

Business excellence

State-of-the-art models are the basis for our new Sales and Operations Planning.

Page 2

The glue that unites us

A comprehensive training program introduces all employees to a new set of values.

Page 4

Mission Quality

Monitoring measures that are Critical to Quality helps improve process capability.

Page 6

NewsLetter

APRIL 2008



The wind turbines in Guanting are delivered by China's leading wind turbine manufacturer, Goldwind, with whom LM Glasfiber initiated long-term strategic cooperation at the beginning of last year.

Olympic winds

The 33 wind turbines at Beijing's first wind farm, the BJ Guanting Wind Farm, are ready to produce clean energy for the 2008 Olympic Games and for many years to come.

Located in a windy plain just 80 kilometers outside the Chinese capital, 33 sets of LM 37.3P blades will help generate 100 million kWh of electricity a year. This is equivalent to the electricity need of 100,000 Chinese households. Every year, the green power will replace 50,000 tons of coal and result in the

saving of 100,000 tons of CO₂ and 782 tons of sulfur dioxide air pollutants.

During the 2008 Olympic Games, the wind farm will cover 5 % of the electricity needed at the Olympic stadiums and thus add to the overall target of greener and more environmentally friendly Olympics.

The current installation in Guanting is the first phase of a wind farm, which, once completed in 2010, will double its current capacity to 100 MW.

Chinese tailwind

The Chinese wind energy market is expected to continue its impressive growth path based on the Government's ambitious target of 20 GW installed wind energy capacity by 2020. Industry analysts expect a growth in the market of at least 25 % over the coming five years.

To accommodate this, in October 2007, LM Glasfiber opened its second Chinese factory in the city of Urumqi in the Xinjiang Province.

Read more on page 3 ►

Long-term balancing of demand and supply

2

NewsLetter

LM Glasfiber is currently undergoing a business transformation to become a fully integrated, professional, global company. The centerpiece of that puzzle is formalized and focused sales and operations planning.

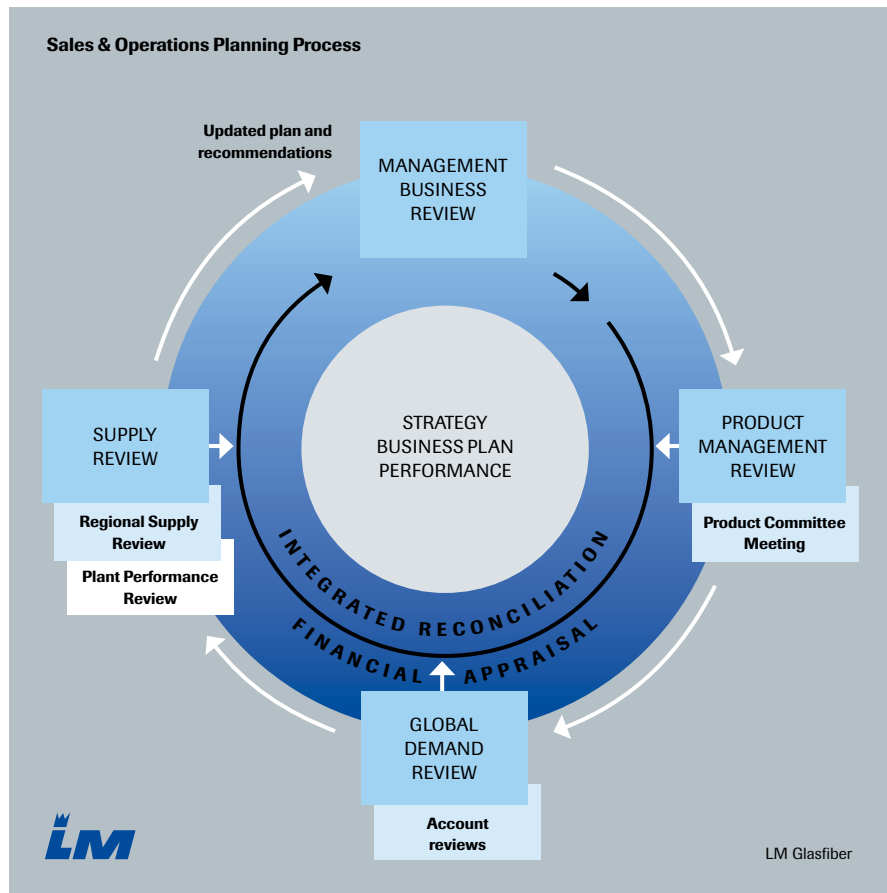
Based on state-of-the-art business excellence models and with the help of specialist consultants, LM Glasfiber has developed a detailed Sales and Operations Planning (S&OP) process. The first planning cycle took place in January this year and involves a monthly review process by top management and relevant functional areas of the company.

With this global process, we will keep the detailed market, sales, manufacturing, sourcing and capacity planning systems in synchronization with the latest business plans and strategic goals.

“We collect all relevant capacity information from our factories around the world; from Global Sales we gather details about our customers’ requirements and expectations for the future, and from Research and Development we keep track of how many new blades we have underway and when we can expect them to be ready for production. Then we make a plan for the next three years. The plan is reviewed and adapted once a month in order to provide a realistic view at any time,” explains Merete Djernæs Rath, S&OP Process Manager.

S&OP

S&OP is a monthly cycle with both regional and global planning meetings concluded by a Management Business Review in week four of the process.



The detailed, integrated planning minimizes our response time to customer requests and enables us to make longer-term decisions on a more solid foundation. Søren F. Knudsen, VP Sales & Marketing, explains: “Improving the visibility of our supply capacity and continuously balancing global capacity with global demand enables us to take the right decisions at the right time to remain an agile and professional partner to our customers.”

We are on a journey

Within the past five years, LM Glasfiber has

established five new factories, expanded the capacity of the existing facilities and doubled our workforce. This has meant an increased need not only for coordination but also for formalized professional processes on all levels. Sales and Operations Planning is the backbone for our business processes. But in all areas of the company, we have, during the past year, focused intensively on implementing global standards, instructions, processes and supporting systems. This business transformation is vital for our continued profitable growth.



Expanding on three continents



Roland Sundén, CEO, and representatives from Goldwind as well as local dignitaries cut the ribbon at the official inauguration of the Urumqi factory.

2007 was another record-breaking year for the wind power industry. New installations were up 30 % compared to 2006, reaching 20 GW. The increasing focus on climate change, security of energy supply and dwindling oil resources coupled with the increasing cost-efficiency of wind power point to a continuation of the market growth.

At LM Glasfiber we base our business model on close, long-term partnerships with the most important players on the market. This means a focus on capacity additions in the key markets for wind energy, also in the future. During 2007, our production capacity was expanded, partly by means of throughput improvement programs at our existing factories, but mainly through the opening of three new factories in China, Spain and India. Furthermore, at the beginning of 2008, we started production at our temporary facility in Little Rock, Arkansas in the US.

Spain

The Castellón factory in Valencia, Spain, was put into operation in June 2007. Here, 167 employees produce blades for our Spanish customer Acciona Windpower. The blades are supplied mainly to projects that form part

of the region's ambitious 2,300 MW Wind Plan tailored to generate 5,750 GWh of power per year by 2010. This is equivalent to the annual electricity consumption of 1.6 million Valencian households.

India

We inaugurated our 11th factory worldwide in Dabaspet, India, during fall last year and produced the first blades in September. The Dabaspet factory will help us keep a strong presence on the fast-growing Indian market, and we currently employ more than 800 people at our Indian facilities, which also include our factory in Hosakote. By the end of 2007, India ranked 4th in the world in terms of installed wind power capacity. Today, India is a major player on the global wind energy market with a potential that is far from exhausted.

China

In Urumqi in the Xinjiang region of China, we successfully opened and started operations at a new factory in October last year. In its first phase, the new factory is expected to produce approximately 500 blades per year and create employment for approximately 200 people. Xinjiang has one of the richest resources of wind energy in China as well as one of the best developed wind industry

bases. Urumqi is home to Chinese market leader Goldwind with whom LM Glasfiber has a long-term strategic supply agreement. The first blades from the new factory have been supplied to Goldwind turbines in the Da Ban Cheng wind park in Xinjiang. The wind farm is the largest in China and has 200 turbines with a total installed capacity of 100 MW.

North America

The latest addition to our production capacity is the temporary facility in Little Rock, US, where we started production in February this year. During the past months, we have hired and trained more than 100 new employees and expect to hire almost 200 in total. This temporary facility enables us to immediately start meeting the demand from our North American customers while our new Little Rock factory is being built. During the start-up phase of the new factory, we will continue to deliver blades from the temporary facility to maintain an uninterrupted high output. Common to all existing and new LM Glasfiber factories is our focus on providing our employees with the necessary skills to produce quality blades. Key to this effort is close cooperation between our different facilities and efficient transfer of knowledge from our experienced teams to our new colleagues.

Our values are what we stand for

4

NewsLetter

As a natural part of our overall business transformation, LM Glasfiber is currently introducing a set of revised corporate values. The values ensure that we all share a common foundation for our global activities and behavior.

In our quest to align our international operations, further develop industrial excellence and prepare the company for the future, LM Glasfiber is establishing a range of new processes and procedures. However, not everything can be controlled by means of rules and regulations. LM Glasfiber's Group Management firmly believes in values as fundamental building blocks.

They are the glue that unites LM Glasfiber's growing workforce across continents regardless of language, education and culture.

LM Glasfiber was founded on a spirit of entrepreneurship and innovation and this has become a part of our identity. However, the

booming development and increasingly professional operations of the wind industry in recent years have triggered a transformation of our business.

People are key

People are our most important resource. And even though we have world-class systems and tools, our employees will make all the difference. We currently run 12 factories in five regions on three continents. Our common foundation for this geographic dispersion, cultural diversity and rapid expansion is our values as defined by Group Management, based on an intensive situation analysis with input not only from employees but also from customers and suppliers.

Rooting a revised set of values in the way we act and make decisions is not something that happens overnight. It takes more than a nice brochure and posters on the walls. Therefore, a global training program was kicked off by a

full day's training of the 12 members of our Group Management in September last year.

Training

Managers in all locations subsequently participated in full-day workshops with Roland Sundén, CEO, and Michael Hakes, VP Human Resources. The focus of the day was value-based leadership. Real-life dilemmas from all levels of our organization presented decision-making scenarios for participants to discuss and resolve within a limited time frame. By April 2008, all employees will have participated in a training session with a minimum duration of three hours, all with dilemma exercises.

"I really enjoyed the open discussions we had during the workshops. And I was happy to see the positive attitude and willingness by our leaders and employees worldwide to take the values to heart. That is what our company needs," Roland Sundén declares.

All training sessions culminate with participants literally signing up to the values. This was kicked off in September with Group Management signing the values poster after a full-day workshop. From the left: Niels Jørgen Koed, VP General Manager, North Europe; Nirmal K. Gupta, VP General Manager, India; Lin Qi, VP General Manager, China; Claus-Peter Starey, VP General Manager, South Europe; Randy L. Fox, VP General Manager, North America; Jørgen D. Gade, CFO; Frank V. Nielsen, VP Research and Development; Søren F. Knudsen, VP Sales & Marketing; Michael Hakes, VP Human Resources; Raffaele Muscetta, VP Global Sourcing; and in front, Ken L. Kaser, VP Global Manufacturing and Roland Sundén, CEO.



Our values

Focus on customer and market

Work as one team

Trust and respect

Take ownership

Innovate for excellence

100,000 LM blades produced!



100,000 blades have now left the LM Glasfiber factories world-wide. Here blade number 1,000 in Canada leaves our factory in Gaspé.

At the end of 2007, LM Glasfiber reached an important milestone: Production of 100,000 blades.

When LM Glasfiber started producing blades in 1978, production of wind turbine blades made of fiberglass was a somewhat new undertaking. It was quickly realized, however, that the potential of this industry was vast and interesting enough to pursue.

From 5 to 61.5 in 30 years

The first blades we designed and produced were about five meters long and would rotate counterclockwise! After six years of production, in 1984 blade no. 1,000 was produced. It measured 8.5 meters, weighed 350 kg and was mounted on a 75-100 kW wind turbine. In the following years, the blade production caught speed. It took only seven more years to get to blade no. 10,000. However, it was still not very big by today's standards, only 12 meters long. In 2007, our blade no. 100,000 was produced – 37.3 meters long.

The blade milestones clearly illustrate the incredible development in wind technology.

Today, our longest blade measures 61.5 meters – still the longest blade installed in the world.

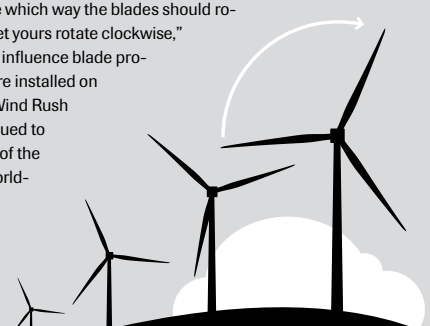
Contributing to a cleaner world

100,000 LM Glasfiber blades correspond to

27 GW installed wind power capacity which each year can save the world more than 46 million tons of CO₂ – more than the current annual CO₂ emission of London.

First one way – then the other

Our first wind turbines had blades that rotated counterclockwise – an old Danish tradition. Today, however, most wind turbine blades around the world rotate clockwise. Why? A possible answer is found in the late 1970s at the kitchen table of one of the pioneers of the wind industry, Erik Grove-Nielsen. Erik and his younger brother, Johannes, were both strongly engaged in early wind turbine development, but whereas Johannes volunteered at the idealistic Tvindpower (a school community of students and teachers who built a wind turbine to supply their school with non-polluting energy), Erik worked as an independent supplier of blades to self-builders and later customers such as Vestas, Nordtank and Bonus. The two brothers always competed with each other, and when Erik was about to complete his first own blade design, he discussed with his wife which way the blades should rotate. "If Johannes' Tvind blades rotate counterclockwise, let yours rotate clockwise," Erik's wife said. And thus, a decision was made that would influence blade production for the next 30 years and beyond. Erik's blades were installed on many turbines, especially in the US during the California Wind Rush from 1982 to 1986. The wind turbine manufacturers continued to spread turbines with clockwise rotating blades to the rest of the world as well, and soon this was the expected standard world-wide. LM Glasfiber started producing blades that rotated clockwise after 1986 when we were asked to produce 11-meter blades for some of Erik's earlier customers who were now used to receiving blades with this particular feature. The rest, as they say, is history.



A versatile local solution

Mission quality

6

Newsletter



A blade is being lifted by crane to the truck, which will take it to the workshop.

On-site workshop enables local repair of blades, showing maximum flexibility to our customers and minimum inconvenience to the end-user.

When four sets of blades needed repair in Taiwan, our Global Service department quickly realized that transporting the blades to our service workshop in Germany would be a costly and time-consuming affair. Immediately, the team started working on an alternative solution to the benefit of our customer and the owner of the turbines. The result was an on-site workshop fully equipped to handle repairs locally.

A great logistical task

Before this, however, comprehensive planning and coordination was needed to allocate all the appropriate resources to Taiwan. Claus Jørgensen, Service Coordinator, was in charge of the project. He says: "It was a focused logistical exercise to coordinate the transportation of repairmen, equipment and cranes and make it all form a synthesis, but we succeeded."

The framework for the local workshop was secured by renting suitable facilities from a yacht-building company in the nearby city of

Kaohsiung. And with the right facilities in place, the project really took off. The LM Glasfiber team in Taiwan consisted of three repairmen from our German workshop, two service technicians and a quality surveyor from our Service Engineering department in Denmark.

Efficiency and teamwork

Working closely with the Taiwanese, the team was focused and efficient, dismantling four sets of blades and repairing them one set at a time during a period of only eight weeks. A spare set of blades was mounted as the first set was dismantled and repaired and the other three defective blade sets were continuously replaced with repaired ones. Thus, the period where the wind turbine was not running was kept to a minimum as was the economic loss of the end-user.

Our positive experience with this project has paved the way for similar projects to the benefit of those of our customers who have turbines in remote locations. "This project is a good example of how creative thinking and dedicated teamwork can provide efficient and time-saving solutions for us and our customers," Claus Jørgensen concludes.

The LM Glasfiber program to ensure process capability and high uniform quality in all our factories includes comprehensive data collection from the factories.

Adding three new factories in 2007 alone while simultaneously increasing the capacity at several of our existing facilities demands a strong focus on robust processes in order to remain in control. And when this is coupled with increasing quality standards and a push for innovation in our maturing wind industry – it calls for a targeted effort.

An essential part of this is making sure that all our facilities consistently operate according to a uniform global production process. But processes and instructions are not everything. Being able to monitor and continuously follow up on the production quality is key. That is why significant resources have gone into defining exactly what is critical to the quality of our blades and not least, how to specify and measure the parameters.

CTQs

For the past year, a number of so-called CTQ (Critical to Quality) measures in the production have been documented and analyzed on a continuous basis. Examples include polyester consumption and blade profile thickness.

Monitoring the production data helps identify possible improvement areas on an overall level and on each production line. This has led to significant improvements in the repeatability of production processes and improved blade quality. In the long run, input of the collected data to Research and Development helps improve the design and manufacturability of future blades.

A portion of the CTQs are specific measures that have been defined in close cooperation with the customers as a means to document the quality of the blades. These are recorded on the blade certificates that accompany each blade leaving the LM Glasfiber factories.

Eighteen months of strong wind

Since the opening of LM Glasfiber's own wind tunnel mid-2006, comprehensive testing has resulted in a complete catalogue of documented profiles and aerodynamic devices.

"We offer our customers optimized and thoroughly tested solutions in accordance with specific blade requirements," says Peter Fuglsang, Chief Aerodynamist. "Our wind tunnel has been invaluable for this work because a long sequence of experiments has been necessary to gain a complete overview. The results we have documented cannot be calculated by today's numerical methods. Comprehensive wind tunnel testing is the only way forward."

During 2007, a series of meticulous aerodynamic tests significantly improved what we offer our customers in terms of targeting the design to their specifications and requirements. Our team of aerodynamics specialists has developed what could be labeled an 'aerodynamic toolbox'. "Various documented profiles can be combined providing us with a high level of flexibility. We have almost unlimited solutions in stock," Peter Fuglsang explains.

Test of oil flow around vortex generators provides new knowledge about airflows along the blade.



Efficiency gain of 2 %

The same applies to the passive aerodynamic devices. "The exact sizing, spacing and positioning of e.g. vortex generators and Gurney flaps determine the main blade flow, and there are many feasible combinations. We have been able to perform tests to document these and we expect an efficiency gain of 2 % for blades with the same rotor diameter," says Peter Fuglsang.

LM Glasfiber's wind tunnel was inaugurated in June 2006 and since then a large number of tests have been performed. These tests have not only documented new airfoils and passive flow control devices, but also provided us with information about the influence of leading edge roughness and details of the boundary layer flow, which we can use in our future developments.

And our wind tunnel has not only been occupied by testing. Since the opening, different groups from mechanical engineers to journalists and customers have shown their great interest by visiting us and requesting more information about our unique facilities.

ShortNews

7

Prestigious awards for LM Glasfiber

In November last year, LM Glasfiber received an important award in India for our ability to market our blades.

Star Export House

We received the award for 'The Best Export Performance' in the category of Fiber Reinforced Plastic/Glass Reinforced Plastic products, which is the highest recognition for exports by the Indian Government. As recipient of the award, LM Glasfiber will be categorized as a 'Star Export House', which gives many advantages in relation to import and simplification of rules and regulations in India.

Nirmal K. Gupta, VP General Manager, India, received the award at a ceremony held at the end of November in Mumbai by The Plastic Export Promotion Council. Leading players in the plastic industry, members of The Plastic Export Promotion Council and dignitaries of concerned Government departments among others participated in the ceremony.

"We have moved from the second place to first place this year. We are honored to receive this prestigious recognition from the Government of India," Nirmal K. Gupta said after the ceremony

“Wind can easily generate as much as 6 % of the US electricity need by 2020, generating thousands of jobs, revitalizing farms and rural communities.”

Randy L. Fox

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ShortNews

Without reliable energy policies, thousands of US jobs are at stake

By Randy L. Fox, VP, General Manager
 North America

During fall of last year, attracted by an appealing specialist company in a booming industry with solutions to one of the world's biggest challenges, I joined LM Glasfiber as VP, General Manager North America.

LM Glasfiber in North America has been undergoing impressive development since it initially established its operations in 1999 with the factory in Grand Forks, North Dakota. We have created more than 1,400 new jobs in three locations in the USA and Canada and we expect to double that number within the next three to five years.

However, when we, together with our customers, project our US activities over the short to medium term, there are literally two very different possible scenarios: one continuing the industrial adventure we have been a part of the past three years with the creation of thousands of new manufacturing jobs, and one where our activity will stagnate or even decrease.

That does not make us any different from the rest of the wind industry. According to a recent study commissioned by the American Wind Energy Association (AWEA), more than 76,000 jobs are put at risk if Congress does not extend the renewable energy tax credits due to expire by December 31st, 2008.

With traditional manufacturing in decline in most of our cities and rural areas, the creation of manufacturing jobs in what we can

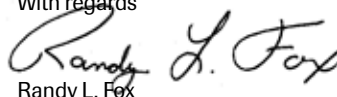
plainly call a future-proof industry should have the attention of our federal politicians. On a local level, politicians acknowledge the effect this has on the economy but more importantly on thousands of families.

Beating previous records, the industry installed 5,244 MW wind energy in the USA during 2007, corresponding to a 45 % expansion of the total wind power generating capacity in a single calendar year while injecting an investment of over \$9 billion into the economy. The new wind farms account for about 30 % of the total new power-producing capacity added nationally in 2007 and will power the equivalent of 1.5 million American households annually.

However, this still takes wind power to less than 1 % of the total electricity generated in the USA. With continued government support (as has historically been the case for coal, nuclear and other technologies), wind can easily generate as much as 6 % of the US electricity need by 2020. This would create thousands of jobs and revitalize farms and rural communities – without consuming any natural resource or emitting any pollution or greenhouse gases.

I believe it is a clear case, and I am confident our industry will continue its positive path in the USA as well as in the rest of the world. I look forward to being a part of this adventure.

With regards


 Randy L. Fox

Prestigious awards for LM Glasfiber

In late September last year, LM Glasfiber received a prize recognizing our performance in Research and Development.

Product Prize

In Denmark, LM Glasfiber received The Confederation of Danish Industries' (DI) Product Prize for developing and maturing for production the world's longest rotor blade (61.5 meters).

In its motivation for awarding the product prize to LM Glasfiber, DI emphasized, among other things, that “on the basis of four years' research and development efforts, LM Glasfiber has developed a whole new generation of blades that truly pushes the envelope in terms of materials and engineering. Thus, LM Glasfiber has demonstrated extraordinary R&D skills, and combined with its leading position in the field of renewable energy, LM Glasfiber helps Denmark retain global leadership in this field.”

Frank V. Nielsen, Vice President Research and Development, accepted the award on behalf of LM Glasfiber.

One wind turbine with these 61.5-meter blades can generate a power output equivalent to the annual power consumption of almost 5,000 households. Thus, this forms a very solid platform for optimizing the utilization of wind energy.