



Press Release

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Breakthrough achieved in application of polyurethane resin in wind turbine blades

Covestro, Goldwind and LZ Blades develop world's first 64.2-meter full polyurethane wind turbine blade

- **The blade satisfies the demand for longer and stronger wind blades**
- **Full polyurethane blade cuts costs while increasing efficiency for wind power enterprises**

Materials manufacturer [Covestro](#) has successfully developed the world's first 64.2-meter wind turbine blade made completely of polyurethane. The blade, made jointly with leading Chinese wind turbine manufacturer [Goldwind](#), and leading wind blade manufacturer LZ Blades, represents a breakthrough in the application of polyurethane resin in large-scale wind turbine blades and marks the beginning of a new generation of longer and stronger blades for the wind power industry.

The full polyurethane wind turbine blade, from the spar cap to the shear web and the shell, is made entirely of polyurethane infusion resin, making it the first of its kind in the global wind power industry. Extensive static and dynamic fatigue tests are being carried out to evaluate the durability of the wind turbine blade before small-scale production commences in 2020.

"In the course of our R&D cooperation with Goldwind and LZ Blades, the superior properties of polyurethane resin were further proven through this trial production. We believe that Covestro's solution can greatly contribute to the sustainable development of the wind power industry," said Dr. Irene Li, Head of Application Development Asia Pacific in the Polyurethanes segment at Covestro.



Decreased costs and increased benefits for wind power enterprises

Test results showed that the polyurethane resin displays better mechanical properties compared with traditional epoxy resin. As it does not require post-curing and has a lower viscosity and faster infusion speed, the polyurethane resin system can greatly improve the efficiency of blade production, thus increasing the competitiveness of blade manufacturers. In the end, the [solution](#) with the polyurethane resin is more cost competitive than the one with the epoxy resin.

In addition, Goldwind has optimized the structural design of the blade, giving better play to the advantages of polyurethane's mechanical properties and infusion speed and ensuring the smooth production of the blade.

Birong Wen, head of Goldwind's wind blade development team, said, "Polyurethane is a very cost-effective material, and can thus provide great support for wind power enterprises when wind power prices will reach parity with thermal power after 2020. In the future, we will invest more in the development of new materials and explore how to apply these technologies to large-scale offshore blades to achieve greater competitiveness. This will help boost the upgrading of materials for wind turbine blades and the continuous innovation of the industry."

Jitendra Bijlani, head of R&D from LZ Blades, said: "The improvement of blade production efficiency by using polyurethane not only enhances the blade cost competitiveness, but also becomes the key to serve our esteemed customers with material technology flexibility. This keeps us ahead in an increasingly challenging market environment."

With the rapid development of the wind power industry, larger wind turbine blades have become increasingly popular in the industry, resulting in higher requirements for various aspects of wind turbine manufacturing, including the infusion resin. As the inventor of polyurethane chemistry and a leader in its application, Covestro has been committed to providing innovative products and cost-effective integrated solutions for the wind power industry to ride the latest development trends. In further cooperation with industry partners, Covestro will continue to contribute to the efficient development of the wind power industry.

About Goldwind:

Established in 1998, Goldwind is a world leading wind turbine technology and energy solutions provider. Goldwind was among the "Top 50 Most Innovative



Companies” on several occasions, one of 2016 “Top 100 Global Challengers”, and one of Intellectual Asset Management’s (IAM magazine) Intellectual Property Champions of China. Since Goldwind was founded, it has installed a total capacity of 50 GW in power around the world, with 31,000 operational wind turbines on six continents and in nearly 24 countries. Also, Goldwind is listed on the Shenzhen Stock Exchange (002202) and Hong Kong Stock Exchange (02208). On October 22, 2019, the “2019 Global New Energy Enterprise 500 List” was released, in which Goldwind ranked 24th.

About LZ Blades:

LZ Blades (Lianyungang Zhongfu Lianzhong Composites Group Co., Ltd.) is a national key high-tech enterprise integrating the development, design, production and service of composite products. Belonging to China National Building Material Group (CNBM), a leading diversified PRC building materials company, LZ Blades is headquartered in Lianyungang, Jiangsu Province, the coast city which makes LZ Blades the nearest factory to the port with a distance of only 35 km. Besides, LZ Blades owns 8 blade manufacturing facilities in China.

With the faith of protecting clear water and blue sky, LZ Blades makes continuous efforts in blade development. Since the very first piece of blade was successfully manufactured in 2006, LZ Blades has earned great success in both home and abroad market. Up till the end of 2019, the accumulated installed capacity of LZ Blades reached 30,000 MW with 20,000 sets of blades being produced. Keeping the mind of forging ahead with innovation, LZ Blades dedicates to providing the best and professional services to its customers.

About Covestro:

With 2019 sales of EUR 12.4 billion, Covestro is among the world’s largest polymer companies. Business activities are focused on the manufacture of high-tech polymer materials and the development of innovative solutions for products used in many areas of daily life. The main segments served are the automotive, construction, wood processing and furniture, and electrical and electronics industries. Other sectors include sports and leisure, cosmetics, health and the chemical industry itself. Covestro has 30 production sites worldwide and employs approximately 17,200 people (calculated as full-time equivalents) at the end of 2019.

Forward-looking statements

This news release may contain forward-looking statements based on current assumptions and forecasts made by Covestro AG. Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of



the company and the estimates given here. These factors include those discussed in Covestro's public reports which are available at www.covestro.com. The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.