



Case Study  
Wind Energy Services  
August 28, 2009

## It's all about speed

The successful operation of a wind turbine depends on the speed of the generator. It must operate at a frequency of precisely 60 cycles per second to produce electrical energy that meets the requirements of the power grid in the United States. And if the part that controls the speed of the turbine fails, the speed at which it's repaired can have a huge impact on the power company that operates the wind farm. Each day that a turbine remains idle can cost the company \$1,000 in lost revenue.

That's exactly what used to happen to Global Wind Power Services in Midland, Texas, when a critical component – the rotor current controller – would stop working on one of its wind turbines in the field. Historically, there has been only one viable solution available to fix this part – shipping the part to its manufacturer in Denmark for repair, which takes up to 16 weeks. Yet Vice President Junior Yanez knows he has to act faster to keep the farm fully operational.

Yanez called upon National Switchgear to help engineer a solution closer to home. National Switchgear had an existing relationship with Global Wind Power to provide maintenance and repair for tower substation equipment in the field, such as switches, transformers, breakers and relays. However, this problem would prove to be different from the norm. First, the Danish manufacturer would not disclose the proprietary information necessary to understand the inner-workings of the part. And second, the part itself is made up of a combination of delicate and intricate micro-electronics housed in tight quarters with power electronics and high voltage. Understanding how it works required an expertise in physics, math, electronic engineering and power electronics combined with mechanical engineering – a very rare combination.

National Switchgear called in its partner company Orbital Machine Works, which specializes in solving complex issues involving physics, electronics, technical and mechanical fields. Together, the companies were able to reverse-engineer Global Wind Power's rotor current controller, figure out how its design code worked, and design a repair solution that reduced the overall repair time from 16 weeks to about 10 days.

"This is the only solution for this type of problem available in the United States," said Yanez of Global Wind Power. "We're really happy to find a local source for this work."

National Switchgear's ongoing service mission includes helping operators of wind farms and other companies in the wind energy business solve bothersome production problems such as the one involving the wind turbine.

According to National Switchgear President Doug Powell, "We're looking into solutions related to other electrical components and problems where the industry has a difficult time finding the right expertise. Our team of engineers deals regularly with issues that require problem-solving and abstract thinking, whether it involves electronics, computing and logic, mechanical design or power electronics."