



**From maintenance services, to turnkey substation construction, to hydraulic drive systems and more, this company is an amazing resource for the global wind industry.**

**FOUNDED IN 1911**, Eaton Corporation has grown from a supplier of small truck parts based in Bloomfield, New Jersey, to a global diversified power management company. Now headquartered in Cleveland, Ohio, Eaton employs approximately 70,000 people worldwide and has customers in more than 150 countries. Having entered the renewable energies market nearly three decades ago, its wind capabilities have expanded to include electrical solutions such as maintenance services, substation construction, arc flash and power system studies, and retrofit upgrades. Hydraulic solutions include product and system design, pitch control devices, and training.

According to Steve Boccadoro, senior vice president of corporate sales and marketing, “Eaton has a long history of serving the wind energy market, and proof of our success is found in the caliber of the companies who use our products,” he says. “End users include Clipper Windpower, Suzlon, Vestas, Gamesa, GE Energy, and REpower Systems, just to name a few.”

These big-wind giants rely on Eaton to provide products that improve reliability, increase efficiency, and enhance safety. Eaton’s products can be found in a number of nacelle subsystems such as electronic controls and distribution—turbine control panels, low- and medium-voltage drives and components, dry-type transformers, and uninterruptible power supply (UPS) systems—and pitch control systems for cylinders, valves, and proximity and speed sensors. The company also provides yaw control systems (motor drive and brake), accumulators, valve control and pressure sensors, power units, pump and filtration, electrical bus ducts, hoses, and hydraulic connectors.

Eaton is especially well known for its hydraulic pitch control solutions, which provide a number of advantages over electric systems. “They are faster and more responsive than electrical controls,” Boccadoro explains, “and you can activate emergency braking even if there’s no power. They are also less sensitive to lightning strikes, which are always a concern with utility-scale wind towers, and incorporating condition monitoring is a simple process.”

In addition, the company provides base-of-tower, turnkey collector substation construction, base-of-

tower maintenance service, and aftermarket solutions. Its base-of-tower switchgear does not contain sulfur hexafluoride (SF<sub>6</sub>), which is an extremely harmful greenhouse gas—see Eaton’s related article in the February 2010 issue of *Wind Systems* magazine—and circuit breakers, such as the company’s new 38kV medium-voltage unit, are compact, reliable, easy to install, and require minimum maintenance.

For those utilizing its wind farm substation construction services, Eaton’s capabilities are extensive. On the design side, engineering and consulting services are available, as well as studies addressing topics such as power quality and reliability, energy management, arc flash and safety, and power-chain management. Build services include power management, safety and risk management, and power-chain equipment modernization. Turnkey project implementation is also available, offering single-point responsibility for the duration of the project, a centralized project management group with regional managers, standardized documentation control, nationwide subcontracting abilities, and multi-vendor equipment selection. Equipment startup and commissioning is available in the company’s support services portfolio, in addition to ongoing maintenance programs, operational and maintenance training, remote condition monitoring, and emergency assistance.

With nearly a century of accumulated expertise, Eaton is also working to adapt many of its proven technologies for the benefit of the wind industry. Having designed large brake systems for mining, marine, and other demanding industries for more than 40 years, it is developing a brake system specifically for wind OEMs. It is also working to increase turbine reliability with new gearbox lubricants and state-of-the-art filtration systems. In addition, Eaton’s hydrostatic transmission reduces complexity and weight in the nacelle.

“As a longtime leader in the wind industry we’re known for providing the most reliable, efficient, and high-quality electrical, hydraulic, and mechanical power management technologies that are available,” Boccadoro says. “And that’s a reputation we work every day to live up to.” —R.W. 

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