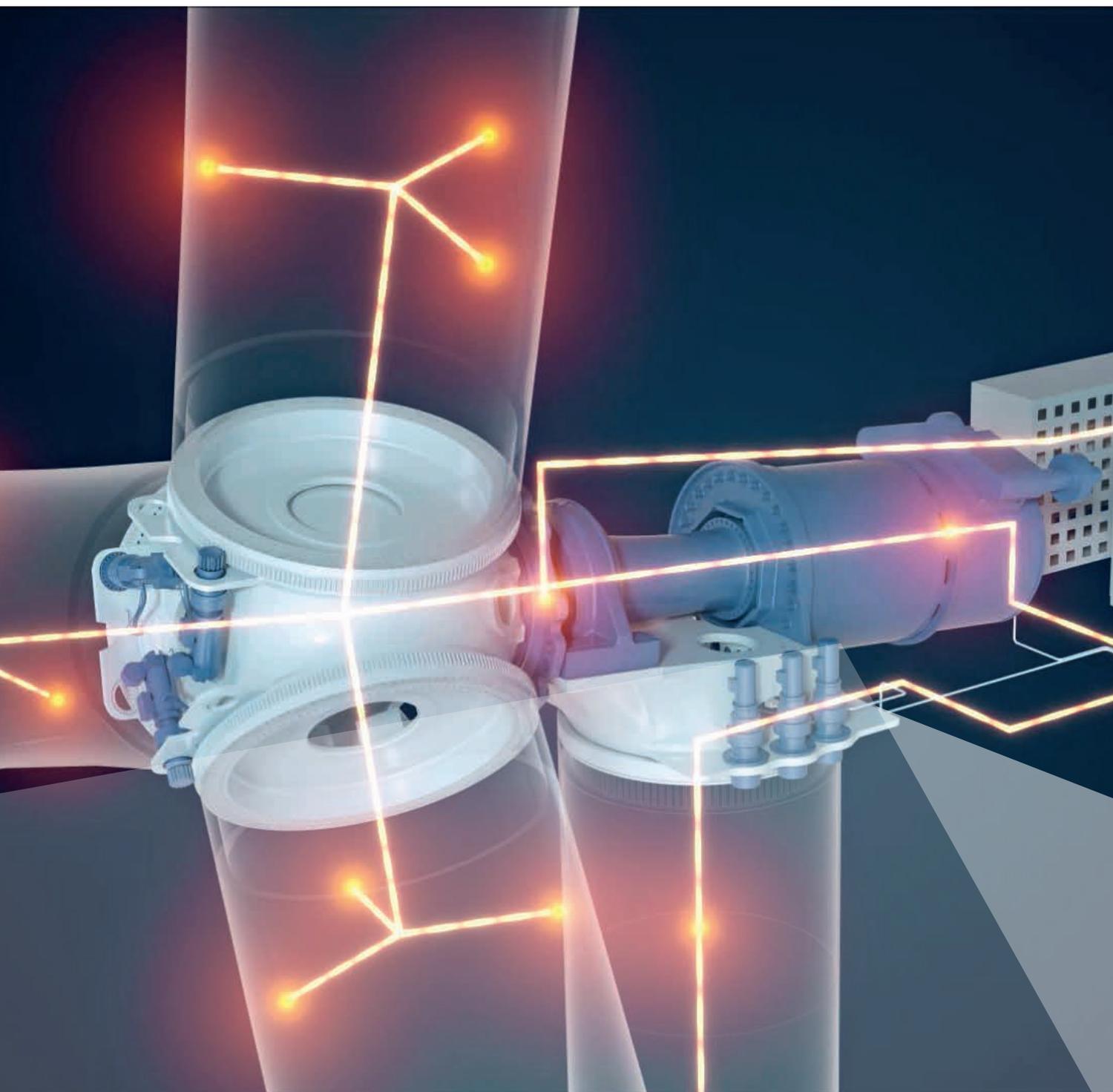


Blade Load Sensors as Standard

# IN SEARCH OF LOWER POWER GENERATION COSTS



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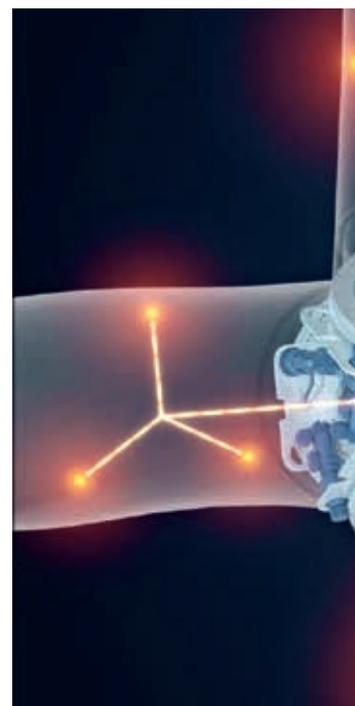
The construction of competitive wind turbines is becoming increasingly challenging. Development specialists at engineering firm bewind are convinced that accurate blade load measurement can offer significant advantages. bewind uses the Bachmann CLS cantilever sensor to reduce fatigue, extreme loads, and vibrations across wind turbine fleet of an international corporation.

bewind's goal is to develop wind turbines with the highest possible energy yield and lowest levelized cost of energy (LCoE). As experienced developers, they understand the need to consider the entire value chain. Dr. Joachim Tischler, General Manager and project manager for turbine development, explains: "In addition to the cost of components, we also consider numerous other factors during development, such as efficiency and failure probabilities – right through to transport logistics and service concepts."

## Improved Plant Efficiency

For turbine cost optimization, bewind requires a standardized solution for reliable blade load measurement. "The highly competitive nature of the wind power industry, particularly in recent years, has led to a significant reduction from turbine manufacturers in material usage per kilowatt of installed power. As a result, structures in both the blade and tower areas are becoming softer, and are operating much closer to technical design limits. Vibrations and load changes must be controlled to ensure stable turbine operation throughout the entire service life, including under extreme conditions," says Dr. Joachim Tischler.

The company conducted extensive research to identify the most suitable sensor for its turbines. For Karsten Warfen, wind turbine developer and safety expert, sensor selection is crucial: "Ultimately, many algorithms and components depend on the measurement technology used. When we start talking about serial turbine production, you can't simply exchange technologies."



### Now as Standard

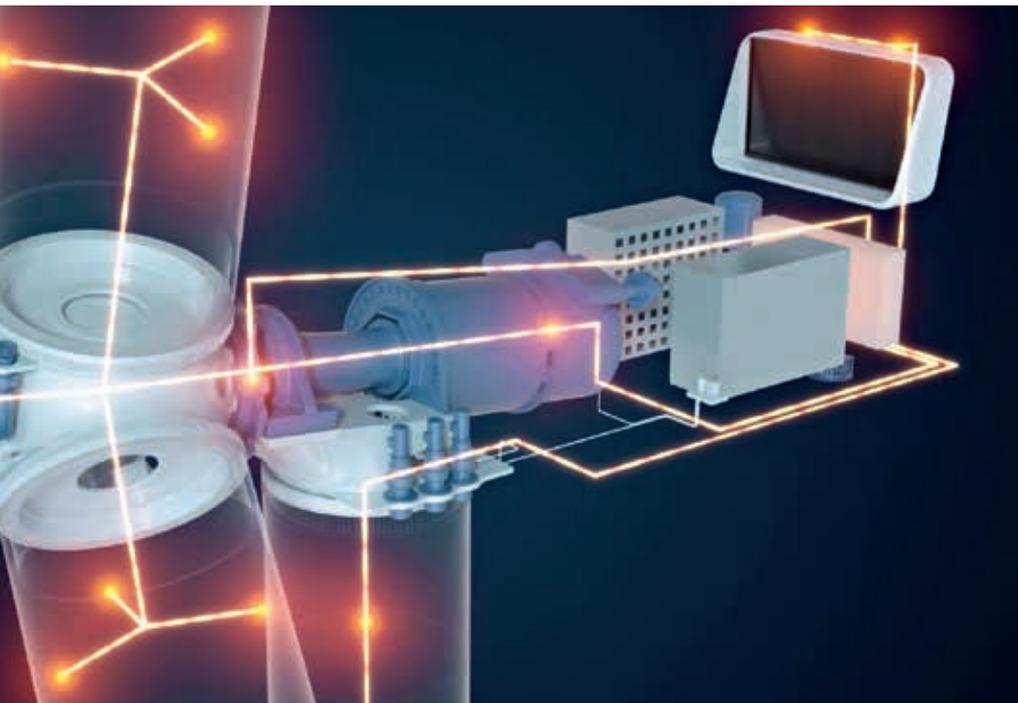
Future bewind turbines will include strain measurement integrated into the rotor blade as standard. New generation turbines, currently in development for the fleet of an international corporation, will all be fitted with the required sensors. For bewind, Bachmann's CLS and industry-proven measurement principle provide the ideal solution for recording blade elongation and associated loads. The easy-to-install sensor, applied directly at the point of load application, gives development specialists the necessary confidence in strain measurement and enables reliable turbine integration.

"Bachmann's strain measurement principle delivers very precise results and is extremely robust. The high-quality measurements allow the precise control of turbines, as well as operation closer to load limits," says Karsten Warfen.

### Reliable Load Statements

For reliable integration, developers rely on four sensors per blade – two edge and two flap sensors. CLS data is processed by the M1 controller with a SAI205 safety module and 4-20 mA interface connection. "We have had good experiences with the Bachmann M1 and safety modules in the past," confirms Karsten Warfen. And with SolutionCenter software, bewind is able to maintain an accurate overview of current blade load processes.

Joachim Tischler praises Bachmann's cooperation "They were very flexible and adapted the sensor design and the controller hardware to our exact requirements." Such flexibility is particularly important to smaller OEMs aiming to reduce LCoE through innovation, enabling them to compete with larger manufacturers. But the sensor also offers plant manufacturers and operators advantages when it comes to maintenance: As the sensors are installed directly at the blade root, repairs can be easily carried out whenever they are needed.



#### BEWIND GMBH

- The private company from Rendsburg, Germany was founded in 2019
- 28 employees with a total of more than 400 years of experience in the onshore and offshore sectors
- Develops competitive wind turbine and subsystem concepts for example for rotor blades and drivetrains. Their customer portfolio includes component and turbine manufacturers as well as wind farm operators and service providers

[www.bewind.de](http://www.bewind.de)

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