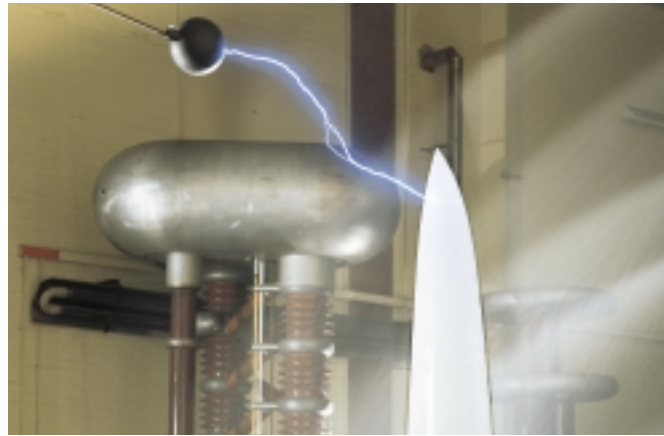


Focus on lightning protection



Lightning strikes may damage the blade structure unless a lightning protection system intercepts the energy and conducts it to the ground.



The risk of lightning striking wind turbine blades has increased significantly as the blades have become longer.

and more lightning damage because the general technical development allowed the construction of taller wind turbines with longer blades. At the same time, the blades were generally manufactured without lightning protection systems," remembers Flemming Møller Larsen, mechanical engineer at LM Glasfiber's development department.

Today, the company has a wealth of knowledge about lightning strikes and lightning protection of the rotor blades. After more than eight years of tests and research, LM Glasfiber is now one of the world's leading experts in this field.

"Today, lightning strikes to the blades are not a huge problem, which is proved by the fact that more than 35,000 LM blades with lightning protection systems operate year after year all over the world without getting damaged," says the mechanical engineer.

It is still not possible to say exactly how often the wind turbines are struck by lightning.

"Apart from the mill's height, geographical factors definitely also play an important role. We know, for instance, that certain Japanese mills are struck by lightning up to ten times a year, whereas a previous calculation for a mill near Tjæreborg Enge in

Denmark, with a total height of 100 metres, shows that this mill is struck on average only 0.8 times a year," reports the mechanical engineer.

He also emphasises that lightning protection of the blades cannot actually prevent lightning from striking the blades.

"That is not possible," says Flemming Møller Larsen, "but the goal is to intercept the lightning and conduct the large amount of energy into the ground in order to avoid damage to the blades."

The actual lightning protection in LM Glasfiber blades consists of metal receptors in the rotor blade surface that intercept the lightning and conduct the energy via the lightning conductor system down to the blade's root face. The company is currently testing new receptor designs and materials with the aim of increasing resistance to lightning impact. A recently developed multi-receptor system with several receptors will also be tested during September and October 2002.

As Flemming Møller Larsen points out, "We take lightning protection very seriously. Our goal, of course, is to develop systems that are even better than those we currently provide."

with our collaboration with IFU and NEPC regarding the start-up of the first rotor blade production in India. We foresee a positive trend in the Indian market, so the time was right to take over the remaining interests in our Indian subsidiary."

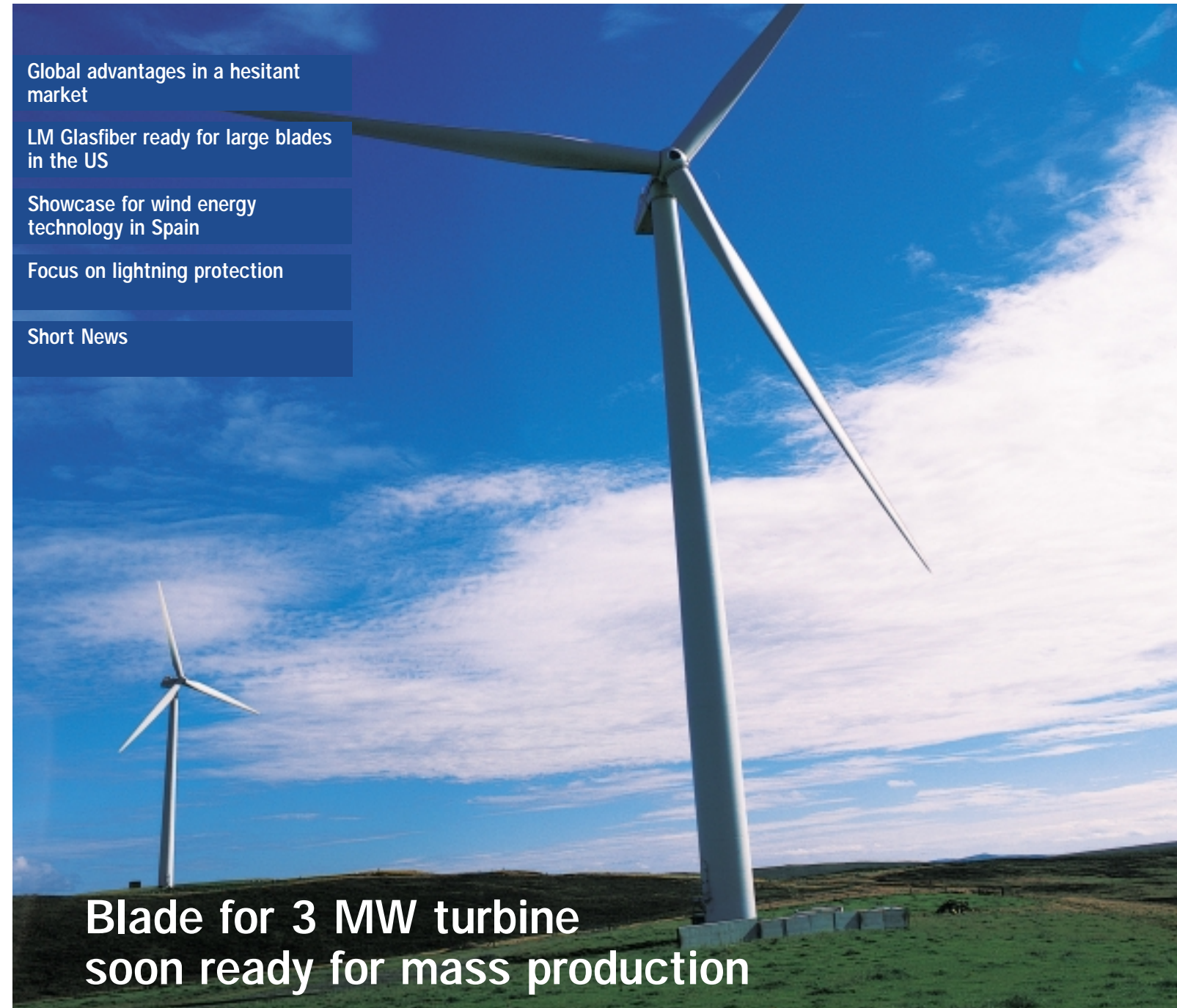
New CEO for LM Glasfiber India
Mr Nirmal K. Gupta has been appointed Chief Executive Officer of LM Glasfiber (India) Ltd, with effect from 1 August 2002.

Mr Gupta graduated with honours as a mechanical engineer with management education. He has extensive experience from more than thirty years in various senior positions in multinational engineering industries. Mr Gupta's last assignment was with STI Sanoh Ltd, and his current goal – with the support of Indian customers – is to expand business in India and improve profitability.

Short News

Full takeover of LM Glasfiber (India)
LM Glasfiber A/S has taken over the outstanding 49.2% minority stakes in LM Glasfiber (India) Ltd, bringing its stake in the company to 100%. The minority stakes were previously owned by LM Glasfiber's joint venture partners IFU (Industrialisation Fund for Developing Countries) and NEPC India Ltd.

Anders D. Christensen, CEO of LM Glasfiber, says "We have been pleased



Global advantages in a hesitant market

LM Glasfiber ready for large blades in the US

Showcase for wind energy technology in Spain

Focus on lightning protection

Short News

Blade for 3 MW turbine soon ready for mass production

With a length of 44.8 metres, LM Glasfiber's new LM 44.8 P rotor blade takes up a fair amount of space in the windy landscape on the Orkney Islands in the Atlantic. The blade is undergoing tests prior to the start of mass production, which is expected in February 2003.

The LM 44.8 P is LM Glasfiber's largest blade to date to be prepared for mass production. It was developed in collaboration with NEG Micon for their new N92 wind turbine of 2.75 or 3.0 MW capacity, with work beginning in November last year.

"The LM 44.8 P is related to the LM 38.8 P and LM 43.8 P. The new blade is designed for pitch-regulation. As a result, the wind turbine can start at lower wind speeds than stall-blades," says Flemming Ejlersen, project manager of the development department.

In addition, the LM 44.8 P is equipped with a multi-receptor system, which serves as a lightning conductor and makes the blade less vulnerable to lightning damage than earlier blades.

"The wind turbine has six receptors on each side compared with the normal single receptor. There is therefore less risk that a lightning strike to a blade will cause damage to a large wind turbine," says the project manager.

The LM 44.8 P was designed on the basis of the NACA 63,600 profile series and the blade weighs 10,000 kg. The turbine reaches its maximum capacity of 2.75 or 3.0 MW at a tip speed of 75 m/s.

The LM 44.8 P is intended for use at wind class II.

Global advantages in a hesitant market



Managing director
Anders D. Christensen

The American PTC scheme, which grants a tax deduction to producers of clean energy, was expected to be extended at the end of 2001. However, it was not until 8 March this year that President George Bush signed the extension of the scheme, which is valid until the end of 2003.

This meant that everything should have been fine. Work relating to project planning that had been shelved or thrown out could be dug out again – there were projects to complete and wind turbines to order. However,

things did not turn out this way. Until now, only a few provisional orders have been placed and a couple of minor orders confirmed.

There are several reasons for this:

- It takes time to prepare a project including approvals, power connections and power supply agreements, etc.
- It is taken for granted that the PTC scheme will be extended for another two years and there is therefore no reason to hurry.
- The United States senate has approved an RPS scheme that obliges the power companies to buy a certain amount of renewable energy over the years to come. The scheme has not yet been adopted, but is expected to be in place at some stage.

The conclusion to be drawn from this is that as long as most companies believe that market conditions are likely to improve further, they are adopting a wait-and-see attitude, regardless of whether conditions are satisfactory

from an objective point of view.

A market with spasmodic demand makes heavy claims on the ability of manufacturers and subcontractors to adjust their production capacity to particular conditions. LM Glasfiber has decided on a global strategy, where production units are located close to the markets they supply. This provides LM Glasfiber's customers with access to exactly the capacity they require. In addition, during the spring, the Euro gained approx. 15% in value compared with the dollar. Other factors being equal, this makes European goods more expensive from an American point of view. This is of some importance, even to manufacturers with production in the US – such as LM Glasfiber – as certain materials and expenses are paid in Euros. All in all, the current situation demonstrates that a local American production unit places both our customers and us in a much better position than if we were exporting out of Europe.

LM Glasfiber ready for large blades in the US



The use of modern production technology guarantees the quality of the finished blades.



The new extension adds 3500 m² to LM Glasfiber's existing facilities in the US.

LM Glasfiber's American factory has added another 3500 m² to its production facilities. With this latest addition, the American facilities have a total floor space of 11.200 m².

Managing director Craig Hoiseth from LM Glasfiber explains, "We have added 3500 m² to our existing production facilities. This will enable us to offer our American and Canadian customers the necessary capacity. The expansion will enable us to produce 50-metre-long blades, and thus supply

the blades of the future."

LM Glasfiber has invested more than USD 3 million in the new facilities, which were ready in March 2002. The strengthening of the factory is part of LM Glasfiber's global strategy of locating production units in close proximity to the markets. The factory in North Dakota is ideally placed for supply to the Midwest, which has some of the largest wind resources in the United States.

Craig Hoiseth continues, "The expansion cements LM Glasfiber's strategy to give its customers access to capacity

on the American market. It provides our customers with the opportunity to meet the demand despite the fluctuations that we have seen on the American market and without tying up their capital in production facilities".

At the moment, LM Glasfiber thus delivers LM 35.0 P blades for NEG Micon's framework agreement with FPL Energy for the supply of wind turbines with a total capacity of up to approx. 600 MW before the end of 2003.

"We feel that in this way we place LM Glasfiber's customers in a favourable position, and we wish to ensure that the American production capacity will continue to meet the needs of our customers," concludes Mr Hoiseth.

Showcase for wind energy technology in Spain

The Sotavento wind farm is one result of the Strategic Wind Power Plan, an initiative launched by the regional government of Galicia in 1995. In a mere six years, Galicia has moved from having just a token wind power capacity to installing a capacity amounting to more than 1000 MW, making Galicia the biggest wind energy producing region in Spain. Other regions have now introduced similar programmes.



There are currently 24 turbines on the wind farm, of which 20 are fitted with LM Glasfiber blades

One of the principal purposes of this showcase wind farm is to disseminate information about and increase awareness of renewable energy. The facility features 24 turbines, and products of all the manufacturers who have a presence in Galicia are represented. The farm is also a testing ground for prototypes, and thus a showcase for the different technologies and types of turbines available on the market.

The majority of the wind farm's capital has come from public funds, and the rest has been provided by the four private companies that operate in the electricity sector in Galicia. The company that owns the Sotavento wind farm performs the important job of extending general awareness about renew-

able energy. There is a range of different activities for the many interested parties that visit the site, especially for students from schools, technical colleges and universities.

The Sotavento wind farm is proof of the spectacular development of wind energy in Spain, which has led to it becoming the third largest market in the world in 2001. Spain has abundant wind resources, and Spanish legislation has incorporated effective measures to promote renewable energy. This means that investors in new initiatives can feel secure within a stable framework for energy sales and tariffs. The determination of the regional governments to favour renewable energy has reinforced this climate of confidence.

Since 2000, the Spanish market has levelled out at more than 1000 MW of installed wind energy per year. This has in turn helped to secure more than 12,000 direct jobs in this sector, which includes manufacturers of turbines, towers, blades, electrical instruments, control systems, generators and so on. This success is due to the technological development of the manufacturers, whether using domestically developed or imported technologies.

LM Glasfiber has played an important role in this industrial development by making significant investments in three factories, together totalling more than 35,000 m², to guarantee local supply

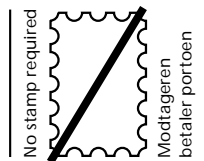


and efficient service for customers in Spain and the Mediterranean area. This has produced very satisfactory results for all the involved parties in Spain.

The LM Glasfiber factory in Ponferrada is one of three plants in Spain, together they total more than 35,000 m² of floor space.

This proximity to the market has enabled LM Glasfiber to collaborate closely with customers, with the development of customised blades, assisting customers in technological development and making the turbines more reliable and efficient. LM Glasfiber is satisfied with the collaboration with the Spanish customers – Ecotènia, EHN and Made – which has created the basis for future co-operation that will have the same spirit and the same degree of success as LM has built up in Denmark with such customers as Bonus, GE Wind Energy, NEG Micon, Nordex and REpower.

No. of turbines	Manufacturer	Rotor diameter	Output kW	Blades
4	NEG Micon	48 m	750	LM
4	Gamesa	47 m	660	Gamesa
4	Ecotènia	44 m	640	LM
4	Bazán-Bonus	44 m	600	LM
4	Made	46 m	660	LM
1	NEG Micon	52 m	900	LM
1	Made	61 m	1320	LM
1	Bonus	62 m	1300	LM
1	Made	52 m	800	LM



LM Glasfiber A/S

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