



Wind Turbine Pitch and Yaw Drive Manufacturers

DRAW BREATH AS MARKET SLOWS

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(This article has been prepared by UK-based Lisergy Consulting, an independent market research consultancy working within the wind energy sector.)

The global wind energy market has seen average growth rates of 28 percent over the last 10 years, according to the Global Wind Energy Council (GWEC), creating major challenges for the component supply industry. GWEC also forecasts an average growth rate of 22 percent for the next five

years, which if realized, will continue to put pressure on suppliers of turbine components.

While the current financial crisis is dampening demand temporarily, the market is expected to rebound, potentially

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resulting in future bottlenecks in supply of key components.

Some of the least-discussed but critical components are the yaw and pitch drives used to orient the turbine and blades in relation to the wind. These drives ensure the turbine optimizes its position to generate energy efficiently and safely.

To understand the dynamics of this vital but little-researched part of the market, Lisergy Consulting has interviewed the major players and some new entrants to create a view of the market and its future challenges.

Four key global players were interviewed: Bonfiglioli Riduttori, Comer Industries, Brevini Power Transmission and Nanjing High Speed Gearbox, plus other players, to gain their perspective on this fast-changing market.

Market Structure

One of the first areas to investigate was to identify the size of this market. Based on industry estimates, the combined global volume for yaw and pitch drives in 2008 was around 118,000 units.

The market value is now estimated to be over 420 million euros per year. This has created opportunities for existing players to grow rapidly and has attracted the attention of new entrants who seek to gain a position in the fast-growing wind energy market.

The wind turbine pitch and yaw drive market is currently dominated by Italian suppliers, particularly Bonfiglioli, Comer and Brevini, but more recently, Chinese supplier Nanjing High-Speed & Accurate Gear Group Co., Ltd. (NGC) has also become significant. All of these companies have largely come from traditional drive and gearbox markets for use in cranes, industrial machinery and agriculture.

By diversifying into wind energy, each has grown its business dramatically and gained a significant market share. This success is in some part making up for the current downturn in building construction machinery and vehicle manufacturing, markets in which several wind industry players are also involved.

Of the top eight global players, three are Italian, three are German, one is Chinese and one Japanese. Unlike other global sectors, no major U.S. manufacturer holds a significant position in the wind turbine pitch and yaw drives market, but today this is perhaps set to change.

Key Players Dominate

The top six players represent more than 87 percent of the global production.

Bonfiglioli, based in Lippo di Calderara (near Bologna), Italy is a family owned company and is the key yaw and pitch drive supplier globally, with a market share of 29 percent. It has doubled its production capacity in two years in Italy and opened a new factory in India to service the Asian market.

Comer Industries, also based in Italy with a head office in Reggio, is the second-largest supplier and has expanded

its manufacturing recently, investing in additional capacity in three plants, including one in China. It is 100 percent-owned by the Storchi family and has a 20 percent market share.

Brevini is also family owned. While the smallest of the three main Italian producers of drives, it has invested significantly in manufacturing in China and more recently released plans for a large wind drive production plant in the United States scheduled to start production in 2011.

China-based NGC is the only non-European company to be producing more than 10,000 units a year. Their market share is around 10 percent, but increasing rapidly based on the fast growth in the Chinese wind energy market. Most of the drives are for Chinese consumption, but NGC has a supply arrangement with GE Energy resulting in some global sales. Nanjing, like Zollern, is a major producer of main drive gearboxes for wind turbines.

The Liebherr Group is one of the largest construction equipment manufacturers in the world. For the wind energy market, it produces gear cutting machines and mobile cranes for mounting wind turbines. The manufacture of drive technology is based in Biberach, Germany. Liebherr-Werk Biberach GmbH has almost 60 years of experience as an internal supplier for drive technology for many applications within the group, which has been applied to the wind energy market since the mid-1990s. The company is the only manufacturer worldwide that offers not only individual components but also produces complete drive systems consisting of gearboxes, electric motors, bearings and control units.

Zollern is a long-established German manufacturing group, partly owned by the Hohenzollern and Merckle families. Pitch and azimuth gears are produced in Germany and also in its assembling facility in China. Zollern also produces wind turbine gearboxes, and thus has a wider offer to the wind energy market than pitch and yaw drives.

Nabtesco is known globally for motion control technology, particularly in the robotics reduction gear market, where it holds over 60 percent global market share. Nabtesco manufactures yaw and pitch drives that use a unique gear technology, making them significantly lighter and smaller than conventional drives.

Other players in the market include Bosch-Rexroth, the large German industrial machinery manufacturer that also produces wind turbine gearboxes.

Has the Financial Crisis Impacted the Market?

The major drive producers over the last few years have seen growth rates of 20–30 percent in sales, reflecting the increases in wind turbine production. This rate of growth has brought with it major challenges for the component supply industry.

As wind power sales manager at Bonfiglioli, Fabio



Campana states, "The last three years saw an amazing growth of the demand. We had to double the production capacity in three years in Italy and open a new factory in India."

However, the global financial crisis has now affected planned wind turbine projects in most countries, resulting in a reduced forecast growth rate for 2009 of around 10–15 percent globally. Only within China have growth rates remained well above this global average, as the Chinese government funds internal infrastructure projects such as wind energy. NGC has indicated annual growth rates in the last three years have been 100 percent in China, with 2009 forecast to be again at this level. So indigenous suppliers such as NGC and those supplying imported drives or components (bearings), will continue to see rapid growth due to Chinese demand.

This reduction in growth globally may actually provide opportunities for the drives suppliers to consolidate and restructure their supply chain, providing a more consistent and resilient supply of drives to wind turbine companies.

Are the Long Lead Times for Drives Likely to Reduce?

One of the key challenges for wind turbine companies in the last five years has been the growth in demand and the inability of component suppliers to match this requirement. In recent years, lead times have been well in excess of six months for wind drives, causing some problems for wind

turbine producers.

As Campana of Bonfiglioli states, "The demand has grown too quickly. Clients were asking for more products immediately, but we could not fulfill such growing demand, so we could just speed up the existing plants (expansions) and the opening of new plants. During that time we were running behind the demand. We are not experiencing problems anymore, but we did for the past three years."

Much of this long lead time was actually not entirely due to drive manufacturers themselves, but to bottlenecks of bought-in drive component supplies such as notch gears and bearings. This has resulted in several drive producers looking to internalize manufacturing of strategic components.

Massimiliano Colombo, marketing manager at Brevini, confirms this. "Like our competitors, we also decided to internalize the production of pinion gears. We now produce them internally. We want to be fully independent within three or four years."

Matteo Storchi, sales director at Comer Industries, reports a similar situation. "There has been a big problem in sourcing the components to manufacture our products. This is because such growth in demand was unexpected. The supply chain was not ready for it. Most manufacturers could not fulfill the demand; they just did not expect the high demand and were not prepared for it."

Key drive suppliers such as Comer and Bonfiglioli have

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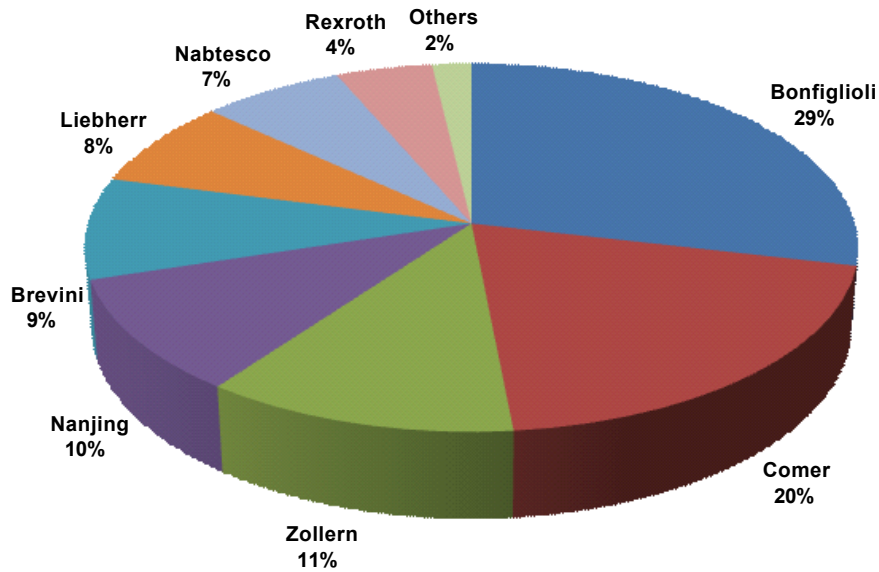
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Global Wind Power Yaw & Pitch Drive Market - 2008



Marketsize -118,000 units

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expanded capacity to reduce lead times and brought in-house some outsourced manufacturing to reduce bottlenecks from suppliers.

“The supply problems were a critical factor until the end of the first half of 2008. We have made additional investments in order to be more flexible and avoid these bottlenecks. They mainly involved a vertical integration,” says Storchi.

As result of the slowdown in demand, due to the financial crisis and increased capacity by Bonfiglioli, Comer and others, lead times have now reduced to four to six weeks for standard items. However, specialist drive configurations can still see drive suppliers quoting lead times more than 24 weeks from order placement.

Once the market improves, and if growth rates get back to 25 percent a year, we may see these lead times increase again, although the additional capacity from existing and new entrants, plus in-house manufacturing of some components, should help protect against this.

Different Strategies are Evolving

The market offerings of the suppliers of yaw and pitch drives are also changing over time, as the market develops, becoming more competitive and sophisticated.

Liebherr-Werk Biberach GmbH, the German component supplier, sees its main advantage in being an “expert partner” for its clients. Solutions for wind turbines include complete pitch and yaw systems consisting of gearboxes, bearings, electric motors and, on demand, electronic control units. Its high degree of vertical integration enables the Liebherr Group to offer hydraulic pitch systems as well.

At Comer Industries the approach is somewhat different, with Storchi stating reliability as the main feature. “The technology is not as important as the reliability of the product. The intervention costs are very high, so it is important to deliver a product that works and lasts.”

Bonfiglioli again has an inclusive strategy, similar to that of Liebherr, as explained by Campana. “Our advantage is to be a wind solution provider that means to offer a complete set of products needed for a wind generator—a complete package. Drives (for yaw and pitch) remain our core business, but we tend to promote sales of complementary products.” At Bonfiglioli, the emphasis is towards the control systems, with the electronics becoming part of its wind drive system sell.

Brevini has made great efforts to grow its business in the wind sector, seeing quality and availability as key factors. “Luckily we don’t see emerging new technology, so our demand will remain steady,” says Colombo.

Nabtesco, the Japanese manufacturer, has created a significant market position based on its novel gear technology, which has led to lighter and smaller drives over conventional units.

Investment and Growth

The investment in drive production capacity has been significant, to close the gap with demand. All of the major drive manufacturers have increased capacity and have plans to increase it further.

Says Campana, “We invested 50 million euros in increasing the capacity. Over 7 percent of turnover was spent on new machinery.”

For Comer Industries, the plans for capacity expansion have been aggressive. "We planned to produce three times more gearboxes, expanding the production of the components that created supplying problems to three plants, one of them in China," says Storchi. "I expect a capacity growth between 40 and 50 percent per year. To reach a total of 55,000 or 60,000 units in three years."

At Brevini, the position is equally ambitious, according to Colombo. "Our strategy will be to expand in China, Japan and the U.S.A, opening new facilities and doubling our production capacity."

Even with the current, challenging global conditions, drive manufacturers are taking a longer-term view, such as that from Storchi at Comer. "There is a high demand. I read the growth is estimated at 15 to 20 percent per year until 2020."

Meanwhile, NGC has also increased its capacity of drives dramatically in the last three years by tripling yaw production and doubling pitch production.

New Entrants

The dominant positions of the current global players may well begin to come under threat in the near future, as new companies begin to enter the market and others begin to review their wind energy strategies.

Sumitomo, the major Japanese industrial giant, is already



present in the market supplying gearboxes for wind turbines, but it launched a new yaw drive for wind power use at Hannover Messe 2009.

ABM Greiffenberger, a specialist German supplier better known for its gearboxes and electric motors, also entered the market in 2009 at Hannover Messe. ABM's range includes yaw and pitch drives as well as its own purpose-built electric motor.

Oerlikon Fairfield, with global headquarters in the United States, has been involved in the North American wind power

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market for almost three decades, providing customized main turbine and yaw drive assemblies as well as large precision gearing components. “We have numerous new opportunities under review that will increase our share in the wind market segment,” says John Strickland, Fairfield’s vice president of marketing and strategic planning.

The drives market is becoming an increasingly competitive marketplace. In view of the small number of global wind turbine producers and the dominance of the existing drive producers, it remains to be seen if these new suppliers can find a long-term position in the market.

Will there be Winners and Losers?

The recent increase in the number of new entrants and the rapid expansion of capacity raise the question of who will survive in the long term and whether the market can sustain all these new companies.



At Bonfiglioli, the view is clear. “Our goals were and still are to be the market leader in the yaw and pitch segments, and this can only be achieved by offering complementary products in order to offer a complete package and pursuing the quality excellence for the most reliable products,” says Campana.

Only time will tell, but perhaps those companies that can sustain consistent availability and quality, and can provide a “systems solution,” are perhaps best placed in the longer term.

As Storchi of Comer Industries stated, “There will be proof of Darwin’s law of natural selection. Only the large and solid manufacturers will remain on the market. It will be tough, but the strong companies will survive.” ⚙

Lisergy Consulting is a specialist market research consultancy with over 20 years experience in business-to-business markets. The consultancy specializes in technical and engineering, including global gear and drive markets. Their experience extends to renewable energy applications such as solar and wind energy, as well as a range of specialist applications in robotics, valves, lathes, x-ray and radar.



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Colin Marson has held senior commercial positions with several global organizations, with responsibility for marketing, competitor intelligence, strategic planning and business development. He initially worked for Shell

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