FINAL Technical Report

COVER PAGE

Federal Agency to which Report is submitted: DOE EERE – Wind & Water Power Program

Project Title: POWER-Purposeful Partnership Coordinating Wind Education Resources

Award Number: DE-EE0000537

Project Period: 12/1/2009 -11/31/2012

Report Date: February 28, 2013

Principle Investigator: Michelle Gibbs, Next Generation Energy Coordinator, michelle.gibbs@gotoltc.edu, 920.693.1372

Report Submitted by: Michelle Gibbs

Recipient: Lakeshore Technical College (LTC) - 1290 North Ave., Cleveland, WI 53015

DUNS Number: 074774324

Working Partners:

- Blackhawk Technical College (BTC), Kirke Plank, Dean of Instructional Programs (phone: 608.757.7727 email: kplank@blackhawk.edu) – *Original Partner*
- Fox Valley Technical College (FVTC), Mike Cattelino, Dean Manufacturing, Transportation, Information & Agriculture Technologies Division (phone: 920-735-4887 email: cattelin@fvtc.edu). – *New Partner*
- Gateway Technical College (GTC), Dennis Sherwood, Dean of Campus Affairs (phone: 262.564.3218 email: SherwoodD@gtc.edu) – *Original Partner*
- Mid-State Technical College (MSTC), Dr. John Anderson, Program Coordinator – Renewable Energy (phone: 715.422.5428 email: john.anderson@mstc.edu) – *Original Partner*

- Milwaukee Area Technical College-Milwaukee (MATC-MIL), to be assigned. – *Former Partner*
- Moraine Park Technical College (MPTC), Matthew Hurtienne, Dean of Information Technology/Campus Dean (phone: 920.887.1441 email: mhurtienne@morainepark.edu) – *Original Partner*
- Northeast Wisconsin Technical College (NWTC) Amy Kox, Associate Dean – Energy and Sustainability (phone: 920.498.6908 email: amy.kox@nwtc.edu) – *New Partner*
- NEW North - Wisconsin Wind Works, Jerry Murphy, Executive Director NEW North (email: jmurphy@thenewnorth.com) – *New Partner*
- General Electric (GE) Power and Water, James Ranes, Senior Service Area Manager / Lean Black Belt at GE Power & Water (email: james.ranes@ge.com). – *New Partner*
- ENSA, Robert Siegel, Operations and Business Development Director (phone: 262-408-2282 email: rob@ensausa.com) – *Original Partner*
- Snap-On Industrial, David Lay, President of Hytorq (phone: 801.492.3458 email: davidlay@hytorc.com) – Hytorq is an affiliated Snap-On Industrial Partner, participating in NC3. – *Original Partner*
- National Coalition of Certification Centers (NC3), Roger Tadajewski, Executive Director, (phone: 405-850-9814 email: roger.tadajewski@nc3.net) – Other Leadership Schools outside of POWER Partners: – *Original Partner*
    - Shoreline Community College
    - Francis Tuttle Technology Center
    - Lawson State Community College
    - New England Institute of Technology
    - South Seattle Community College
    - Wichita Area Technical College

Cost-Sharing Partners:

- Blackhawk Technical College (BTC), Kirke Plank; – *Original Partner*
- Fox Valley Technical College (FVTC), Mike Cattelino; – *New Partner*

- Gateway Technical College (GTC), Dennis Sherwood; – *Original Partner*
- Mid State Technical College (MSTC), Dr. John Anderson; – *Original Partner*
- Milwaukee Area Technical College-Milwaukee (MATC-MIL); – *Former Partner*
- Moraine Park Technical College (MPTC), Matthew Hurtienne; and – *Original Partner*
- Northeast Wisconsin Technical College (NWTC), Amy Kox. – *New Partner*

DOE Project Team: DOE HQ Program Manager – Jose Zayas

DOE Field Contract Officer – Pamela Brodie

DOE Field Grants Management Specialist – Sonia Gordon

DOE Field Project Officer – Debbie Schultheis

DOE/CNJV Project Monitor – Michael Carella

Signature of Submitting Official:

Michelle Gibbs

Acknowledgment, Disclaimer and Proprietary Data Notice:

Acknowledgment: This report is based upon work supported by the U. S. Department of Energy under Award No. DE-EE0000537.

Disclaimer: Any findings, opinions, and conclusions or recommendations expressed in this report are those of the author(s) and do not necessarily reflect the views of the Department of Energy.

Proprietary Data Notice: To the best of our knowledge, we did not create any proprietary data.

TABLE OF CONTENTS

LIST OF ACRONYMS

Lakeshore Technical College	LTC
Associate of Applied Science	AAS
Wisconsin Technical College System	WTCS
Department of Energy	DOE
Blackhawk Technical College	BTC
Fox Valley Technical College	FVTC
Gateway Technical College	GTC
Mid-State Technical College	MSTC
Milwaukee Area Technical College	MATC
Moraine Park Technical College	MPTC
Northeast Technical College	NWTC
General Electric	GE
National Coalition of Certification Centers	NC3
National Center for Construction Education and Research	NCCER
Association for Career and Technical Education	ACTE

Wisconsin Energy Research Consortium	WERC
NEW NORTH - Wisconsin Wind Works	WWW
Individual Technical Studies	ITS
Trade Adjustment Assistance	TAA
Workforce Investment Act	WIA
Safe: Access, Fall protection, Evacuation, and Rescue	SAFER
American Association of Community Colleges	AACC
Sustainability Education & Economic Development	SEED
K-12 energy Education Program	KEEP
American Wind Energy Association	AWEA
Distributed Wind Energy Association	DWEA
Midwest Renewable Energy Association	MREA
RENEW Wisconsin	RENEW
Midwest Rural Energy Council's conference	MREC
Center for Energy Workforce Development	CEWD
Society of Professional Rope Access Technicians	SPRAT
Supervisory Control and Data Acquisition	SCADA
Lock-Out-Tag-Out	LOTO

LIST OF APPENDICES

Appendix A - 2013 Summer boot camp schedule (first and second year shared program students).

Appendix B - Photos of the campus turbines.

Appendix C - Photos of the Rescue Tower and GE Nacelle.

Appendix D - Campus sustainability signage.

EXECUTIVE SUMMARY

At the time of LTC's application we were home to a small / mid-sized Wind Energy Research and Teaching Center, funded in part by We Energies, and offered the state of Wisconsin's first Associate of Applied Science (A.A.S.) Degree in Wind Energy Technology. With President Obama promising investment in wind, LTC and its partners were uniquely situated to meet the challenge through an organized career pathways approach that utilized industry drivers and occupationally verified curriculum to train the workers who "*transform our energy sector*." LTC's employer partners validated the findings of the "20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply" report by the US Department of Energy which recognized programs like LTC's as an "excellent beginning," noting that *many more like them are necessary* to meet the challenges of the 20% Wind scenario.

One of the focuses of the study was the lack of trained technicians to work on installation and maintenance of renewables (and more specifically for our grant application wind turbines). LTC's goal, made possible with the funding provided in this grant, was to increase the number of skilled graduates to help meet this national objective. LTC was already a leader in wind for the state of Wisconsin but wanted to upscale from a single school to a statewide (and potentially regional) center for wind energy. LTC planned to leverage our facilities, curriculum, and faculty expertise to meet this goal.

POWER, ***P****urposeful Partnerships c****O****ordinating* ***W****ind* ***E****ducation* ***R****esources*, built on the strength of each partner to improve the value and quality of LTC's Wind Energy Technology core curriculum and coordinate a career pathways approach to promote wind energy careers, increase access to Wind Energy Technology core courses, and produce graduates to help ensure an abundant and skilled workforce to support the 20% wind scenario. By providing comprehensive career awareness and outreach to high school students and their parents, dislocated workers, adult learners, and other untapped labor pools, students understand the career opportunities that await them in the industry and are motivated to pursue the higher education that is necessary for success.

POWER was comprised of objectives to assist in furthering the wind energy industry and collaboration for wind energy careers.

Activity 1a - *Engage industry partners through POWER Project Steering Committee meetings, Wind Program Advisory Committee meetings, outreach activities, and employer surveys.*
Activity 1b - *Conduct high school outreach to engage students in programs of study that lead to wind energy career pathways through local technical colleges.*
Activity 1c - *Promote wind energy career pathways to dislocated workers, veterans, incumbent workers, and other untapped labor pools.*
Activity 2a - *Provide faculty professional development opportunities.*
Activity 2b - *Modify industry recognized certification in Torque for online or blended delivery.*
Activity 2c - *Embed industry recognized credentials into existing curriculum.*
Activity 3a - *Engage five WTCS, colleges to design Individual Technical Studies programming options for students.*
Activity 3b - *Engage partners to validate and evaluate curriculum for ITS options.*
Activity 3c - *Work with ten other WTCS colleges to explore additional ITS options.*

LTC with the help of its partners, Gateway Technical College (GTC), Milwaukee Area Technical College (MATC), Moraine Park Technical College (MPTC), Mid-State Technical College (MSTC), Blackhawk Technical College (BTC), Fox Valley Technical College (FVTC), and Northeast Technical College (NWTC), Snap-On Incorporated, Invenergy, and Vestas, We Energies, General Electric (GE), National Coalition of Certification Centers (NC3), New North – Wisconsin Wind Works, and Wind Program Advisory Committee Members, designed this project to meet the workforce needs of the wind industry in Wisconsin and the country.

Throughout the project period LTC hosted Wind Program Advisory Committee and POWER Steering Committee meetings. LTC and partners attended local, regional, and national conferences as a way to promote the program, network, and provide professional development of staff.

Torque Certification materials from NC3, Snap On, Hytorq, and Gateway Technical College are completed. These materials are used in the Wind Technician courses. Materials were available to participants of the NC3 Train-the-Trainer programs. NC3 and Snap-On reorganized the staffing and dedicated additional resources for maintenance of the web based registration for individuals receiving the Torque Certification (Basic).

Staff from the LTC energy department are constantly in contact with industry partners about changes in the wind industry, best practices, faculty development opportunities, and how to better the program through the advisory committee meetings, regular correspondence, and campus visits. Our numbers show this with our graduates and their placement in the wind industry. LTC has continuously increased the number of graduates from the program: 2008 (1 graduate); 2009 (3 graduates); 2010 (8 graduates); 2011 (12 graduates); and 2012 (13 graduates). Our graduates are out competing other graduates for jobs at organizations like: Kettle View Renewable Energy, LLC, Ingeteam, Endurance Wind, Broadwind, NextERA, Invenergy, GE, Avanti, Renew Energy Maintenance, Fuhrlaender North America, and Seventh Generation.

LTC worked with WTCS POWER Partner schools to develop shared programs for Wind Energy. With this model (in place of the ITS) students at partner schools can live at home and take their general education and trades courses at their local school and then attend a summer boot camp at LTC. During the boot camp students have the opportunity to climb and train on our one-of-a-kind equipment and graduate with a degree from LTC in Wind Energy. This summer LTC will host boot camps for both first and second year shared program students. Formal shared program agreements have been signed with FVTC, MPTC, and NWTC. LTC staff continue to work with POWER Partner and remaining WTCS schools on shared programs agreements.

BACKGROUND

At the time of LTC's application we were home to a small / mid-sized Wind Energy Research and Teaching Center, funded in part by WE Energies, and offered the state of Wisconsin's first Associate of Applied Science (A.A.S.) Degree in Wind Energy Technology.

LTC's employer partners validated the findings of the "20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply" report by the US Department of Energy which recognized programs like LTC's as an "excellent beginning," noting that *many more like them are necessary* to meet the challenges of the 20% Wind scenario. With President Obama promising investment in wind, LTC and its partners were uniquely situated to meet the challenge through an organized career pathways approach that utilized industry drivers and occupationally verified curriculum to train the workers who "*transform our energy sector*."

One of the focuses of the study was the lack of trained technicians to work on installation and maintenance of renewables (and more specifically for our grant application wind turbines). LTC's goal was to increase the number of our graduates to help meet this national objective. LTC was already a leader in wind for the state of Wisconsin but wanted to upscale from a single school to a statewide (and potentially regional) center for wind energy. LTC planned to leverage our facilities, curriculum, and faculty expertise to meet this goal.

INTRODUCTION

LTC and its partners, Gateway Technical College (GTC), Milwaukee Area Technical College (MATC), Moraine Park Technical College (MPTC), Mid-State Technical College (MSTC), Blackhawk Technical College (BTC), Fox Valley Technical College (FVTC), and Northeast Technical College (NWTC), Snap-On Incorporated, Invenergy, and Vestas, WE Energies, General Electric (GE), National Coalition of Certification Centers (NC3), New North – Wisconsin Wind Works, and Wind Program Advisory Committee Members, designed this project to meet the workforce needs of the wind industry in Wisconsin and the country.

POWER, ***P****urposeful Partnerships c****O****ordinating* ***W****ind* ***E****ducation* ***R****esources*, built on the strength of each partner to improve the value and quality of LTC's Wind Energy Technology core curriculum and coordinate a career pathways approach to promote wind energy careers, increase access to Wind Energy Technology core courses, and produce graduates to help ensure an abundant and skilled workforce to support the 20% wind scenario. By providing comprehensive career awareness and outreach to high school students and their parents, dislocated workers, adult learners, and other untapped labor pools, students understand the career opportunities that await them in the industry and are motivated to pursue the higher education that is necessary for success. The career pathways approach allows students to select from LTC's signature Wind Energy A.A.S. program by enrolling directly at LTC or enroll in a shared program at a partnering school. With this model students are able to take their general education and trade courses on their local campus and then come to LTC for the core wind curriculum and have the opportunity to train on our unique equipment (see Appendix A for the first and second year summer boot camp schedules for 2013). POWER also included

professional development activities for faculty from all partnering technical colleges, and core curriculum updates and improvements to reflect industry feedback.

POWER was led by LTC's Next Generation Energy Coordinator (hereafter "Coordinator") Kiah Smith/Michelle Gibbs. The Coordinator was supported by LTC's Project Champion and subject matter expert (hereafter "Champion") Jenny Heinzen/Matthew Boor as well as the Dean of the Energy, Doug Lindsey. Smith resigned from his position at LTC in the spring of 2010 and Gibbs was brought on at that time. Heinzen was the lead wind instructor and was a valuable asset in the creation of the program. In the fall of 2010 LTC brought on a second wind instructor, Boor, and he also took on responsibilities of the Champion. In the winter of 2011 Heinzen resigned from her position at LTC and Boor assumed all Champion responsibilities. The Coordinator position had multiple responsibilities relevant to POWER, including driving industry engagement, coordinating outreach, and promoting energy careers. In addition the Coordinator oversaw administrative aspects of grant management, including record keeping, progress reports, and scheduling, with support from Lindsey and LTC's financial department and grants specialists. Each educational partner had a campus leader that served on the POWER project steering committee, which connected partners throughout the implementation of the project.

POWER was comprised of objectives to assist in furthering the wind energy industry and collaboration for wind energy careers:

Activity 1a - *Engage industry partners through POWER Project Steering Committee meetings, Wind Program Advisory Committee meetings, outreach activities, and employer surveys.*
Activity 1b - *Conduct high school outreach to engage students in programs of study that lead to wind energy career pathways through local technical colleges*.
Activity 1c - *Promote wind energy career pathways to dislocated workers, veterans, incumbent workers, and other untapped labor pools*.
Activity 2a - *Provide faculty professional development opportunities*.
Activity 2b - *Modify industry recognized certification in Torque for online or blended delivery.*
Activity 2c - *Embed industry recognized credentials into existing wind curriculum*.
Activity 3a - *Engage five WTCS colleges to design Individualized Technical Studies (ITS) programming options for students in related programs.*
Activity 3b - *Engage partners to validate and evaluate curriculum for ITS options*.
Activity 3c - *Work with other ten WTCS colleges to explore additional ITS options*.

ACCOMPLISHMENTS, RESULTS, AND DISCUSSION

Activity 1a - *Engage industry partners through POWER Project Steering Committee meetings, Wind Program Advisory Committee meetings, outreach activities, and employer surveys.* Tasks: Establish POWER Steering Committee and meeting schedule, invite new members to LTC's Wind Advisory Committee, invite new members to advisory committees for relevant programs at partnering colleges. Utilize LTC's existing wind energy resources online collaboration tool to streamline communication between partners.

- Throughout the project period LTC hosted Wind Program Advisory Committee meetings during the spring and fall term.
- POWER Partner Steering Committee Meetings were hosted by LTC February 2010, June 10, November 2010, April 2011, August 2011, October 2011, November 2011, February 2012, and May 2012. Partners had the option of coming to LTC for the meeting or participate via Interactive Television (ITV).
- LTC Commissioned three of its four on campus turbines: 50kW Entegrity (May 2010), 50kW Endurance (August 2010), and 2.5 kW Proven (October 2010). The first turbine (65kW Vestas V-15Turbine) was installed in 2004 and provided the motivation to develop the wind program (see Appendix B for photos of the turbines).
- 2010-2011 Engineered and installed the Rescue Tower and GE Nacelle (see Appendix C for photos of the Rescue Tower and GE Nacelle).
- Lindsey and Gibbs continue to serve on the Wisconsin Technical College System (WTCS) Renewable Energy Deans and Coordinators committee. This group meets monthly (via phone or in person) to discuss emerging jobs in energy within the State of Wisconsin and the country and how to prepare a future workforce.
- Lindsey continued to serve as a LTC representative for Wisconsin Energy Research Consortium (WERC) and attends quarterly meetings. WERC's mission is to "combine industry and the power of Wisconsin's top four Engineering Research Universities, and Technical Colleges to provide cutting-edge consulting, research, workforce development, and industry expansion."
- Gibbs continues to serve on the NEW ERA Sustainability Task Force Committee and attends a monthly conference call or bi-monthly in-person meeting. NEW ERA is a partner in the NEW North. The NEW ERA group is a "consortium that fosters regional partnerships among the public colleges and universities in the NEW North to better serve the educational needs of the 1.2 million people in northeast Wisconsin."
- Lindsey continue to serve on the Wisconsin Wind Works (WWW) Alliance and attends monthly conference calls or in-person meetings on behalf of LTC. LTC and WWW are building a stronger relationship and looking at better ways of partnering and promotion. The WWW "is a consortium of nearly 300 suppliers and manufacturers working collaboratively to satisfy foreign and domestic wind power supply chain needs. It is a collaborative initiative of New North, Inc. a regional non-profit economic development organization, dedicated to building powerful supply chain partnerships to encourage business development in wind energy."
- Gibbs continues to serve on the Sheboygan, WI Maywood Environmental Park Advisory Board and also sits on the education committee. The board meets bi-monthly and the education committee meets monthly. One of the major initiatives of the education committee is increasing STEM education for elementary, middle, and high school students in Sheboygan County.
- LTC partnered and continues to work with the group National Coalition of Certification Centers. "(NC3) was established to address the need for strong industry partnerships with educational institutions in order to develop, implement and sustain industry-recognized portable certifications that have strong validation and assessment standards."
- LTC hosted a SAFER: Safe, Access, Fall protection, Evacuation, and Rescue training sessions for employees from organizations outside of LTC.
- Staff from LTC participated in the Lakeshore Industry Cluster Initiative Leadership Team Meetings. The Economic Development Corporation of Manitowoc County is leading this

effort jointly with economic development organizations in Manitowoc, Door, Calumet, Kewaunee, and Sheboygan Counties. The Cluster Initiative engages businesses in Industry Cluster Networks to analyze and leverage assets and opportunities for additional business growth and development. The targeted industries that will be the initial focus of the Lakeshore Industry Cluster Initiative will be Manufacturing, Food Processing/Agriculture, Energy, and Tourism."

- Lindsey and Gibbs continue to participate in events/webinars for the American Association of Community Colleges (AACC) Sustainability Education & Economic Development (SEED).
- LTC continues to host community outreach events like their semi-annual POWER OF GREEN series and Earth Day Activities. These were open to students, staff, and community members. The purpose of the series is to educate people on renewables, energy efficiency, and ways they can live a more sustainable life.
- Throughout the grant period Lindsey, Gibbs, and Boor built stronger relationships with organizations like the Sierra Club, American Wind Energy Association (AWEA), Burger Boat, GE, Avanti Wind, Tower Tech, Ingeteam, and Gearbox Express. LTC will continue to work on maintaining these relationships.
- Throughout the grant period Lindsey, Gibbs, Heinzen, and Boor made connections and discovered synergies with industry and educational partners at annual events like the Green Energy Summit, AWEA conferences, RENEW, Midwest Renewable Energy Association, MREA, Wind Tech Conference, American Association of Community College's (AACC) Sustainability Education & Economic Development (SEED) Pre-Conference, Workforce Development Institute Conference, ACTE/NC3 Energy Summit, U.S. Offshore Wind Market and Supply Chain Workshop, Windustry Small and Community Wind Conference, Smaller Wind Conference, NEW North Summit, Wisconsin Sustainable Business Council Conference, Offshore Wind Conference, Annual Great Lakes Wind Collaborative Meeting, AWEA Safety Conference, Wind Alliance Conference, AWEA Small and Community Wind Conference/Exhibition. LTC will continue to send staff to these types of events for professional development, best practices, and networking.
- During the grant period LTC hosted visitors on campus like the Wisconsin Lt. Governor Rebecca Kleefisch, Wisconsin DNR Secretary Cathy Stepp, a representative from Senator Ron Johnson's office, and Congressman Petri. Tours included the energy division and renewable energy systems. LTC will continue to welcome visitors on campus to learn about energy and sustainability.
- LTC's program was highlighted in the press:
    - July 12, 2011 LTC was highlighted in the SEED newsletter for its accomplishments in campus sustainability. The newsletter also praised the WTCS for being the first state to have all colleges partnered in SEED.
    - May 29, 2012 LTC was featured in an article titled "Certified Technicians Come with More than a Diploma" in WIND POWER ENGINEERING Magazine.
    - August 29, 2012 Lindsey was quoted by the Milwaukee Journal Sentinel for their front page business article on wind technician jobs related to Great Lakes Wind.
    - November 26 – December 4, 2012 LTC was selected as the banner ad feature school on the American Association of Community College's (AACC) homepage. The photo featured Boor and students atop the campus GE nacelle.
- Lindsey negotiated a direct transfer of the full LTC Wind Energy Technologies AAS degree to Excelsior College, Albany, NY. This agreement was strongly recommended by industry partner GE Energy. GE has also reached a credit transfer for their

proprietary GE 1.5 turbine technician training. This post-graduation industry experience adds another 30 credits towards the bachelor's degree at Excelsior. Lakeshore Technical College Associate in Applied Sciences in Wind Energy Technology to Excelsior College Bachelor of Professional Studies in Technology Management with an Area of Focus in Renewable Energy transfer agreement.

- September 16, 2010 LTC was the host site for a National Coalition of Certification Centers (NC3) meeting. Organizations in attendance included: LTC, Snap-On, American Wind Energy Associate (AWEA), Midwest Renewable Energy Association (MREA), Gateway Technical College (GTC), Francis Tuttle Technical College, Miramar College, and Shoreline Community College was connected to the meeting via phone.
- September 28, 2010 LTC was the host site for the NEW North "Where are the Green Business Opportunities?" conference. The event was a panel discussion on how new and existing businesses in Northeast Wisconsin can take advantage of market opportunities in the alternative energy, renewable energy, and energy efficiency fields.
- November 4, 2010 LTC hosted a meeting on campus for Snap-On and the National Center for Construction Education and Research (NCCER). This Florida based training organization provides skilled trades training for the non-Union non-affiliated federal apprenticeships in conjunction with Pearson Texts. They are broadening their existing power drives and electrical curriculum with four different wind courses / text packages. Several wind colleges are supporting this activity with Subject Matter Experts.
- January 19, 2011 Lindsey and Gibbs presented information on the Wind Program and partnerships during the DOE Workforce Development Grant Webinar.
- January 24, 2011 Gibbs had a tele-meeting with Kylah McNabb, Program Manager - Wind Development Specialist for the Oklahoma Department of Career & Technology Education discussing the wind industry and possible partnerships in the future.
- July 20, 2011 Gibbs attended and hosted a booth at Fox Valley Technical College (FVTC) Clean Energy/Sustainability Expo showcasing green energy programming.
- October 5, 2011 LTC hosted an Igniting Innovation event – Creating Business Value Through Sustainable Practices. The focus of the event was an exploration of how sustainable practices drive innovation and business success in the new economic climate of the 21st century.
- October 13, 2011 Lindsey, Gibbs, and Boor hosted, helped plan, and participated in the Capturing Clean Energy event sponsored by the local Sierra Club, Wisconsin Interfaith Power & Light, and Wisconsin Environment. The purpose of the event was to inform the general public about the benefits of investing in energy efficiency and clean renewable energy and highlight the career opportunities as LTC. Boor was a presenter and the evening also included a tour of LTC's campus renewable energy systems.
- November 4, 2011 LTC hosted a Snap-On Wind Energy Lab Dedication. Snap-On has been a tremendous partner to LTC over the years and recently donated equipment to outfit the wind lab.
- November 10, 2011 LTC hosted a Grow Green event, Work, Live, and Savor Sustainability. The focus of the event included eco-preneuring and renewable energy systems.
- November 14, 2011 LTC hosted a screening of Green Fire a biography of Aldo Leopold which was open to students, staff, and the community.
- June 11-15, 2012 LTC hosted GE and Granite on campus for their recent hire training. They utilized LTC classrooms, wind turbines, and training equipment for their summer college intern orientation program. Topics Included OSHA-10 Hour, Safe Access and

Rescue, and CPR/First Aid. Three of the students participating are current LTC Wind Students on their internships and other participants came from schools such as Iowa Lakes Community College, Columbia Gorge Community College, and Minnesota West Community College.

Activity 1b - *Conduct high school outreach to engage students in programs of study that lead to wind energy career pathways through local technical colleges* Tasks: Distribute Wind Energy career information to high school students through school visits and presentations, Experience LTC, and similar recruitment events at partnering colleges.

- Gibbs worked with the LTC Marketing Department to develop promotional materials to be used for outreach to local middle school and high school.
  - On-Campus Walking Tour – Educational signage at each of the four campus wind turbines, wind equipment, solar panels, and light tubes. This signage was originally produced for "self-guided" tours by campus visitors, but will also be used during guided tours as points of interest. The signage continues to be utilized during campus tours. (see Appendix D for an example of the campus sustainability signage).
  - WTCS Wind Energy Technology Program Video – Highlighting careers for which the program prepares students and discusses course work, interests, and abilities in order to be successful. The videos are now loaded out on the updated program site. See link to the Wind Energy Program Website in the "References Section" at the end of the report.
  - Additional mini-videos regarding "Power of Green" at LTC can be found on the LTC You-Tube website, please follow the link found in the "References Section" at the end of the report.
- Gibbs also worked with outside marketing consultants on the creation of an additional outreach video geared for younger audiences. See link in the ""References Section" at the end of the report titled "YouTube – Power of Green videos". The clips are labeled as middle and high school videos. The link was shared with local middle / high school counselors/teachers during the quarter. The videos are being shared via internet links in place of DVDs as an easier mode of distribution.
- Gibbs continues to work with the LTC high school liaisons on outreach, promotion, and distribution of the new Wind Program Video at local high schools and middle schools.
- Gibbs continues to work with Sara Greenwood, LTC's K-12 Relations Manager, to discuss pathways on the WiCareers Website for middle/high school students. See link in the "References Section" at the end of the report titled "WiCareers."
- Gibbs continues to serve on the Sheboygan, WI Maywood Environmental Park Advisory Board and their education committee. The board meets bi-monthly and the education committee meets monthly. One of the major initiatives of the education committee is increasing STEM education for elementary, middle, and high school students in Sheboygan County.
- Staff from LTC hosted booths at events like Sheboygan's EarthFest, local Earth Day events, Midwest Renewable Energy Association (MREA) Fair, NEW North Summit, Green Energy Summit, Eco-Fair 360 in Walworth County, the Village of Cleveland's annual parade, and NWTC's campus Engineering Open House, and Northwind 100 Wind Turbine Dedication Ceremony in Random Lake as way of program outreach. LTC will continue to send staff to these types of events for outreach into the community.

- Over the project period there were monthly visits to local high schools by our LTC High School Liaisons and Gibbs. At these visits they highlight the Wind Energy Program. LTC Wind Program materials were provided to POWER Partner colleges for their use as well. This effort is continued by LTC staff.
- Annual on campus events like Career Discovery, Experience LTC, Career Expo, LTC Take our Daughters & Sons to Work Day, and Campus Open Houses are opportunities to get middle and high school students on campus and learning about programs offered at LTC. The Wind Program will continue to be showcased.
- During the project period LTC hosted its annual Program of Study Night. This event is designed to allow high school teachers to meet with LTC faculty to continue to partner on curriculum and to develop programs of study. During the work-time with LTC faculty, the high school teachers are able to "cross-walk" curriculum to help refine their programs of study and network with other faculty and staff. This event will continue to be hosted.
- June 21-24, 2010 LTC hosted Energy Tech Camp (Eight junior high and middle school students). The days and topics were: Monday-Energy Overview, Tuesday-Wind Energy, Wednesday-Nuclear Energy, and Thursday-Field Trip to Point Beach Nuclear Power Plant.
- September 28, 2010 LTC was the host site for the NEW North “Where are the Green Business Opportunities?” conference. The event was a panel discussion on how new and existing businesses in Northeast Wisconsin can take advantage of market opportunities in the alternative energy, renewable energy and energy efficiency fields.
- May 5, 2011 POWER OF GREEN: Your Career event. Part of a NEW NORTH Regional Job Fair, was open to the general public. Lindsey presented on LTC green energy programs. Other panelists included FVTC, MPTC, and NWTC showcasing their green programs.
- April 23 and 30, 2012 Boor taught an “Intro to Green Energy” Course which he developed as part of a program for non-traditional students. The purpose of this program is to assist individuals interested in Non-Traditional Occupations (NTO) by offering opportunities to explore pre-technical skills in high earning programs prior to students enrolling in a program. Thus they will be able to make informed decisions which could positively influence dropout rates and increase completion retention rates. The green energy course covered intro to energy, wind, and nuclear. Boor completed he intro to energy and wind portions (which ran April 23 and 30). LTC staff are planning to host this event again in spring 2013.
- May 14, 2012 Boor participated in mock interviews at Kiel High School with prospective wind students.
- July 10-12, 2012 and July 24-26, 2012 LTC hosted two sessions of “MY College LTC Summer Preview Program” for Multicultural Youth. High school students who will be juniors or seniors in the 2012-13 school year were invited to: Learn more about career interests and programs of study; Meet instructors and staff; Hear how students have found success at LTC and beyond. Lindsey and Gibbs took turns presenting during the Energy Program Section of the two sessions. This included tours of the Energy Education Center, indoor lab spaces, and the outdoor wind lab.
- September 21, 2012; Boor worked with 3 new student outreach advisors from LTC to climb the rescue tower simulator. These high school coaches and student advisors now have tower climbing credibility, when talking with students about their career interests.
- November 10, 2012 LTC hosted the FIRST Lego League Competition on campus. The FIRST (For Inspiration and Recognition of Science and Technology) program involves many employees/employers from the Manitowoc and Sheboygan County area to engage

the students and grow their interest in robotics, team building, presentation skills, as well as math, science, and technology. "FIRST is a non-profit organization founded by Dean Kamen in 1989 to inspire young people's interest and participation in science and technology. FIRST is a worldwide engineering and design challenge matching teams of high school students and professional mentors. The mission of FIRST is to inspire young people to be science and technology leaders, by engaging them in exciting mentor-based programs that build science, engineering and technology skills, that inspire innovation, and that foster well-rounded life capabilities, which include self-confidence, leadership, and communication."

- November 26 – December 4, 2012 LTC was selected as the banner ad feature school on the American Association of Community College's (AACC) homepage. The photo featured Boor and students atop the campus GE nacelle.

Activity 1c - *Promote wind energy career pathways to dislocated workers, veterans, incumbent workers, and other untapped labor pools*. Tasks: Make DVD available to job centers, make appropriate program promotional cards available at job centers.

- Gibbs worked with the LTC Marketing Department to develop promotional materials to be used for outreach to dislocated workers, veterans, and incumbent workers.
    - On-Campus Walking Tour – Educational signage at each of the four campus wind turbines, wind equipment, solar panels, and light tubes. This signage was originally produced for "self-guided" tours by campus visitors, but will also be used during guided tours as points of interest. The signage continues to be utilized during campus tours (see Appendix D for an example of the signage created).
    - WTCS Wind Energy Technology Program Video – Highlighting careers for which the program prepares students and discusses course work, interests, and abilities in order to be successful. The videos are now loaded out on the update program site. See link to the Wind Energy Program Website in the "References Section" at the end of the report.
    - Additional mini-videos regarding "Power of Green" at LTC can be found on the LTC You-Tube website, please follow the link found in the "References Section" at the end of the report. Additional promotional materials were provided to POWER Partner colleges for their use as requested.
- Staff from LTC hosted booths at events like Sheboygan's EarthFest, local Earth Day events, Midwest Renewable Energy Association (MREA) Fair, NEW North Summit, Green Energy Summit, Eco-Fair 360 in Walworth County, the Village of Cleveland's annual parade, and NWTC's campus Engineering Open House, and Northwind 100 Wind Turbine Dedication Ceremony in Random Lake as a way to conduct program outreach into the community. LTC will continue to send staff to these types of events as a way to reach into the community.
- Polly Abts, LTC Training Director for Workforce Solutions, held Trade Adjustment Assistance (TAA) and Workforce Investment Act (WIA) meetings throughout the project period. During the sessions, Abts gave a brief presentation on entering school as a dislocated worker. Presentations contain information on the hot careers and what is fundable through TAA / WIA (they usually only pay for those programs that have a sustainable wage). LTC's green energy programs are always high on the list. They also discuss admission processes and remediation or any need to brush up on basic skills. At

each event, LTC staffs an information table to talk one-on-one with potential students after all of the presentations are given.

- September 28, 2010 LTC was the host site for the NEW North “Where are the Green Business Opportunities?” conference. The event was a panel discussion on how new and existing businesses in Northeast Wisconsin can take advantage of market opportunities in the alternative energy, renewable energy and energy efficiency fields.
- February 22, 2011 Heinzen spoke at the Manitowoc Democrats' meeting about the current status of the statewide wind siting legislation (PSC 128), Governor Walker's 1800' setback proposal, and the outlook of wind energy in Wisconsin.
- February 23, 2011 Heinzen spoke at the Northeast Wisconsin Chapter Association of Electrical Inspectors' meeting in Green Bay, Wisconsin about small wind energy systems and the new Article (694) in the National Electrical Code.
- March 3, 2011 Heinzen spoke at two breakout sessions for the annual Midwest Rural Energy Council's conference (MREC) in Minneapolis (Bloomington), Minnesota about the current state of affairs in wind energy in Wisconsin.
- May 5, 2011 POWER OF GREEN: Your Career event. Part of a NEW NORTH Regional Job Fair, was open to the general public. Lindsey presented on LTC green energy programs. Other panelists included FVTC, MPTC, and NWTC showcasing their green programs.
- March 24, 2011 Heinzen spoke at the Sheboygan Retired Teachers' Association meeting in Howards Grove, Wisconsin about the basics of wind energy with Q&A at the end.
- September 12, 2011 Heinzen spoke during a Town of Mitchell public input hearing and meeting regarding a small wind ordinance.
- September 25, 2011 Heinzen attended and hosted a booth at the Northwind 100 Wind Turbine Dedication Ceremony in Random Lake.
- September 27-28, 2011 LTC hosted OSHA Wind Course Offerings on campus. Heinzen participated in the construction of this course, a "basic safety in wind" training seminar for the general public (non-climbers) in conjunction with UW-Oshkosh. There were approximately eighteen LTC wind staff, students, industry partners, and general public in the course over the two days.
- March 27, 2012 Gibbs traveled to Manitowoc, WI to present to the local Kiwanis Club on the basics of wind energy, LTC’s Wind Energy Associates Degree, and campus wind.
- April 18, 2012 LTC hosted a campus wide “Career Discovery Event” welcoming the potential students and the general public to see campus and discuss programming opportunities. Career Discovery is primarily an adult recruitment event which is geared to all adults and scheduled in the twilight and evening hours, twice a semester, so that daytime workers may attend. By a vast majority, the attendees range in age between 25-55.
- April 23 and 30, 2012 Boor taught an “Intro to Green Energy” Course which he developed as part of a program for non-traditional students. The purpose of this program is to assist individuals interested in Non-Traditional Occupations (NTO) by offering opportunities to explore pre-technical skills in high earning programs prior to students enrolling in a program. Thus they will be able to make informed decisions which could positively influence dropout rates and increase completion retention rates. The green energy course covered intro to energy, wind, and nuclear. LTC plans to offer this course again in spring 2013.
- April 19, 2012 Boor gave a presentation to the Cleveland Lions Club about wind energy.

- April 25, 2012 Gibbs participated in a webinar "Find out how Center for Energy Workforce Development (CEWD) is helping the energy industry to build a diverse pipeline, specifically for women in non-traditional positions. During this one-hour webinar, participants learn how to sponsor a 40-hour career exploration workshop for women with our latest toolkit as well as explore other CEWD materials for attracting and retaining women."

<u>Activity 2a</u> - *Provide faculty professional development opportunities*. Tasks: Schedule Introduction to Wind Systems training for partnering college faculty and high school faculty, identify training opportunities for safety disciplines, and enroll faculty in training programs.

- Boor and Gibbs attended training in curriculum development and instruction.
- Boor is working on his MBA from Marquette University in Milwaukee, Wisconsin.
- LTC staff attended professional development meetings and conferences such as: AWEA Annual Summit; U.S. Department of Energy (DOE) meeting in Denver, CO; Wind Alliance conference in Albuquerque, NM; Endurance E series wind turbine maintenance training Greensburg, Kansas; American Wind Energy Association (AWEA) Conference in Los Angeles, California; Small Wind Conference in Stevens Point, Wisconsin; MREA Energy Fair in Stevens Point, Wisconsin; Offshore Wind Conference in Grand Rapids, Michigan; Distributed Wind Energy Association (DWEA) and American Wind Energy Association (AWEA) Small and Community Wind conferences in Des Moines, IA; Annual Great Lakes Wind Collaborative Meeting in Ypsilanti, Michigan; U.S. Offshore Wind Market and Supply Chain Workshop in Atlanta, GA; and the Wind Tech 2012 Conference in Sweetwater, Texas. LTC will continue to send staff to these types of events for the benefits of professional development, lessons learned, and networking.
- August 17, 2010 Lindsey, Hoerth, Gibbs, Heinzen, Thompson, and Skabroud led tours of the campus turbines and wind equipment during LTC's All-Staff In-Service. The theme of the event was "The Power of Green, The Power of You!" promoting green energy and sustainability.
- October 8, 2010, Gibbs presented information on green energy programs during the "Careers of the Future" hosted at LTC. This day-long event was a workshop for area high school staff, counselors, instructors, and administrators regarding career information and trends.
- June 13-17, 2011 NC3 hosted a summer national energy Train-the-Trainer at LTC which was open to POWER Partners.
- June 20-23, 2011 LTC hosted a Summer Institute. One of the sections was titled Intro to Energy for local high school teachers and opened the enrollments up to DOE POWER Partner schools. Participants in the Summer Institute were also able to receive graduate credit for the course through Marian University if they choose to do extra course work. There were a total of eight participants in the Intro to Energy section.
    - Boor taught the class for the first time in Fall 2011 to LTC wind students and then finalized the materials. In February 2012 Gibbs created flash drives with the course materials and distributed the "Intro to Energy" course materials to the high school teachers for their use in the classroom.
- July 2011 Gibbs was selected for a yearlong leadership training course with Sheboygan County Chamber and attended monthly meetings.

- July – August 2011 Gibbs and Boor attended the Wisconsin Technical College System (WTCS) Certification #52 Teaching Methods Course.
- September 27-28, 2011 LTC hosted OSHA Wind Course Offerings on campus. Heinzen participated in the construction of this course, a "basic safety in wind" training seminar for the general public (non-climbers) in conjunction with UW-Oshkosh. There were eighteen LTC wind staff, students, industry partners, and general public in the course over the two days. This was also opened to POWER Partners, but they were unable to send anyone for the training.
- October 5, 2011 Boor participated in LTC's annual Program of Study Night. This event is designed to allow high school teachers to meet with LTC faculty to continue to partner on curriculum and to develop programs of study. During the work-time with LTC faculty, the high school teachers are able to "cross-walk" curriculum to help refine their programs of study and network with other faculty and staff.
- October 24-27, 2011 Gibbs attended the Wisconsin Public Utility Institute (WPUI) Energy Utility Basics course. This course was designed to immerse participants in the background, infrastructure, engineering, and politics of the energy industry.
- April 27, 2012 NEW ERA hosted their yearly event for faculty professional development. The focus of this year's event was "Integrating Sustainability Into Your Teaching."
- May 2012 Maywood is also associated with Wisconsin's K-12 energy Education Program (KEEP) and was a site for a "Doable Renewables" section for educators. "KEEP's mission is to initiate and facilitate the development, dissemination, implementation and evaluation of energy education programs within Wisconsin schools." Gibbs continues to work with the LTC high school liaisons on getting this information out to the local teachers.
- May 29 and 31, 2012 Ryan Skabroud, LTC Emergency Management Coordinator (July 2012 named Dean of Public Safety), led a SAFER course for nine adjuncts from LTC as a train-the-trainer. This increased the number of staff on the emergency rescue team at LTC and also allows for the ability to increase contract training in this area.
- June 20, 2012 LTC hosted a daylong session for the "WTCS Tour of Excellence." The Tour of Excellence is a graduate level class put on by Marian University for K-12 teachers to learn more about the technical college system. During one of the weeks the participants will visit 4-5 technical colleges. Lindsey, Gibbs, and Rich Hoerth, Dean of Public Safety / Agriculture, led the portions covering the Environmental Campus, Energy Education Center, Campus Sustainability, and Electro-Mechanical.
- July 8–11, 2012 Habeck, MPTC lead instructor attended InterSolar NorthAmerica conference; he attended presentations on Smart Grid, Energy Storage, UltraBattery Technology, and Grid-connect Power Electronics. Technology demonstrations consisted of motor control, position feedback, automation hardware, and data acquisition. Contacts were made with industry professionals and experts in renewable energy technology, with an emphasis on solar/wind hybrid units.
- July 31, 2012 Boor and a Hy-Torq regional trainer industry representative conducted a train-the-trainer Hy-Torq course for other LTC instructors and summer wind students. Topics included updated techniques in the application of the Snap-on based hydraulic torque equipment, tethered use of the equipment at height and a demonstration of equipment on the Outdoor Wind Lab GE turbine fittings.
- October 15-19, 2012 five LTC staff members participated in Elevated Safety LLC's Society of Professional Rope Access Technicians (SPRAT) training on campus.

Activity 2b - *Modify industry recognized certification in Torque for online or blended delivery.* Tasks: Develop 12 credits of online curriculum including lectures, power point presentations, assignments, quizzes, and tests.

- Torque Certification materials from NC3, Snap On, Hytorq, and Gateway Technical College are completed. These materials are used by Heinzen and Boor in the Wind Technician courses. Materials were available to participants of the NC3 Train-the-Trainer program.
- NC3 and Snap-On reorganized the staffing and dedicated additional resources for maintenance of the web based registration for individuals receiving the Torque Certification (Basic).
- November 4, 2010 LTC hosted a meeting on campus for Snap-On and the National Center for Construction Education and Research (NCCER). This Florida based training organization provides skilled trades training for the non-Union non-affiliated federal apprenticeships in conjunction with Pearson Texts. They are broadening their existing power drives and electrical curriculum with four different wind courses / text packages. Several wind colleges are supporting this activity with Subject Matter Experts.
- June 13-17, 2011 LTC hosted a NC3 Summer Torque and Meter 275 Training. This training was open to all NC3 members across the country and POWER Partners. Instructors from around the country were invited to travel to Wisconsin and attend an energy train-the-trainer event. Unfortunately only one school participated in the torque training at LTC, but NC3 did see it as a success, because they were able to make connections and receive the training.
- April 1-4, 2012 Lindsey traveled to Francis Tuttle Technology Center in Oklahoma City, OK to attend the ACTE / NC3 Energy Summit with Brian Albrect, President Gateway Technical College (GTC), Larry Hobbs, GTC Instructor and representatives from Snap-On, NC3, ACTE, and GE. Other representatives included American Association of Community Colleges, DOL Assistant Secretary, and NCCER. The National Coalition of Certification Centers (NC3) and the Association for Career and Technical Education (ACTE) hosted the Building a Sustainable Energy Workforce Summit with a view towards bringing together leaders in industry and education to ensure a skilled energy workforce to meet the rapidly changing needs of the future. The summit featured expert panels from industry, education, and government sharing insights on emerging needs for skilled labor in the energy sector and the current status of technical training and education. The second day's focus was a series of brainstorming sessions to develop initiatives to bridge the gap between the realities of today's energy workforce and the needs in the next three to five years. "NC3 was established to address the need for strong industry partnerships with educational institutions in order to develop, implement and sustain industry-recognized portable certifications that have strong validation and assessment standards."
- July 31, 2012 Boor and a Hy-Torq regional trainer industry representative conducted a train-the-trainer Hy-Torq course for other LTC instructors and summer wind students. Topics included updated techniques in the application of the Snap-on based hydraulic torque equipment, tethered use of the equipment at height and a demonstration of equipment on the Outdoor Wind Lab GE turbine fittings.

<u>Activity 2c</u> - *Embed industry recognized credentials into existing wind curriculum*. Tasks: Modify and enhance LTC's core wind curriculum to include specific safety elements identified in Activity 2A.

- LTC wind staff continue to have discussions with industry partners about changes in the wind industry and how to better the program through the advisory committee meetings, regular correspondence, and campus visits.
- Boor, Heinzen, and Ryan Skabroud, LTC Emergency Management Coordinator (July 2012 named Dean of Public Safety), developed a climb training curriculum called "SAFER: Safe, Access, Fall protection, Evacuation, and Rescue" to better meet the needs of industry as new technologies and policies are developed. Lindsey, Gibbs, Boor, Skabroud, Sheila Schetter, Workforce Solutions Training Director II, and Rich Hoerth, former Dean of Public Safety met regularly to discuss the utilization of the high angle rescue equipment and provide training to the students and industry.
- As part of the Intro to Energy Course Boor takes the students on tours to local places such as Edgewater Generating Station (baseload coal plant), Orion Energy Systems (a patented technology and energy management strategy company), and Manitowoc Cranes (large crane manufacturer) to see the regional contribution to the energy supply chain.
- Lindsey continues to work with Real Time Data in regards to collecting all wind turbine data in one software and streaming it to a website. This will enhance the ability of the wind students to more accurately compare the different campus turbines with net-electrical energy production by date and overtime. WE Energies has provided LTC with grant dollars to make this project happen.
- LTC Commissioned three of its four on campus turbines: 50kW Entegrity (May 2010), 50kW Endurance (August 2010), and 2.5 kW Proven (October 2010). The first turbine (65kW Vestas V-15Turbine) was installed in 2004 and provided the motivation to develop the wind program (see Appendix B for photos of the turbines).
- See Appendix C for photos of the LTC Outdoor Wind Lab trainers (GE Trainer and Rescue Tower). These trainers were designed and fabricated to meet the needs of students enrolled in the Wind Energy Programs and SAFER training at Lakeshore Technical College by giving them "real world experience" while they learn. These trainers were part of the LTC matching equipment funds for this DOE Power Partners – 20% by 2030 Wind Grant.
    - The GE Trainer incorporates direct drives, multiple digital reporting devices, full PLC Ethernet enabled control and several remarkable measurable instruments. Of special note are the radar bar liquid depth measurement and an internal pressure measurement devices on each of the vessels. The corresponding pictured Programmable Logic Control lab facility will receive signals from the distant trainers to provide real time Supervisory Control and Data Acquisition (SCADA) functionality.
    - The Rescue Tower allows students to have a real world experience in terms of climbing and high angle rescue.
- September 16, 2010 LTC was the host site for the NC3 meeting. During the meeting the group agreed certifications need to be further developed. LTC committed to providing staff and helping with shaft alignment curriculum development, other partners are NC3, Snap-On, Gateway Technical College, and Vibralign and other technical colleges across the country. Items planned to be embedded in the curriculum from industry include thermal imaging – precision measurement and video-borescope certification modules.

- November 10, 2010, Trevor Stiles from Foley and Lardner, LLP was on campus presenting information to the Wind Program students on his experiences in the wind industry and trends he is seeing as an Environmental Lawyer. Stiles is involved in all renewable development at Foley and Lardner, but focuses a lot of his time on interconnecting wind farms to the rest of the transmission grid and selling the power after it's generated.
- December 10, 2010 Second year Wind Program students in the Data Log Analysis course presented information about the renewable energy systems at LTC and provided time for a question and answer session. The Data Log Analysis course was included in the Wind Program as a result of the industry representatives asking for Excel spreadsheet proficiency and application to the wind turbines. The presentation was open to all LTC staff and students and was a good lesson on public speaking about wind turbines for the students.
    - The students in this class also present the information at the annual Green Energy Summit in Milwaukee, Wisconsin. This is an excellent opportunity for them to do public speaking and learn how to be an advocate for wind and filter questions from an audience. The ability to attend the conference is also a opportunity for the students to listen to panelists from around the country and learn how to network.
- March 21, 2011 Boor and Wind Technology II students met with owner of Maxfield's Topsoil. The owner has an old Enertech 44kW wind turbine. Students met with the owner, learned from his experiences owning the turbine for seventeen years, and then climbed the tower and prepared it to be taken down.
- March 24, 2011 Boor brought in Brian Halverson of Gearbox Express to the Wind Technology Class to discuss gearbox technologies.
- May 23-25, 2011 Boor attended the American Wind Energy Association (AWEA) Conference in Los Angeles, California working on industry contacts, incorporating industry approved skills into course work, and job placement for graduates.
- July 6, 2011 Heinzen and Boor met with GE Wind Safety Instructor for review of LTC materials, courses, and labs.
- September 27-28, 2011 LTC hosted OSHA Wind Course Offerings on campus. Heinzen participated in the construction of this course, a "basic safety in wind" training seminar for the general public (non-climbers) in conjunction with UW-Oshkosh. There were eighteen LTC wind staff, students, industry partners, and general public in the course over the two days.
- February 3, 2012 LTC hosted a staff member from Broadwind. The representative met with Lindsey, Gibbs, and Boor and toured the facilities and then gave a presentation to the wind students about the wind industry.
- March 27, 2012 Boor invited industry partners from GE to come and tour LTC's campus and meet with students and discuss "life in wind" and career opportunities.
- January 9 and 10, 2012 Matthew Boor, LTC Lead Wind Energy Instructor, attended the AWEA Trade Show in San Diego, CA. The purpose of this trip was to network and attend the presentations and learn about new industry technologies.
- March 30, 2012 LTC hosted a Wind Energy Day for students and staff at MSTC to discuss shared program updates, summer boot camp, and actually get the students and staff into the new nacelle to give them a feel for climbing a wind turbine. MSTC participants were enrolled in a LTC Tower Safety Basics course.

- April 2012 Maywood Environmental Park hosted an "educators open house" for local educators and education stakeholders. The program consisted of information on existing and new education equipment and programs at Maywood. This gave the educators the ability to test out Maywood's new water quality and alternative energy kits. Educators also had the opportunity to network and highlight their classroom initiatives.
- April 5, 2012 Boor met with GE representatives to discuss Lock-Out-Tag-Out (LOTO) strategies and further develop safest possible training environment.
- May 31, 2012 Lindsey met with LTC Physical Plant Director and the selected electrical contractor to review the plan of work for installation of the Data Acquisition System (DAS) for all four turbines. This was in regards to the Real Time Data grant for the collection all wind turbine data in one software and streaming it to a website. This will enhance the ability of the wind students to more accurately compare the different campus turbines with net-electrical energy production by date and overtime. WE Energies has provided LTC with grant dollars to make this project happen.
- June 11-15, 2012 LTC hosted GE and Granite on campus for their recent hire training. They utilized LTC classrooms, wind turbines, and training equipment for their summer college intern orientation program. Topics Included OSHA-10 Hour, Safe Access and Rescue, and CPR / First Aid. Three of the students participating are current LTC Wind Students on their internships and other participants came from schools such as Iowa Lakes Community College, Columbia Gorge Community College, and Minnesota West Community College.
- Fall 2012; Lindsey negotiated a direct transfer of the full LTC Wind Energy Technologies AAS degree to Excelsior College, Albany, NY. This agreement was strongly recommended by industry partner GE Energy. GE has also reached a credit transfer for their proprietary GE 1.5 turbine technician training. This post-graduation industry experience adds another 30 credits towards the bachelor's degree at Excelsior. Lakeshore Technical College Associate in Applied Sciences in Wind Energy Technology to Excelsior College Bachelor of Professional Studies in Technology Management with an Area of Focus in Renewable Energy transfer agreement.
- In 2008 LTC had one graduate with placement in the wind industry as well as two students that took courses at LTC, but did not graduate, and received placement in wind. In 2009 LTC had three graduates with 67% job placement in wind. The one student that did not report working in wind needed to stay local due to family commitments and is employed in the construction industry. In 2010 we had eight graduates with 50% reporting they work in the wind industry. One student reported working for a local manufacturer and we have been unable to connect with the remaining three students. In 2011 LTC graduated 12 students from the wind program with 58% reporting they work in the wind industry, the remaining students needed to stay local due to family commitments but did report being employed. In 2012 LTC graduated 13 students with 69% reporting working in the wind industry or continuing their education. Three students needed to remain local, but have reported they are employed. We have been unable to contact the remaining student. May 2013 graduation already has 8 students applied for graduation and we anticipate a few more to be added. We also expect summer and winter graduates in 2013.
    - LTC experiences the same pressure for non-graduates in industry employment as reported by other wind energy program across the country. Strong industry partnership as evidenced by GE, Ingeteam, Endurance Wind, Invenergy, and NextERA recognize the problem and provide incentive for program completion.

Recent four-year degree articulations may also provide greater value in attaining graduate status.

- Graduates have reported receiving positions at the following companies: Kettle View Renewable Energy, LLC, Ingeteam, Endurance Wind, Broadwind, NextERA, Invenergy, GE, Avanti, Renew Energy Maintenance, Fuhrlaender North America, and Seventh Generation.

Activity 3a - *Engage five WTCS colleges to design Individualized Technical Studies (ITS) programming options for students in related programs.* Tasks: The Coordinator meets with campus leaders to design Wind ITS programs. Activity 3b - *Engage partners to validate and evaluate curriculum for ITS options*. Tasks: Meet with campus leaders from each partnering college to evaluate curriculum. Identify and sequence course offerings to complete a Wind IT'S A.A.S. at each college. Activity 3c - *Work with other ten WTCS colleges to explore additional ITS options*. Tasks: Identify programs that align to core wind courses, identify interested colleges, meet with college administrators to discuss feasibility, interest, and commitment.

- In the grant proposal it was thought that having partner schools enroll students in an ITS degree was the best option, however after further discussion with partners it was decided that developing formal shared program agreements would be a much better alternative (and less confusing) for students. With this model students at partner schools can live at home and take their general education and trades courses at their local school and then attend a summer boot camp at LTC. During the boot camp students will have the opportunity to climb and train on our one-of-a-kind equipment and graduate with a degree from LTC in Wind Energy (see Appendix A for a copy of the first and second year wind summer boot camp schedule).
- Lindsey and Gibbs continue to serve on the WTCS Renewable Energy Deans and Coordinators committee. This group meets monthly (via phone or in person) to discuss emerging jobs in energy within the State of Wisconsin and the country and how to prepare a future workforce.
- LTC staff continue to work with POWER partner colleges (and WTCS schools) to discuss ITS/shared program options and Summer Boot Camps.
- May 11, 2011 the WTCS Board was on campus at LTC and received a tour of the wind turbines, lab, and Lindsey, Gibbs, and Boor answered questions about the wind industry and the program.
- March 12-25, 2011 POWER Partner GTC offered a study abroad opportunity in wind. Five Students joined ELL instructor Elaine Asma and Automotive and Wind Technology instructor Bob Braun for a two week introduction to wind and wave energy technology and manufacturing in Scotland. Students learned about research and development in wind and wave technology, alternative energy power distribution and the role the Scottish government and municipalities play in alternative energy development.
- 2011 LTC worked with DOE Staff on a formal modification request for a six-month extension of the grant and replacement of a current POWER Partner MATC-Milwaukee with FVTC and NWTC. On January 4, 2012 we were notified by Shaun Jensen that we received approval and the extension was granted for one-year as opposed to the six-months we originally requested.

- 2011 LTC secured formal shared Wind Programs with FVTC, MPTC, and NWTC. These shared agreements launched Fall 2011. Each of these programs in the future will take up to four students, thus totaling 12 shared students and meeting one of the project objectives of increasing our program capacity by 50%. With the new shared Wind Programs at NWTC, FVTC, and MPTC their students will take some courses at the partner schools during the Fall and Spring Terms and then come to LTC in the summer for their wind courses in order to receive the proper safe climbing techniques and wind competencies.
    - See links to the shared program websites for FVTC, MPTC, and NWTC in the References Section of this report.
    - MPTC reported having developed a 12-credit Substation Electrician Certificate Program that begun Fall 2012. This program of study serves as an ITS option for students who want to continue their studies and complete an Associate Degree in Windy Energy Technology – or pursue careers in other renewable energies.
    - LTC has had detailed discussions with MSTC and GTC on future partnerships/ transfer programming for wind.
    - June 11, 2012 was the first day for LTC's Wind Energy Program Summer Boot Camp for POWER Partner students. One student came from MSTC, one from FVTC, and two from NWTC. These students took some of their general education courses / prerequisites at their local schools and came to LTC for training on the turbines under Boor for the summer. The DOE grant funded industry outcomes for worker at height, safe access and rescue, and torque and were taught in these courses.
- 2011 LTC was contacted by the manufacturer of the Endurance turbine stating that the blades had a manufacturers defect and they would provide three new blades for replacement on the unit. The three blades that were previously on the turbine were used for educational purposes and display at LTC in the Snap-On Wind Energy Lab, NWTC, and MSTC.
- January 20, 2012 Lindsey presented on Energy Education during the WTCS District Board meetings at LTC. Lindsey highlighted shared programs and industry partnerships. There were board members and administrators from all 16 technical colleges.
- March 30, 2012 LTC hosted a Wind Energy Day for students and staff at MSTC to discuss shared program updates, summer boot camp, and actually get the students and staff into the new nacelle to give them a feel for climbing a wind turbine. MSTC participants were enrolled in a LTC Tower Safety Basics course.

CONCLUSIONS

With the assistance from all of our educational and industry partnerships we have been able to meet the goals / objectives laid out in the grant.

Activity 1a - *Engage industry partners through POWER Project Steering Committee meetings, Wind Program Advisory Committee meetings, outreach activities, and employer surveys.*
Activity 1b - *Conduct high school outreach to engage students in programs of study that lead to wind energy career pathways through local technical colleges*.

Activity 1c - *Promote wind energy career pathways to dislocated workers, veterans, incumbent workers, and other untapped labor pools*.
Activity 2a - *Provide faculty professional development opportunities*.
Activity 2b - *Modify industry recognized certification in Torque for online or blended delivery.*
Activity 2c - *Embed industry recognized credentials into existing wind curriculum*.
Activity 3a - *Engage five WTCS colleges to design Individualized Technical Studies (ITS) programming options for students in related programs.*
Activity 3b - *Engage partners to validate and evaluate curriculum for ITS options*.
Activity 3c - *Work with other ten WTCS colleges to explore additional ITS options*.

We are constantly in contact with our industry partners for the most up to date best practices/ lessons learned and developing our faculty for the wind industry to make the program the best; and our numbers show that with our graduates and their placement in the wind industry.

LTC has continuously increased the number of graduates from the program: In 2008 LTC had one graduate with placement in the wind industry as well as two students that took courses at LTC, but did not graduate, and received placement in wind. In 2009 LTC had three graduates with 67% job placement in wind. The one student that did not report working in wind needed to stay local due to family commitments and is employed in the construction industry. In 2010 we had eight graduates with 50% reporting they work in the wind industry. One student reported working for a local manufacturer and we have been unable to connect with the remaining three students. In 2011 LTC graduated 12 students from the wind program with 58% reporting they work in the wind industry, the remaining students needed to stay local due to family commitments but did report being employed. In 2012 LTC graduated 13 students with 69% reporting working in the wind industry or continuing their education. Three students needed to remain local, but have reported they are employed. We have been unable to contact the remaining student. May 2013 graduation already has 8 students applied for graduation and we anticipate a few more to be added. We also expect summer and winter graduates in 2013. LTC experiences the same pressure for non-graduates in industry employment as reported by other wind energy program across the country. Strong industry partnership as evidenced by GE, Ingeteam, Endurance Wind, Invenergy, and NextERA recognize the problem and provide incentive for program completion. Recent four-year degree articulations may also provide greater value in attaining graduate status. Our graduates are out competing other graduates for jobs at places like: Kettle View Renewable Energy, LLC, Ingeteam, Endurance Wind, Broadwind, NextERA, Invenergy,GE, Avanti, Renew Energy Maintenance, Fuhrlaender North America, and Seventh Generation.

With LTC's steering committee meetings and connections with the other WTCS schools we were able successfully implement formal shared programs with FVTC, MPTC, and NWTC which started Fall 2011. We have also cross-walked a student from MSTC. We are still discussing other shared programs with the remaining WTCS schools. This shared program has become a model for other programs because of the stronger relationships built between the partnering schools and continuous communication.

A lesson learned for the project is to modify the way LTC administered the partner contributions portion of the grant. Although prior to the start of the grant each partner college signed a formal letter committing a lead person on their campus to assist in the development of the shared programs, some partners were not able to meet this commitment, and therefore did not spend the grant funds originally designated for them. Once this became apparent, LTC requested an

extension, modification of the grant funds, and brought on two other WTCS schools (FVTC and NWTC) as new POWER Partners to help fill the void. For future grants, we recommend setting a time frame within the Letter of Commitment to achieve such objectives. Failure to do would result in sanctions, potentially including exclusion from the grant and withdrawal from further activities. In addition, agreements should contain mutual indemnification and hold harmless clauses.

LTC is overall very satisfied with the outcomes we've achieved over the past few years and that has been made possible because of this grant funding.

RECOMMENDATIONS

A lesson learned for the project and recommendation is to modify the way LTC administered the partner contributions portion of the grant. Although prior to the start of the grant each partner college signed a formal letter committing a lead person on their campus to assist in the development of the shared programs, some partners were not able to meet this commitment, and therefore did not spend the grant funds originally designated for them. Once this became apparent, LTC requested an extension, modification of the grant funds, and brought on two other WTCS schools (FVTC and NWTC) as new POWER Partners to help fill the void. For future grants, we recommend setting a time frame within the Letter of Commitment to achieve such objectives. Failure to do would result in sanctions, potentially including exclusion from the grant and withdrawal from further activities. In addition, agreements should contain mutual indemnification and hold harmless clauses.

REFERENCES

Link to the NEW LTC Wind Energy Program Website:
http://gotoltc.edu/programs/windEnergy/index.php
*note the link to the Final WTCS Video (click the photo on home wind page)

Shared Wind Program Websites:

>Fox Valley Technical College –
http://www.fvtc.edu/public/academics/degree.aspx?plan=10-482-1

>Moraine Park Technical College –
http://www.morainepark.edu/programs-and-courses/programs-of-study/Wind+Energy+Technology/

>Northeast Wisconsin Technical College –

http://www.nwtc.edu/academics/degrees/environment-energy/energy/Pages/WindEnergyTechnology.aspx

LTC new 4 wind turbine electrical energy data reporting site:
http://data.aprsworld.com/sites/ltc/

WI Career Pathways:
http://www.wicareerpathways.org/

Link to the NEW LTC Sustainability Website:
http://gotoltc.edu/sustainability/index.php

Link to the current Lakeshore Technical College YouTube Videos:
>Power of Green http://www.youtube.com/playlist?list=PL686495E9CEEBD8E8&feature=plcp

LTC Energy Education Website (this is just an initial landing page, more information is to come this fall as well as links to other sites):
http://gotoltc.edu/businessIndustry/energyEducationCenter.php

APPENDICES

Appendix A - 2013 Summer boot camp schedule (first and second year shared program students).

Appendix B - Photos of the campus turbines.

Appendix C - Photos of the Rescue Tower and GE Nacelle.

Appendix D - Campus sustainability signage.

Appendix A

Wind Technology Program – Summer School Schedule @ Lakeshore Technical College for Shared Program Students

For more information: Contact Michelle.Gibbs@GoToLTC.edu OR Matthew.Boor@GoToLTC.edu

Please Note: The "Intro to Wind Systems" prerequisite will be offered as an ITV class February 15 to May 9 (5-9pm) broadcast to FVTC, MPTC, NWTC, MSTC

Sundav	Mondav	Tuesdav	Wednesdav	Thursdav	Fridav	Saturdav
May 2013 1st Summer					**3**	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

Lakeshore Technical College, 1290 North Avenue, Cleveland, Wisconsin **1-888-468-6582**

Wind Technology Program – Summer School Schedule @ Lakeshore Technical College for Shared Program Students

For more information: Contact Michelle.Gibbs@GoToLTC.edu OR Matthew.Boor@GoToLTC.edu

Please Note: The "Intro to Wind Systems" prerequisite will be offered as an ITV class February 15 to May 9 (5-9pm) broadcast to FVTC, MPTC, NWTC, MSTC

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 2013 1st Summer						1
2	3	4	5	6	7	8
9	10 Health/Safety 8am-11am & 11:30am-2:30pm	11 Intro to Energy 7:30am-11am Health/Safety 11:30am-2:30pm	12 Health/Safety 8am-11am & 11:30am-2:30pm	13 Health/Safety 8am-11am & 11:30am-2:30pm	14	15
16	17 Health/Safety 8am-11am & 11:30am-2:30pm	18 Intro to Energy 7:30am-11am Health/Safety 11:30am-2:30pm	19 Health/Safety 8am-11am & 11:30am-2:30pm	20 Health/Safety 8am-11am & 11:30am-2:30pm	21	22
23	24 Health/Safety 8am-11am & 11:30am-2:30pm	25 Intro to Energy 7:30am-11am	26 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm ***Group A***	27 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm ***Group A***	28	29

Lakeshore Technical College, 1290 North Avenue, Cleveland, Wisconsin **1-888-468-6582**

Wind Technology Program – Summer School Schedule @ Lakeshore Technical College for Shared Program Students

For more information: Contact Michelle.Gibbs@GoToLTC.edu OR Matthew.Boor@GoToLTC.edu

Please Note: The "Intro to Wind Systems" prerequisite will be offered as an ITV class February 15 to May 9 (5-9pm) broadcast to FVTC, MPTC, NWTC, MSTC

July 2013 1st Summer

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4th of July	5	6
7	8 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm ***Group A***	9 Intro to Energy 7:30am-11am Wind Tech 1 Lab 11:30am-2:30pm ***Group A***	10 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm ***Group A***	11 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm ***Group A***	12	13
14	15 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm Tentative-Enrollment Based	16 Intro to Energy 7:30am-11am Wind Tech 1 Lab 11:30am-2:30pm Tentative-Enrollment Based	17 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm Tentative-Enrollment Based	18 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm Tentative-Enrollment Based	19	20
21	22 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm Tentative-Enrollment Based	23 Intro to Energy 7:30am-11am Weather Make-Up Time 11:30am-5:30pm	24 Wind Tech 1 Lab 8am-11am & 11:30am-2:30pm Tentative-Enrollment Based	25 Wind Tech 2 8am-11am & 11:30am-2:30pm	26	27
28	29 Wind Tech 2 8am-11am & 11:30am-2:30pm	30 Intro to Energy 7:30am-11am Weather Make-Up Time 11:30am-5:30pm	31 Wind Tech 2 8am-11am & 11:30am-2:30pm	1 (Aug) Wind Tech 2 8am-11am & 11:30am-2:30pm	2 (Aug)	

Lakeshore Technical College, 1290 North Avenue, Cleveland, Wisconsin 1-888-468-6582

Wind Technology Program – Summer School Schedule @ Lakeshore Technical College for Shared Program Students

For more information: Contact Michelle.Gibbs@GoToLTC.edu OR Matthew.Boor@GoToLTC.edu

Please Note: The "Intro to Wind Systems" prerequisite will be offered as an ITV class February 15 to May 9 (5-9pm) broadcast to FVTC, MPTC, NWTC, MSTC

August 2013

Sundav	Mondav	Tuesdav	Wednesdav	Thursdav	Fridav	Saturdav
				1 *Please reference: the last line of the July calendar*	2	3
4	5 **Wind Tech 3** 8am-11am & 11:30am-2:30pm	6 **Wind Tech 3** 8am-11am & 11:30am-2:30pm	7 **Wind Tech 3** 8am-11am & 11:30am-2:30pm	8 **Wind Tech 3** 8am-11am & 11:30am-2:30pm	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Lakeshore Technical College, 1290 North Avenue, Cleveland, Wisconsin **1-888-468-6582**

Wind Technology Program – Summer School Schedule @ Lakeshore Technical College for Shared Program Students

For more information: Contact Michelle.Gibbs@GoToLTC.edu OR Jennifer.Heinzen@GoToLTC.edu

Please Note: The "Intro to Wind Systems" will be offered as an ITV class February 13 to May 8 (5-9pm) broadcast to FVTC, MPTC, NWTC, MSTC

Sundav	Mondav	Tuesdav	Wednesdav	Thursdav	Fridav	Saturdav
May 2013 2nd Summer					3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20 6 Hours (6) 8am-11am & 11:30am-2:30pm	21 6 Hours (12) 8am-11am & 11:30am-2:30pm	22 6 Hours (18) 8am-11am & 11:30am-2:30pm	23 6 Hours (24) 8am-11am & 11:30am-2:30pm	24	25
26	27 Memorial Day	28 6 Hours (30) 8am-11am & 11:30am-2:30pm	29 6 Hours (36) 8am-11am & 11:30am-2:30pm	30 6 Hours (42) 8am-11am & 11:30am-2:30pm	31	1

Wind Technology Program – Summer School Schedule @ Lakeshore Technical College for Shared Program Students

For more information: Contact Michelle.Gibbs@GoToLTC.edu OR Jennifer.Heinzen@GoToLTC.edu

Please Note: The "Intro to Wind Systems" will be offered as an ITV class February 13 to May 8 (5-9pm) broadcast to FVTC, MPTC, NWTC, MSTC

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 2013 2nd Summer						1
2	3 6 Hours (48) 8am-11am & 11:30am-2:30pm	4 6 Hours (54) 8am-11am & 11:30am-2:30pm	5 6 Hours (60) 8am-11am & 11:30am-2:30pm	6 6 Hours (66) 8am-11am & 11:30am-2:30pm	7	8
9	10 5.5 Hours (5.5) 8am-11am & 11:30am-2pm	11 5.5 Hours (11) 8am-11am & 11:30am-2pm	12 5.5 Hours (16.5) 8am-11am & 11:30am-2pm	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Lakeshore Technical College, 1290 North Avenue, Cleveland, Wisconsin 1-888-468-6582

Wind Technology Program – Summer School Schedule @ Lakeshore Technical College for Shared Program Students

For more information: Contact Michelle.Gibbs@GoToLTC.edu OR Jennifer.Heinzen@GoToLTC.edu

Please Note: The "Intro to Wind Systems" will be offered as an ITV class February 13 to May 8 (5-9pm) broadcast to FVTC, MPTC, NWTC, MSTC

July 2013 2nd Summer

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4th of July	5	6
7	8 6 Hours (6) 8am-11am & 11:30am-2:30pm	9 6 Hours (12) 8am-11am & 11:30am-2:30pm	10 6 Hours (18) 8am-11am & 11:30am-2:30pm	11 6 Hours (24) 8am-11am & 11:30am-2:30pm	12	13
14	15 6 Hours (30) 8am-11am & 11:30am-2:30pm	16 6 Hours (36) 8am-11am & 11:30am-2:30pm	17 6 Hours (42) 8am-11am & 11:30am-2:30pm	18 6 Hours (48) 8am-11am & 11:30am-2:30pm	19	20
21	22 5.5 Hours (5.5) 8am-11am & 11:30am-2pm	23 5.5 Hours (11) 8am-11am & 11:30am-2pm	24 5.5 Hours (16.5) 8am-11am & 11:30am-2pm	25 5.5 Hours (22) 8am-11am & 11:30am-2pm	26	27
28	29 5.5 Hours (27.5) 8am-11am & 11:30am-2pm	30 5.5 Hours (33) 8am-11am & 11:30am-2pm	31	1 (Aug)	2 (Aug)	

Lakeshore Technical College, 1290 North Avenue, Cleveland, Wisconsin 1-888-468-6582

Wind Technology Program – Summer School Schedule @ Lakeshore Technical College for Shared Program Students

For more information: Contact Michelle.Gibbs@GoToLTC.edu OR Jennifer.Heinzen@GoToLTC.edu

Please Note: The "Intro to Wind Systems" will be offered as an ITV class February 13 to May 8 (5-9pm) broadcast to FVTC, MPTC, NWTC, MSTC

Sundav	Mondav	Tuesdav	Wednesdav	Thursdav	Fridav	Saturdav
August 2013				*1* *Please reference: the last line of the July calendar*	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Appendix B


Entergity

Appendix C


LTC
LTC


LTC

Appendix D

LAKESHORE TECHNICAL COLLEGE

GE Nacelle & Hub
OUTDOOR WIND LAB

KEY FEATURES

- State-of-the-art, ground-level training platform
- Gives students the opportunity to practice safe yaw deck-to-nacelle and nacelle-to-hub access procedures
- Students methodically practice before doing so hundreds of feet in the air
- Students perform routine maintenance on a real utility-scale turbine, giving them true to life experience checking gearbox oil, changing an oil filter and swapping pitch motors—all under the confined working conditions of a wind technician in the field

LTC installed the GE nacelle and hub in 2011.

This material is based upon work supported by the Department of Energy under Award Number DE-EE0000537.

Fast FACTS

NACELLE WEIGHT
56 tons

INSIDE THE NACELLE
Controller, gearbox, generator and shafts

HUB WEIGHT
10 tons

INSIDE THE HUB
- Made of cast iron
- Attachment point for three blades and nacelle

LAKESHORE TECHNICAL COLLEGE

Rescue Tower
OUTDOOR WIND LAB

KEY FEATURES

- **Full-size wind tower section and platform**
- **Offers students the experience of a multiple-stage tower climb with additional access and rescue points**
- **The rescue tower accommodates multiple students at one time, allowing them to practice emergency evacuation maneuvers and rapid descents**

Fast FACTS

TOWER HEIGHT
90 feet

WEIGHT
60 tons

TRAINING FOR OTHER INDUSTRIES
- **Electrical towers**
- **Communication towers**

LTC installed the rescue tower in 2010.

This material is based upon work supported by the Department of Energy under Award Number DE-EE0000537.