Clearing Regulatory Hurdles to Revive a Classic Wind Machine

by Willi Hempel
Wind Enthusiast

Several decades ago, before modern small-scale wind turbines hit the market, one of the most sought-after wind generators was the pre-REA direct-drive machine made by Jacobs Wind Electric. It's rugged, powerful, and reliable when maintained well. When I was growing up, my father and I flew five different homebuilt wind turbines, and I had always dreamed of someday flying a "Jake."

In September 2003, I spotted an old Jake sitting idly on a tower only a few miles from my family's home in Merton, Wisconsin, and immediately thought to myself, "I need to get this machine running again." I also had the feeling that, decades ago, I had once read about this particular machine.

Searching through some of my old periodicals, I found that then-U.S. Representative Henry S. Reuss [D-Milw] installed the 32 VDC, 1,800 W, direct-drive Jacobs Wind Electric generator at his summer home in North Lake, Wisconsin, in 1976. The wind generator was connected to the utility grid through a Gemini synchronous inverter.

After striking a deal with the current owner of the wind generator, I began assembling the necessary equipment to remove the machine from the tower. . . . Removing a 400-pound wind generator from atop a 72-foot tower can be challenging, but we did it and lived to tell the tale. The next step was to rebuild the generator and put it back into action.

Regulatory Hurdles

With the wind generator and inverter refurbished, I had to work on getting approval for installing the system. First, an expert from Wisconsin Focus on Energy, which works with residents and businesses to install cost-effective energy efficiency and renewable energy projects, performed a site assessment. Focus on Energy requires that the entire wind turbine rotor should sit at least 30 feet above any obstruction within a 500-foot radius of the tower. Remembering that trees grow and towers don't, I estimated tree heights for the next 20 to 30 years to determine the tower's height. My 1.3 acres has a 70-foot-tall tree to the west, and to the east is a 40-acre white pine forest with trees that will probably reach 75 feet. The site assessor recommended a minimum tower height of 112 feet, and I rounded up to 120 feet.

Focus on Energy also provided an incentive of $5,940 to cover approximately 25% of the project's cost.

Unfortunately, my proposed tower location didn't meet property-line setback requirements, so I had to request a variance through the Merton Zoning Board. In September 2005, I had to attend a public hearing before the Merton Zoning Board of Adjustment (BOA). After I described the project and answered questions from the board members, the meeting was opened to the public. The concerns were declining property values, audible noise, and visual impact to the neighborhood. Our suburban neighborhood homes are about 30 years old and sit on 1- to 3-acre partially wooded lots.

The BOA denied my request, but after all the elbow grease and sweat I'd put into bringing the Jake back to life, I was determined to see it fly.

After discussions between my attorney and the town attorney, and four more public hearings, the BOA granted my variance—but with fifteen conditions attached (including a 70-decibel noise limit at the closest property line, and a requirement that a structural engineer verify that the tower was installed according to the manufacturer's specifications). After almost six months of effort, I finally received a building permit to erect the wind turbine.

The Jake Generates

Then came the moment I'd been dreaming about—getting the wind generator into the air. The crew on the ground attached the generator to the crane, and the 14-foot-diameter blade rotor was attached to the generator. The crane hoisted the whole assembly to the top of the 120-foot tower.

Getting the Jake up on the tower wasn't the end—we still needed to wire the system. Because this system was eligible for net metering, an interconnect agreement and site inspection were required by the local electric utility, and a sign-off was needed from the local electrical inspector. They gave their approval—almost three years to the day after I first set eyes on the old Jake!

An average wind speed of 11.8 mph should generate about 400 kilowatt-hours per month, providing roughly two-thirds of our electrical needs. . . .

With the Jake running, we're more motivated to see how we can minimize our energy usage by implementing conservation measures and upgrading to more efficient appliances. I am also pleased that since our Jake was erected, it has generated many positive responses from people in the area. In fact, more than one neighbor has expressed interest in installing a wind turbine.✡

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Straight from the Garden

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serves a new Habitat for Humanity house in Lancaster. Timmerman is slated to lead two MREA solar hot water workshops this year, one in Benton and the other in Willard. For more information about MREA's workshops, visit www.the-mrea.org.

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