



The little wind turbine that could

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Dan Webb, then vice president of Webb Research Corp. in Falmouth, began his interest in wind power in 2004 when he started attending seminars on wind turbines. An energy-expert friend heightened Webb's interest by suggesting a utility-scale turbine of at least 1-megawatt capacity for the site of his family's high-tech business in the Falmouth Technology Park. This windy, industrial location is one-third of a mile from the nearest residence and 180 feet above sea level.

Webb hired a consultant, Boreal Renewable Energy Development of Arlington. In 2005 a detailed feasibility study was completed, supported by a grant from the Massachusetts Renewable Energy Trust. The study included turbine sizes from 100 kilowatts to more than 1 megawatt. By 2006 Webb applied for and received a substantial design and construction grant from the Massachusetts Renewable Energy Trust Large On-Site Renewables program.

Webb investigated running underground electrical cables to other nearby businesses within the Falmouth Technology Park. While well-intentioned, this approach was found to be too costly and impractical because of legal constraints on cable placement.

In 2007 new state legislation for virtual net metering, introduced by Rep. Matt Patrick of Falmouth, would resolve this problem and facilitate renewable energy projects statewide. The Green Communities Act, signed into law by Gov. Deval Patrick in 2008, included the net metering provisions increasing the maximum allowed capacity of wind and solar systems from 60,000 watts (60 kilowatts) to 2 million watts (2 megawatts). Excess electricity not consumed on-site is paid for by the electric utility, or credits can be transferred to other electricity users.

The arduous process of seeking permits began. Webb recalled: "Navigating the maze of local, state and federal permits became sort of an obsession to reach the next milestone." It took three more years of grueling effort for Webb to obtain approvals from numerous entities.

Then in 2007 Webb obtained a \$300,000 grant from the U.S. Department of Agriculture. As the project by then required more of his time and the company's money, Webb realized he needed to form a separate legal entity for the venture, and Notus Clean Energy LLC was born. The name Notus comes from the Greek god of southwest wind, the prevailing summer wind on Cape Cod.

Larger expenditures were soon required for detailed site surveys, engineering consultants, road and foundation designs, photo simulations and other necessary tasks. For example, a detailed noise study by Epsilon Associates determined the turbine sound level at nearest residences, under worst-case conditions, would be less than 2 decibels, barely perceptible to the human ear.

The Massachusetts Noise Control Regulation allows a noise level of up to 10 decibels above ambient (background) level, measured at the property line.

By 2008 all permits were in place and Notus began preparing a request for construction proposals.

Then in 2009 it was time to shop for a wind turbine in the 1.5-megawatt range. Utility-scale wind turbines are typically sold in large numbers and are difficult to purchase in small quantities. Wind energy development was growing rapidly in the United States in 2009 and established turbine manufacturers would not consider selling just one turbine. The only willing vendors had unproven designs or had never worked in the U.S. market, risks Webb was unwilling to take.

By summer 2009 negotiations began for the purchase of a new Vestas 1.65-megawatt wind turbine that had been in storage. This turbine had previously been purchased by the Massachusetts Renewable Energy Trust for the discontinued Orleans municipal project. (An identical turbine was purchased by the town of Falmouth and installed at its wastewater treatment plant.) Vestas is the world's largest wind turbine manufacturers.

The American Recovery and Reinvestment Act of 2009 made Notus eligible for a 30 percent cost grant, in lieu of the previously legislated Production Tax Credit for wind energy. Notus can apply for these funds when the turbine is operational.

On April 1, general contractor Delaney Group Inc. broke ground. Construction was an impressive sight, and went smoothly. The foundation contains 26 tons of steel reinforcing bars and required 32 cement-mixer truckloads. The giant construction crane, assembled on site, weighs 500 tons and requires its own permit from the FAA.

Interestingly, construction was the fastest phase of the project. Turbine installation was completed on May 18, and "going live" awaits only connection to NStar's electrical grid. The Notus wind turbine will generate enough electricity to power about 500 homes, eliminating more than 1,000 tons annually of carbon dioxide emissions.

Jim Liedell and Charles Kleekamp are retired engineers and past directors of Clean Power Now.

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