

Flender Unveils REVO: A Groundbreaking Drive Concept for Wind Turbines

- **Revolutionary torque density: REVO is the first drive concept to reach the benchmark of 300 Nm/kg.**
- **Lower energy production costs: Wind turbines can be built more compactly and efficiently or deliver greater output without increasing in size.**
- **Competitive edge by a global setup: Global engineering teams collaborate on a unique technological innovation.**

As the global wind turbine market will continue to grow in the coming years, the size and output of turbines—both onshore and offshore—are steadily increasing. Amid ongoing public and political debate about the future of energy supply, manufacturers in the wind sector are striving to enhance the efficiency of their systems and reduce the cost of wind energy. A major milestone in this effort is the introduction of REVO, a new drive concept launched today by German drive specialist Flender under its wind energy brand, Winergy. For the first time, a turbine drive has achieved the coveted threshold of 300 Newton meters per kilogram (Nm/kg) in torque density.

“With REVO, we are setting a new standard in wind power technology,” said Andreas Evertz, CEO of the Flender Group. “By increasing torque density, we boost efficiency while reducing material usage—making the wind industry even more competitive and sustainable.”

Efficiency Through Enhanced Torque Density

REVO is a validated design concept that offers 300 Nm/kg for new turbine developments. The result is a significantly more compact drive system. For the same power output, the required outer diameter can be reduced by up to 25 percent. Andreas Klein, Vice President of Drive Systems and Gear Engineering at Flender’s wind segment, explains: “Torque density—sometimes also named power

density—refers to how much torque a drive can transmit per kilogram of material. It's a key metric for the overall CAPEX of a wind farm.”

The compact gearbox design addresses several critical challenges in developing next-generation turbines and offers wide-ranging benefits. Transportation costs are reduced, and drive systems remain road-transportable—even for current and future turbine classes exceeding 8 megawatts. REVO's compactness opens previously inaccessible installation sites, accelerating wind energy deployment.

Reduced material usage also enables smaller, lighter nacelles and lowers the mass at the top of the tower. This, in turn, allows for cost savings in tower and foundation construction. Compared to gearboxes of the same power class in 2010, REVO enables a 70 percent reduction in CO₂ emissions thanks to its efficient use of materials. Additionally, the use of low noise journal bearings ensures compliance with European noise emission regulations and increases reliability.

A Collaborative Effort of a Global Team

REVO is the product of Flender's global setup and strong engineering capabilities. Flender creates a competitive edge by utilizing the close collaboration within its global engineering team. By advancing existing technological trends and introducing new gear materials, the team has created a unique prototype. Key element of this design is the unique combination of new technologies, that result in an unprecedented torque density. These include an optimized combination of planetary stages and gears per stage, as well as space-saving, noise-reducing second-generation journal bearings. Enhanced gear materials and induction hardening further improve drive reliability. Validated through extensive testing, REVO sets a new benchmark for torque density and represents a new generation of wind turbine technology.

“In recent years, we've already managed to double the torque density of our drives,” said Tommy Rahbek Nielsen, President of Winergy. “With REVO and the achievement of the 300 Nm/kg mark, we're unlocking even more possibilities for our customers—greater output in the same footprint, or more compact components without sacrificing performance and reliability. Together, we select the optimal technology package for each project.”

First Presentation at Winergy in Voerde

After the extensive validation and testing phase, the REVO design concept is currently on display at the Winergy facility in Voerde, Germany. “Its compactness

compared to previous drive systems is striking,” said Tommy Rahbek Nielsen. “The prototype is intended to inspire conversations with our customers as we work together to develop the best drive solutions for new projects. Our shared goal is to make wind energy as efficient and cost-effective as possible.”

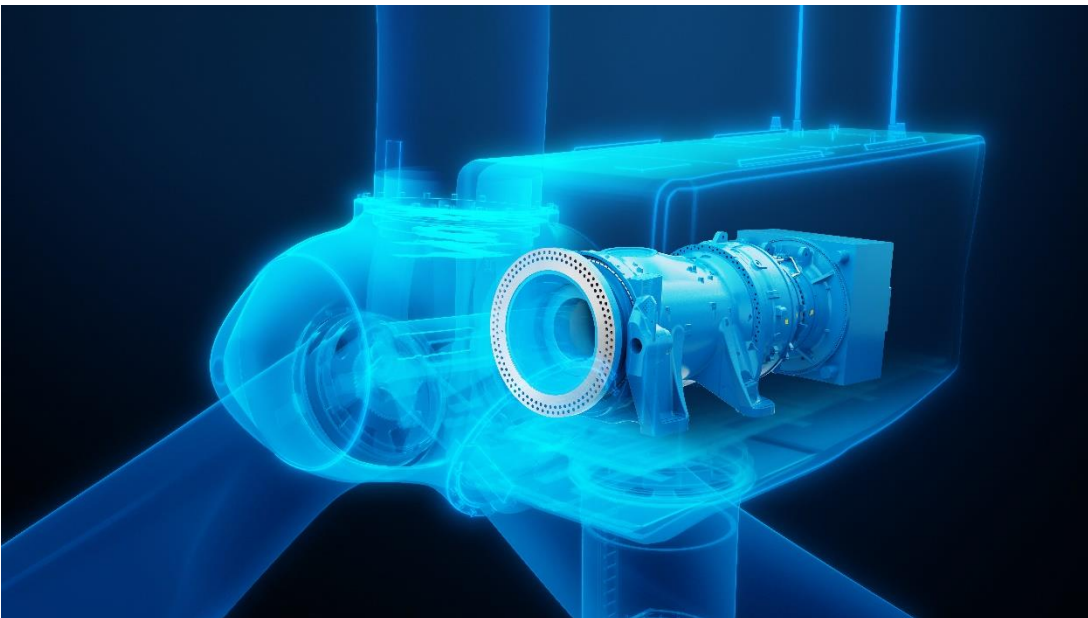
“With REVO, we offer a solution tailored to the demands of today’s and tomorrow’s wind energy projects,” added Flender CEO Andreas Evertz. “We’re proud to present this innovation—a step forward in securing the future of energy supply.”



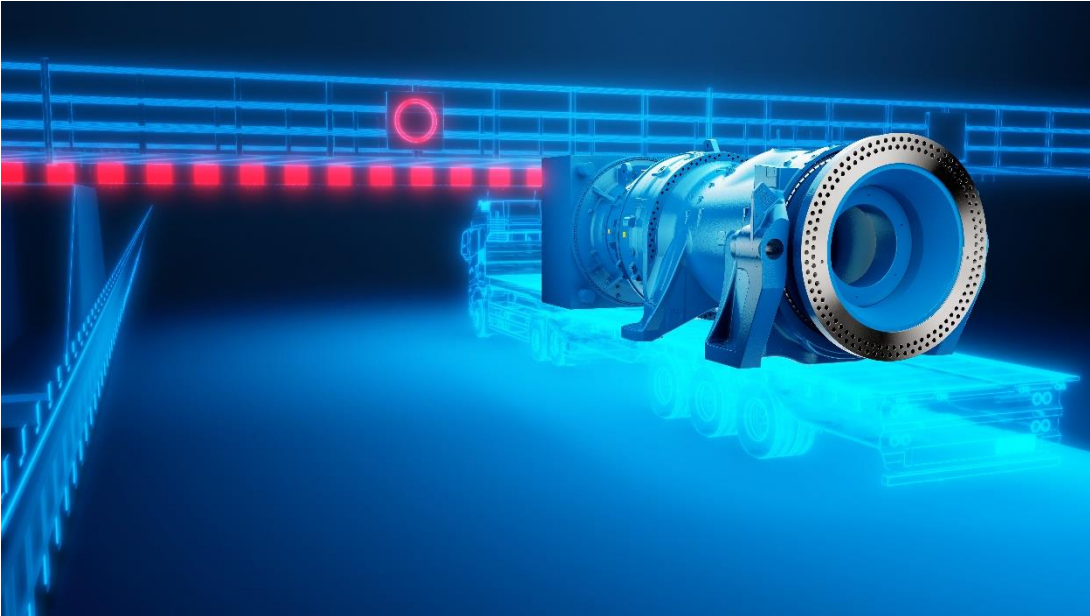
REVO sets new standards with a torque density of 300Nm/kg.



Second-generation journal bearings are part of the technology package.



The compact design reduces the design space required for the nacelle and thus the tower head mass of the turbine.



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Flender is a leading, tech-enabled provider for mechanical and electrical drive solutions, supplying highest quality, performance, and innovation for 125 years. The two product brands "Flender" and "Winergy" offer a wide range of gear units, couplings, generators, and associated services, focusing on key industries such as wind energy, cement, raw material processing, gas, power generation, water and wastewater, marine, cranes, and conveyor technology. With efficient drive solutions and a strong CSR focus, Flender is the partner of choice for a sustainable future. The renowned sustainability rating by EcoVadis ranks Flender among the top 1 percent of the most sustainable companies worldwide. Flender employs approximately 8,500 people globally. The company is headquartered in Bocholt, Germany. For more information, visit www.flender.com.