

# Escalating Costs of Carbon Based Energy Combined With Global Climate Change Offer Opportunity for Wind Turbine Development

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by **Don Bowen, Jr.**

## Overview

In August 2008 I accompanied Mark Richey, founder and owner of Mark Richey Woodworking, to India to meet with representatives of Elecon Engineering. Elecon, a supplier of mid-range turbines for the past two decades, welcomed the opportunity for us to tour their gearboxes and production facility. Founded in 1951, the company historically manufactured 400 kW units before introducing 600 kW units in 1999. Components are sourced from dependable global companies that specialize in generators, gearboxes, hydraulics, brakes, and control panels.

At a time when many turbine manufacturers are in the enviable position of having backlogged orders with demand far outpacing supply, smaller companies are finding more opportunities to establish and advance their products. Indeed, it was global scarcity of medium-to-large scale wind turbines that resulted in our consideration of Elecon's 600 kW machine.

In all likelihood, India will play a vital role in meeting the industrial demand for wind turbines over the coming years. As investors move away from carbon-based electricity production, India is in a position to leverage its established manufacturing base, low labor costs, and experience with renewable energy to take advantage of growing, worldwide demand for wind power.

This trip enabled us to gain important insight into general business practices in India, as well as the specific practices of Elecon Engineering. The face-to-face meetings produced clear communication and shared trust – results that would have been impossible to achieve had we relied exclusively on email, fax, or telephone communication. Not only will our investigation of Elecon facilitate the acquisition, installation and maintenance of the turbine chosen for Mark Richey Woodworking, it has already strengthened Meridian's qualifications around developing wind power. Through these travels, we've gained first-hand knowledge of how Indian wind technology can be used to capitalize on tax incentives and land use changes (e.g., the mixed use of farmlands) in the United States.



## Arriving in Mumbai

Our trip began with a 16-hour, non-stop flight from JFK Airport in New York to Mumbai, India. During the lengthy trans-Atlantic flight I took the opportunity to meet fellow travelers who had strong ties to our destination. Through our conversations, I gained some authentic insights into the culture and history of India, a country that I would be visiting for the first time. My initial impression was of diverse peoples and rich traditions, and scenes where ancient monuments and sophisticated architecture blend together.



Mumbai is a dynamic, bustling city of 13 million people, the most populated in India. Though evidence of the poverty with which India has struggled for generations is everywhere (more than 1 billion people live in India today), the country's vitality is obvious. We were privileged to spend our first two nights at the comfortable Taj Tower. Across the street, we could see basalt arch 26 meters high, known as the "Gateway to India," which signifies the end of control by England and the beginning of India's autonomy and self-rule, which occurred on February 28, 1948. Many similar views revealed a confluence of past, present, and future.



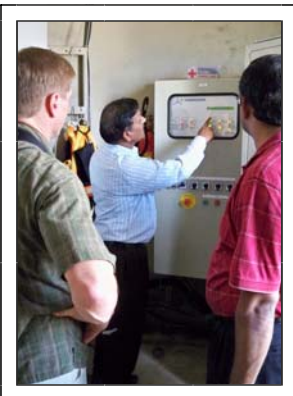
Today, Mumbai is an economic center; a hub of heavy industry, agriculture, software development, and petrochemical production. Although we did not witness any occurrences, Mumbai is also home to political extremists, who occasionally launch violent strikes throughout the region. Our experience, however, was entirely peaceful. Our Indian contacts were interesting and gracious hosts, generously arranging for us to dine with their friends and associates. These informal opportunities to share conversation and sample local cuisine were among the highpoints of our trip.

## Seeing the Turbines

From Mumbai, we flew north to Kandla where we met with Elecon executives Vikas Karulkar and M. S. Bhoi, as well as representatives of Reflecting Blue Technologies; Brian Larson and Ramu Adusumilli. Because these men would be our guides for the remainder of the trip, our initial conversations were about logistics and scheduling.



The next leg of our journey was at times unnerving and dangerous, crossing remote territory where emergency services would have been challenged to provide a rapid response to an accident scene. Yet after bearing witness to near collisions with cattle, pedestrians, scooters, and motorcycles, we became de-sensitized to the speeding, two-lane traffic.



Before long, we arrived in a region dotted with wind turbines. They were clustered by capacity and manufacturer, as well as by landowner/developer and installation period. At a particular turbine, a number of field support employees of Elecon gathered, waiting for us. As we stood with them in the pedestal tower, these skilled technicians provided us with an in-depth instructional overview of the control panel equipment and turbine operating system.





We were invited to ascend the 50-meter (164 foot) tower to inspect the nacelle (turbine hub), where M.S. Bhoi provided instruction about the turbine components, their origin of manufacture, and the specific reasons for which Elecon selected them. Speaking technically, M.S. Bhoi gave an overview that proved to be one of the most informative experiences, in one of the most exciting places, of the trip. After the detailed tutorial, we took time to observe the beautiful views from atop our unusual vantage point – the turbine hub.

The day was sunny and warm, and as we descended to ground level, the light breeze picked up as if on cue. Within minutes, there was sufficient wind to meet the required cut-in speed of 3 meters per second. It was a perfect opportunity to witness the cold start up and flawless operation of the turbine. As we admired the machine, lunch was served in the cool shade of the pedestal.

## Touring the Elecon Plant

Our travels resumed with a nearly 6-hour drive southward to the Elecon plant in Ahmedabad. The roads, while rustic, passed through vibrant communities where commerce was bustling. In many villages we saw women in beautifully colored dresses and school children in neatly pressed uniforms.



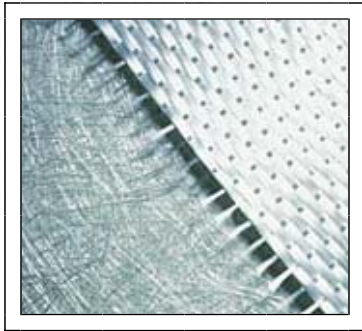
Upon arriving at Elecon, we were greeted warmly by V.D. Kalani, Elecon's Vice-President and Prayzsvin Patel, Chairman and Managing Director. Also on hand was Hemant Rawal, Manager of Production for the Alternative Energy Division. Together, they escorted us through the manufacturing building, where nacelles are assembled from components sourced from leading manufacturers worldwide. Similarly, Elecon designs and builds platforms, frames and housings. The gearboxes, however, are Elecon products, from design to fabrication and assembly. These were made by machinists in an adjacent plant.

During the tour, we learned about Elecon's 55-year history, its technical development and its business growth. The staff who accompanied us was outgoing and helpful, and didn't hesitate to volunteer information and answer questions. The tour also included access to the design center, where engineers were using products from Parametric Technologies and the most current versions of Microsoft products to communicate with designers, vendors and clients around the world. We were genuinely impressed with all that we saw and heard throughout this facility.



## Finding our Turbine Blades at LM Glasfiber

From the Elecon plant, we drove to Bangalore and LM Glasfiber, a company that has set the standard for manufacturing turbine blades. In fact, LM Glasfiber is now the largest manufacturer of wind turbine blades in the world, with three factories in this region, and closer to home, in Windsor, Colorado.



A guide greeted us, but did not permit entry to the fabrication and assembly building. The plant is safeguarded out of concern for the security of proprietary information.

Although we were prohibited from taking photographs in or around buildings that housed manufacturing, these restrictions were eased as we toured the storage and lay-down areas that covered dozens of acres surrounding the factory. With our guide's assistance, we located the three blades, each 79 feet in length that will be transported to Newburyport as components of the turbine for Mark Richey Woodworking. Elsewhere on site, we saw larger blades, as long as 200 feet.

After the site walk, we were invited to the conference room, where a more substantive review of blade design and production was provided. The discussion was led by Gangappen B., who described how LM Glasfiber developed new materials and a unique process for manufacturing wind turbine blades using the microstructure of glass fiber and resin to create large-scale composite designs.



Their exclusive process calls for specific chemical surfaces on the fiber and nerve of the glass fiber mat. By focusing on the tensile strength of the fibers and the overall structure of the glass fiber mat, the company has set a new benchmark for product quality.



## Summary

While the United States has pursued carbon-based energy sources such as coal and oil for large-scale generation of electricity, dozens of other countries have been developing environmentally sensitive, renewable technologies. During our trip to India, we saw convincing evidence of this country's ability to be a major player in supplying wind turbines to international markets. Meridian Associates is positioned to help its clients develop emission-free energy sources, without having to wait years for backlogged equipment.

Mark Richey Woodworking in Newburyport, Massachusetts, with the support of Meridian Associates, will capitalize on



the opportunity to acquire technologies within a relatively short lead-time. In doing so, Mr. Richey and his company will soon provide a useful example of how large-scale wind turbines acquired from overseas can support manufacturing facilities in the northeastern United States. As energy costs continue to escalate and the need to address climate change becomes more urgent his resourcefulness in turning to Indian suppliers and his commitment to zero emissions will benefit both his business, society, and the environment.

