

Leading by Example: Renewable Energy at Lakeshore Technical College
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Author's Note: This paper is not "academic" by definition. There are no charts, distribution curves, or citations. It is more like an essay, told in the first person that chronologically summarizes how and why Lakeshore Technical College became involved in the world of renewable energy and how we impact the community. I am an instructor and an electrician. I teach electrical apprenticeship, electrical code, basic electricity, agricultural wiring, and renewable energy classes. This document is from my personal perspective and does not necessarily reflect the views of the college.

The mission of Lakeshore Technical College (LTC) is to give the citizens of Manitowoc and Sheboygan County the skills they need to get good jobs. To succeed in this mission means to keep close relationships with local employers. Therefore advisory committees meet regularly to help design and update the programs, courses, and curriculum that must evolve with new technologies and demands in the workplace. At times the college is quite proactive and can predict upcoming trends in the job market; other times it is simply reactive to immediate community needs.

LTC faculty member and long-time environmentalist Steve Power is responsible for getting the college involved with a renewable energy project called PETE – Partnership in Environmental Technology Education. In 2002, he and I traveled to the Department of Energy's National Renewable Energy Laboratory (NREL) in Colorado to meet with educational coordinators and instructors from 13 technical and community colleges throughout the United States. There we learned from renowned experts about the components and technologies involved in various renewable energy systems. Representatives from the schools also shared ideas and techniques relative to curriculum development and teaching methods.

Shortly after joining PETE, a project coordinated through the Consortium for Education in Renewable Energy Technology (CERET), Steve and I worked with local curriculum specialists and industry leaders to design and develop courses in the field of renewable energy. We created classes in energy management, photovoltaic (PV) systems, wind power, and biomass and biogas systems.

Also in 2002, LTC began working with Focus on Energy, Wisconsin's public benefits funds delegate, to attain a renewable energy demonstration grant worth a phenomenal \$100,000. Largely because of the ambition and work of Doug Lindsey, the Dean of Agriculture, Trade & Industry, the college was awarded the grant money and erected a 65 kW wind turbine on the north side of the campus. Seventh Generation Energy Systems of Madison, WI installed the reconditioned California wind turbine in August of 2004, and I was encouraged and delighted to participate in the installation.

The current wind maps of Wisconsin show Lakeshore counties like Brown, Door, Kewaunee, and Manitowoc as having respectable wind speeds - arguably the best in the state. The LTC campus is located in southeast Manitowoc County, approximately one mile from the coast of Lake Michigan. The average wind speed at the site is 12-13 miles per hour.

Originally the plan was to install both a small wind system as well as a small photovoltaic system with the grant money. Shortly before the grant application deadline, Doug approached me and asked for a second opinion: small wind and small PV, or big wind? I answered in favor of “big wind” without hesitation. He and I agreed that the college could always later install a PV system when another grant opportunity presented itself.

The money LTC received from Focus on Energy was a “matching” grant. In order to get \$100,000, the college had to spend \$100,000. LTC spent \$100,000 on curriculum development and staff training in renewable energy technologies. In return, the 65 kW wind turbine and a 50-meter meteorological tower were installed, along with wireless communication from the wind turbine’s programmable logic controller to a real-time data website. Minute-by-minute production data associated with the wind turbine goes into daily software files. Numbers showing wind speeds and direction, turbine status and orientation, voltage, current, frequency, power factor, and energy is recorded in the software files and is available to the public on the LTC website. The real-time data can also be seen in a user-friendly and graphic format on www.gotoltc.edu.

The LTC wind turbine is conveniently located in plain view of motorists traveling along Interstate 43 which runs north-and-south between Green Bay and Milwaukee. The turbine advertises itself. I have received numerous phone calls and emails in the last two years from people who were “just driving by,” noticed the generator, and had some questions. The machine attracts attention and gets people talking about renewable energy.

The college has made a strong statement by installing a wind turbine and teaching renewable energy classes, whether that was anticipated or not. LTC is openly promoting the use of clean, renewable, domestic energy. And LTC is telling the community that it supports wind power. Wisconsin Public Radio was there during the crane lift on installation day and aired a lengthy story that same afternoon. The college media department created a promotional/educational video of the installation for the LTC cable TV channel. It still airs regularly.

Ironically, in 2004, during the same period of time that LTC was reveling in the recent success of the wind turbine installation, a wind power controversy was growing in Manitowoc County. As a result of heavy opposition to a proposed wind farm in the townships of Two Rivers, Two Creeks, and Mishicot, the County Board of Supervisors passed a one-year moratorium in the spring of 2005 - halting the installation of all wind turbines in Manitowoc County.

I had attended a few of the public hearings, and was horrified to hear the terrible misinformation being spread about wind turbines by certain citizens: wind turbines are noisy, dangerous, threatening to wildlife, detrimental to property values, and overall eyesores. They said that wind turbines throw ice, cause stray voltage, interfere with communication systems, and cause groundwater contamination.

Being new to the world of NIMBY (not in my back yard) mentality and local zoning procedures in general, I was naïve and thought that my skills as an educator would be useful to the people of Manitowoc County. I wrote commentaries for the Manitowoc *Herald Times Reporter* and was a repeat guest on the local AM radio talk show answering questions from the host and callers about wind power. I was truly convinced that I could sway my opponents.

An attempt of mass education, LTC offered free seminars on wind power to the public. I created and presented in April of 2005 three consecutive Saturday-morning sessions: *Wind Power Basics*, *Truths and Myths*, and *The First Step: Getting Started*. The seminars were wildly successful; there were more than 80 people in attendance on the busiest day. Many participants were simply there to learn more about the machines and how they work. Some were thinking about installations on their own property. Only a few opponents came. I handed out CDs on the third Saturday that contained all three of the PowerPoints with links to a plethora of websites.

In May of 2005, I was approached by the Chairman of the County Board and the County Executive and asked to be a member of the Wind Energy Systems Advisory Committee (WESAC) that was formed along with the moratorium, apparently because I was the nearest “wind expert.” I accepted. The committee met regularly for nearly a year and wrote new ordinances that are effectively a ban on wind turbine installations in Manitowoc County. I was unsuccessful.

But alas, LTC was still experiencing wind-related success stories.

In November of 2005, the first LTC student climbed the tower and helped perform the bi-annual maintenance. Velvet Sommers, an Electro-Mechanical student, expressed interest in the wind turbine since its installation. She had taken my *Renewable Energy Interconnection* and *Introduction to Wind Systems* classes, along with nearly all of her other related program courses. She wanted to climb, and I wanted to let her.

Doug Lindsey helped me create a one-credit (unadvertised) climbing course with a hefty list of prerequisites – electronics, motors, hydraulics, and wind. We designed it for someone in their final semester of the Electro-Mechanical program. Allowing Velvet to climb was, at first, an issue of liability. But as long as a student is enrolled in a specific course, LTC runs the same risk as a student getting a shock in the electronics lab or being crushed by a car in the automotive lab.

Velvet climbed on a beautiful, lightly crisp November morning, and the sun broke through the clouds just as the local reporter and photographer were driving up the gravel road to the turbine. It was a picturesque day with a bold, blue sky, and the next morning the story was on the front page of the Manitowoc *Herald Times Reporter*. We were all in shock; none of us were expecting front-page news.

The story was picked up by the Associated Press (AP) and appeared in newspapers all over the country. We were elated. And we were even more excited when, a few weeks later, we were contacted by Gamesa Wind U.S. and asked about our training program. A representative flew from the main office in Pennsylvania to LTC and met with Doug and me for nearly a full day. We talked about the Electro-Mechanical program and how closely it mirrored the skills Gamesa needs for its technicians.

Together we created a new program that piggy-backs the Electro-Mechanical program, called *Wind System Technician*. It is an option for any Electro-Mechanical student; only a few course requirements are different. For example, to graduate as a Wind System Technician, one would not have to take the pneumatics courses normally required by the Electro-Mechanical degree, but would instead have to take the generator and wind systems courses. The new Wind System Technician program (that will be available starting in the fall of 2006) includes a 3-credit internship in the summer working for Gamesa.

Lakeshore Technical College received the 2005 Innovation Award from the Interstate Renewable Energy Council (IREC). This was noteworthy recognition, as LTC had just announced its Renewable Energy Initiative, which means the college is ready to promote its new course offerings.

LTC still has a long way to go to reach sustainability. It is a small campus, but it uses a huge quantity of energy. In 2006, the college started the Energy Management Committee to start addressing some conservation and efficiency ideas. The mission is to spread education and awareness about energy and natural resource consumption to everyone at LTC, and the vision is to ultimately become a sustainable or net-zero energy campus. I plan to start up and coordinate a “green” student club in the fall of 2006.

In the meantime, LTC is planning to install two photovoltaic arrays on the south side of the campus – one fixed and one tracking. The systems will be interconnected through inverters that will be on display for the students to see. I will begin teaching courses in PV as soon as the system is installed.

The college has also been talking about more wind power. Back when the college was finding a good site for the wind turbine, three stakes were put into the ground. There has always been chatter of more wind turbines. However, because of the new Manitowoc ordinances, LTC may not be able to do that. The property would be considered a “wind farm” and would need to maintain a distance of 1000’ from all property lines. That kind of clearance does not exist. Time will tell if that turns into an issue.

The college president has also expressed an interest in constructing a “green” building to be located on the hill near the wind turbine. The structure could be used as a classroom and/or demonstration facility. It could incorporate all kinds of renewable energy and smart building concepts – like geothermal heating and cooling, solar thermal for hot water, and a PV/wind hybrid system for electricity. It would be the perfect place to conduct renewable energy seminars, workshops, field trips, and labs.

LTC will be installing an “energy kiosk” in the commons area near the cafeteria and bookstore. At the kiosk, students and staff will be able to see in real-time the energy production and consumption on the campus. The energy usage will be broken down by buildings and departments. The wind turbine and the PV array output information will also be made available at the kiosk. This project is planned in an effort to increase awareness of energy consumption and is an idea drafted by the newly-formed LTC Energy Management Committee.

The title of this paper is *Leading by Example*, and that’s exactly what the college is doing. The people of Sheboygan and Manitowoc County look to the school to provide the citizens with the skills they need to get good jobs. And good jobs today are in the world of clean, renewable domestic energy. LTC has trained more than two dozen certified electricians in the state to install and interconnect renewable energy systems. An Industrial Maintenance student has recently accepted a welding position at a company in Manitowoc that constructs very large wind turbine towers. And Velvet, the infamous student climber, is today employed by Gamesa and is currently working at a wind farm in Illinois.