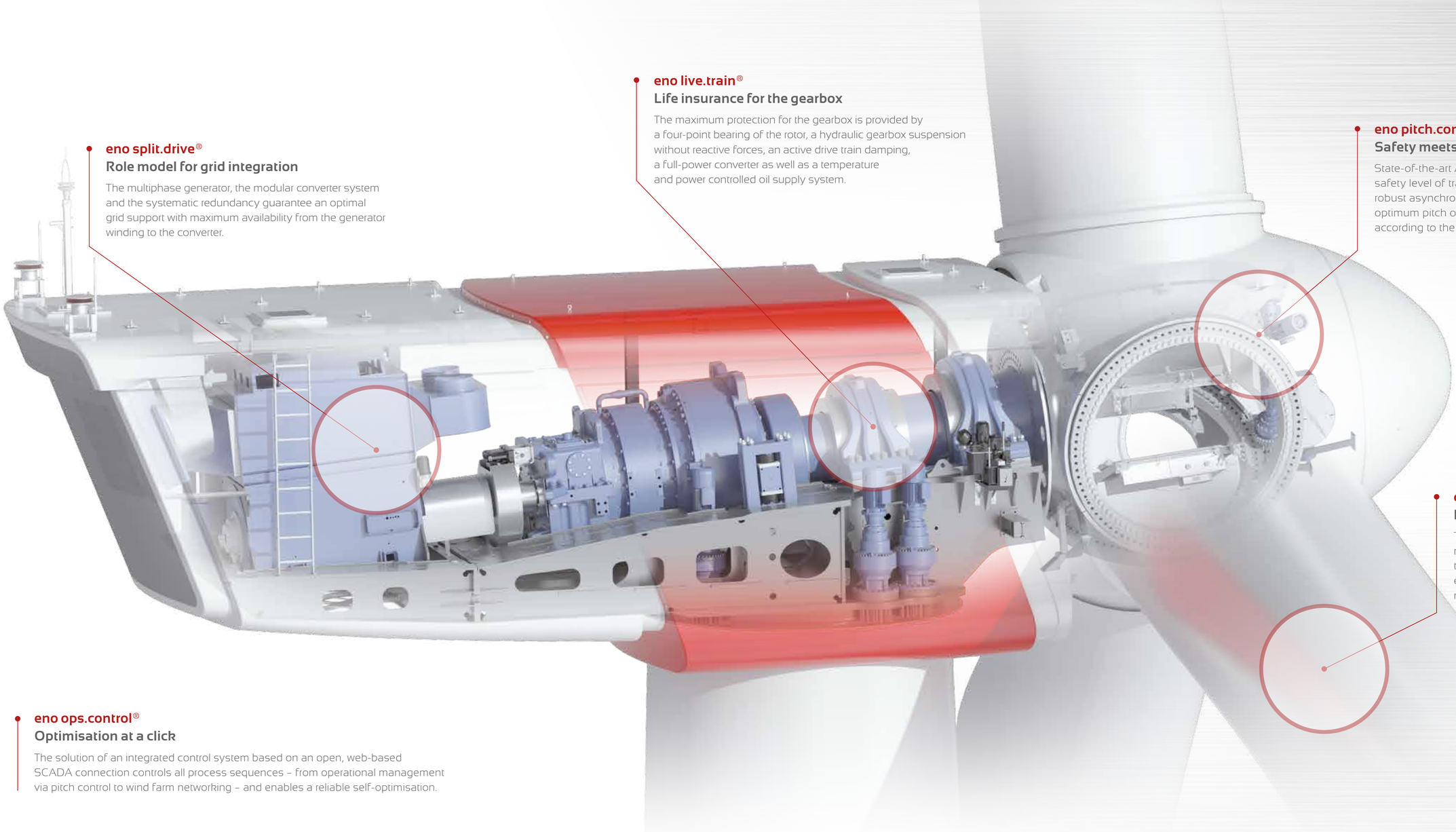
The **eno live.train®** concept guarantees maximum reliability and durability for all drive train components of the eno 114: A unique four-point bearing of the rotor and a hydraulic gearbox suspension keeps the gearbox free of reactive forces to assure maximum protection. In addition, a redundant configuration of cooling and converter systems ensure full operability of the turbine even at a subsystem failure.

Excellent grid characteristics

With its well proven combination of a brushless synchronous generator and a full-power converter the eno 114 handles grid faults smoothly and reliably. The wide reactive-power range underlines the excellent grid compatibility of the turbine regarding flicker and harmonics without a need of any additional filters or compensation systems. With these characteristics the eno 114 can easily meet all standard grid connection requirements.

Complete service

Undisturbed operation, high productivity and reliable yields: To ensure these benefits sustainably eno energy offers a comprehensive service and after-sales programme. The flexible full-maintenance concept – **eno complete.care®** – provides a permanent supervision of the machines, including condition monitoring. Highly qualified on-site service technicians ensure smooth and trouble-free operation of the wind farm. In this way the operating costs can be calculated for long term. Thus, the availability is guaranteed at a high level.



eno split.drive®
Role model for grid integration

The multiphase generator, the modular converter system and the systematic redundancy guarantee an optimal grid support with maximum availability from the generator winding to the converter.

eno live.train®
Life insurance for the gearbox

The maximum protection for the gearbox is provided by a four-point bearing of the rotor, a hydraulic gearbox suspension without reactive forces, an active drive train damping, a full-power converter as well as a temperature and power controlled oil supply system.

eno pitch.control®
Safety meets efficiency

State-of-the-art AC drive technology meets safety level of traditional DC systems. The robust asynchronous motors ensures the optimum pitch of the rotor blades at all times according to the latest safety guidelines.

eno blade®
Efficiency redefined

The pioneering rotor blade design minimises loads and maximises the turbulence resistance to achieve an extraordinarily high efficiency and maximum profit of the wind farm.

eno ops.control®
Optimisation at a click

The solution of an integrated control system based on an open, web-based SCADA connection controls all process sequences – from operational management via pitch control to wind farm networking – and enables a reliable self-optimisation.

Optimised efficiency for wind farms

Technical specifications eno 114 3.5 MW

General

Type	eno 114
Rated Power	3,500 kW
Cut-in wind speed	3 m/s
Rated wind speed	13 m/s
Cut-out wind speed	25 m/s
Tilt angle	5°

Rotor

Diameter	114.9 m
Nominal speed range	4 - 11.8 rpm
Swept area	10,369 m²

Rotor blade

Manufacturer	eno energy
Material	GRP
Length	56.0 m

Gears

Model	Planetary-/spur gearing
Gear ratio	approx. 1:119

Generator

Type	Synchronous generator
Design	slip ringless / brushless excitation

Tower (hub height)

92 m; 127.5 m; 142 m

Converter

Type	Full power converter
Model	Modular IGBT inverter topology

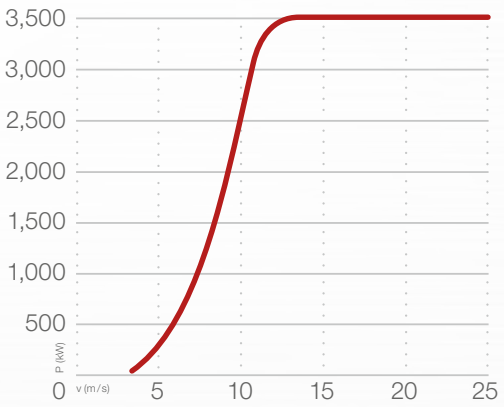
Sound power level

calculated (Mode 0)[1]	105 dB(A)

Wind class

Wind class according to IEC	IEC IIs[2]
Wind zone according to DIBt	WZ 4, GK2

Power curve eno 114



Annual energy yield[3]

v_w, hub height	eno 114
6.0 m/s	8,291 MWh/a
6.5 m/s	9,768 MWh/a
7.0 m/s	11,202 MWh/a
7.5 m/s	12,568 MWh/a
8.0 m/s	13,847 MWh/a
8.5 m/s	15,031 MWh/a

Reference yield according to FGW TR 5

Hub height	Reference yield in kWh
92 m	50 058 416
127.5 m	54 644 823
142 m	56 052 155

[1] noise-reduced operation modes available on request

[2] Advanced turbulence classification for more compact wind farm layout

[3] annual energy yields valid for k=2.0 (Weibull distribution)

Efficient wind farms. For a clean future.

It is our goal to make wind energy more efficient. Economic success of renewable energies and growing importance of climate protection go hand in hand. eno energy has already planned and installed a large number of wind farms all over Europe. With this experience we have designed the 2 and 3.5 MW platform to achieve maximum output out of the wind farm. Therefore we offer the most efficient solution for each location.

Contact: sales@eno-energy.com

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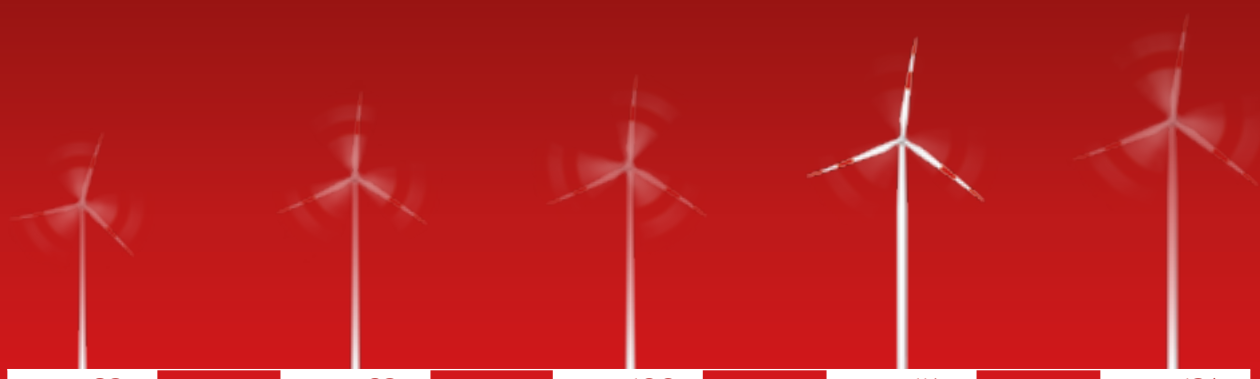

eno 82	eno 92	eno 100	eno 114	eno 126
2.05 MW IEC IIa	2.2 MW IEC IIIa	2.2 MW IEC IIIa	3.5 MW IEC IIs	3.5 MW IEC IIIs

eno energy systems GmbH
Am Strande 2 e . 18055 Rostock . Germany
phone: +49 (0)381 . 20 37 92-0
fax: +49 (0)381 . 20 37 92-101
mail: sales@eno-energy.com
www.eno-energy.com

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