TECHNOLOGY IN ACTION

Building leadership in wind power

Orgalim's Technology in Action series showcases how the technology industries we represent are shaping a future that's good for Europe's economy and society – and how the right policy framework can help them do even more.

Challenge

Europe's wind industry is a European success story, but it is currently facing a unique mix of challenges, as European Commission President Ursula von der Leyen acknowledged in her 2023 State of the European Union address.

Although a record 16 GW were installed in 2022, according to the Commission, this pace is well below the 37 GW per year required to achieve the forecasted contribution of wind power to the EU's 2030 renewable energy target, now at 45%, following the Fit for 55 revision. To deliver that, Europe needs to strengthen and expand its wind supply chain. But the competitive headwinds are increasing and global market share is declining, notably in the face of price competition from China.

How to maintain European competitiveness and leadership in this increasingly competitive global wind turbine market and accelerate the energy transition in Europe?

Solution

If anyone can do it, it is ZF Wind Power, a world leader in the development, production and testing of gearboxes for wind turbines. The company has 23% market share in the worldwide geared wind market, powering more than 80,000 wind turbines and 150 million households worldwide. And it is tackling head-on the challenge of maintaining and building its leadership and competitive edge, while at the same time delivering the net-zero transformation.

Main photo: ZF Wind Power's plant in Lommel

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Dr Martin Knops, CTO, ZF Wind Power

How? Essentially in three ways, and advanced technologies are central to all three.

First and foremost is the product itself. Since 2016, ZF has offered a modular gearbox platform concept, called SHIFT, which thanks to standardised building blocks offers wind turbine manufacturers high flexibility in adapting wind turbine designs to changing market requirements, while reducing the Levelised Cost of Energy (LCoE). Essentially, it offers more flexibility, more compact designs and, increasingly, more torque to deliver more power per turbine.

Case in point, in 2020, ZF together with Vestas launched the most powerful onshore powertrain at the time, with a capacity of 6 MW. Just a few years later, the partners launched a new powertrain on the market with

ZF Wind Power delivers advanced gearbox solutions on a global scale

a torque level more than three times higher and 15 MW output. "With the development and production of the complete 15 MW powertrain, we prove we are actively preparing for the future," says ZF Wind Power CTO, Dr Martin Knops. "The evolution and dynamics in the wind market will require a whole new level of testing and validation of modular powertrains that will drive the new generation of wind turbines." The company is currently building a test facility capable of validating wind turbine powertrains up to 30 MW, in anticipation of the next generation of even more powerful powertrains which the team is preparing to produce in future.

Second is how the gearboxes are made. For new product designs, ZF uses advanced software to create a digital twin of the facility prior to setting up the assembly process, so that everything is virtually predefined, checked in 3D, optimised and validated. This enables swift integration of new processes in the existing manufacturing facilities. The aim is to offer fully modular production, complete powertrain testing, validation and pre-commissioning all under one roof. And to keep improving efficiency: ZF aims to reduce its Scope 1 & 2 CO_2 emissions worldwide by 80% by 2030 (versus 2019) and Scope 3 emissions by 40%.

Third, once in operation, the company's ZF Thrive smart service and predictive maintenance platform helps wind park operators, OEMs and other partners increase turbine performance and availability, extend their lifetime and reduce operational costs and hence the cost of energy.

Policy implications

To support its ability to compete and thrive, ZF Wind Power's top asks of policymakers include:

1. A competitive playing field: make full use of the trade instruments to ensure a level-playing field with non-European competitors.

2. Collaboration between Commission, Member States and industry to monitor challenges, exchange best practices and coordinate actions through an EU Wind Power Forum.

3. Financial support: Europe's wind industry needs substantial investments to expand and upgrade. Investment decisions need to be taken now, in order to keep pace with the REPowerEU ambitions.

4. Create a long-term outlook: improve the auction design, simplify the permitting procedures, and enhance the grid.

Related Orgalim position papers

- Delivering the Net-Zero Transformation
- Renewable Energy Directive
- Electricity Market Design

About ZF Wind Power

ZF Wind Power, based in Lommel, Belgium, is a worldwide, leading, technology-driven manufacturer and service partner in the global wind turbine gearbox industry. The company is leading the high-performance onshore segments with products of up to 8000 kNm and was the first to exceed 200 Nm/kg torque density in compact modular platform designs. It delivered the world's first offshore 9.5 MW wind turbine gearbox and delivered, in close cooperation with its partner, the first 15 MW complete powertrains for the offshore market. ZF has the largest global installed capacity of +8 MW offshore wind turbine gearboxes. Since it entered the wind industry in 1979, ZF Wind Power has delivered more than 80,000 gearboxes, powering as much as 180 GW, mainly high-performance, wind turbines, covering almost 25% of the total installed capacity of gear-driven wind turbines worldwide. Together with its partners, the company constantly invests in the wind market to empower a sustainable future.

zf.com

communications@orgalim.eu | www.orgalim.eu

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