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Skill is just the beginning

Iowa Lakes Community College teaches its future wind technicians more than just how to repair turbines.

By Dan Lutat

Building a professional workforce is an essential, but often overlooked, component of wind-energy development.

Thanks to private landowners in the heartland, wind-energy development is now a mainstay in rural communities that needed a modern hedge against agricultural and fossil fuel volatility.

"Our diplomas represent more than degrees," said recent graduate John Kleppinger. "They represent drive, determination, and resiliency — key ingredients to reaching any goal. Even though I'm not certain where I'll wind up, I now have the ability to pursue what I'm passionate about. I can now achieve my dreams and the life I've imagined."

What does being a professional really mean? Professionals are defined by service to the common good, specialized skills and training required for entry into the field and deliberate development from the rookie to novice to expert to master.

It isn't enough to advocate for an industry if that field wishes to be called a profession. Since turbines are a visible part of the landscape, technicians are required to be ambassadors of the industry in communities where they are now raising families.

A deliberate process of developing talent — not just hiring it — both on the job and formally, is necessary to ensure that the wind-energy field grows the right leaders.

It is a common mistake to assume that people just come by leadership naturally, or that there is always someone with the right skill waiting for a job offer. Leaders are indeed made by those who understand that one's position doesn't denote leadership.

None can look back on their experiences and say they succeeded on their own. Understanding the pathway of professional development is critical, and the pathway begins with the understanding that all doing is learning and all learning is knowing.

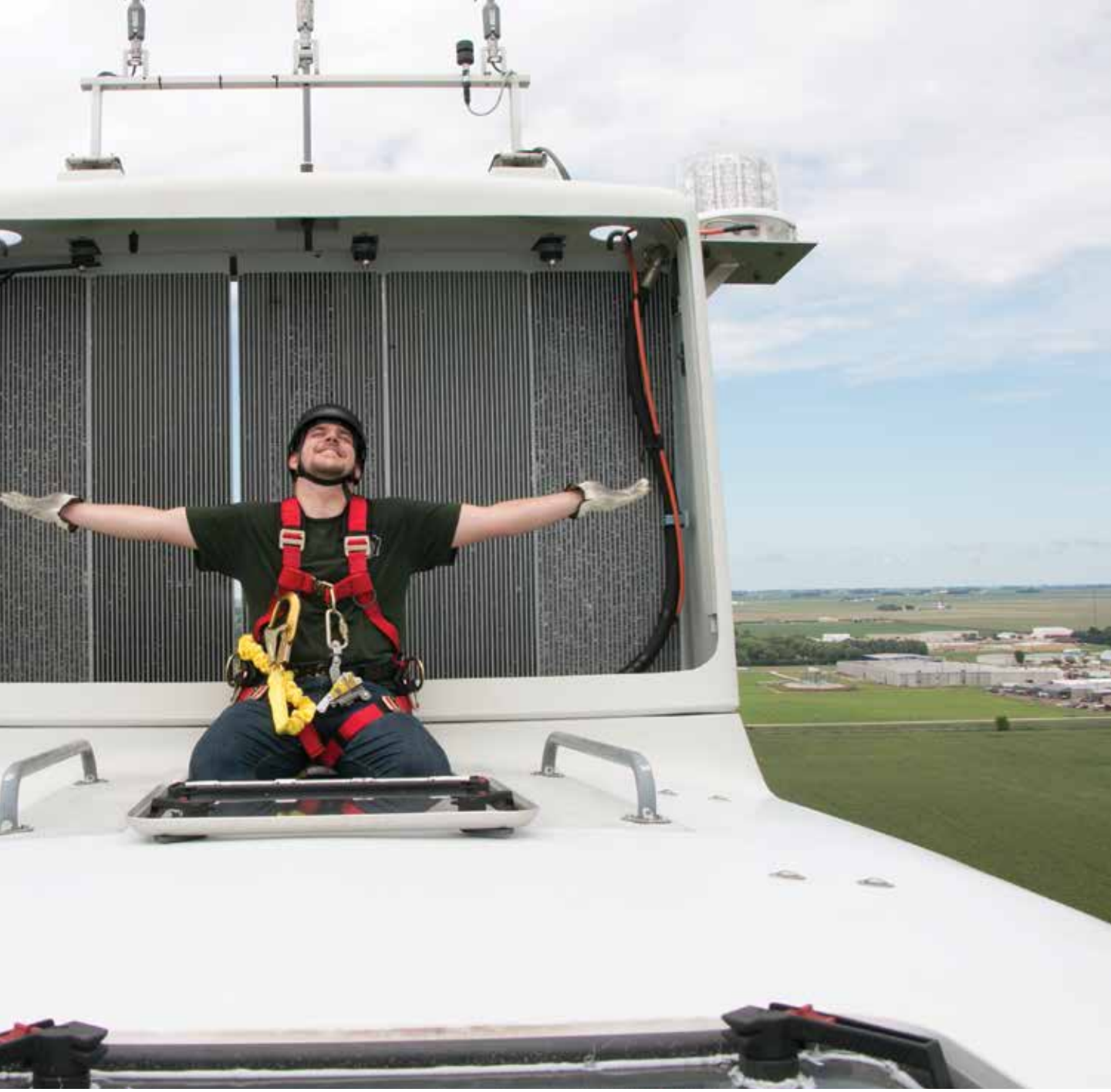
This concept is evident in the nation's first Associate in Applied Science in Wind Energy and Turbine Technology at Iowa Lakes Community College, where developing the person is as important as developing skills.

It can't be overstated that a cornerstone of professional development is skill. Expert power is an essential building block of leadership and must be demonstrated in order to earn trust and respect from others.

As a person earns skills, an essential part of developing individuals along a "whole person concept" is mentorship in the art of building a network, articulating what they bring to the workforce, lifelong learning, and what a professional development pathway looks like.

At Iowa Lakes, that conversation begins with every prospective student and continues after graduation.

Foundational instruction means that consequences of decisions are an integral part of the student's lived experience, from safety to team dynamics. Planned values opportunities are built into lectures and demonstrated in labs so that students live the consequences of their approach to problems.



Since rolling out the nation's first Associate in Applied Science Degree in Wind Energy and Turbine Technology in 2004, Iowa Lakes has been a leader in delivering training and education to meet a steadily growing demand for operations and maintenance technicians across the country and abroad. (Courtesy: Iowa Lakes Community College)

In the course of experimenting, planning, and problem solving, individual values are modified, reinforced, and refocused with a responsibility message driven by something bigger than a paycheck or a stable job future.

This is where the seeds of leadership are sown, and where the greatest teacher — failure — is applied in developmental lessons that build versatile, resilient leadership traits.

Alongside technical and safety training, Iowa Lakes identifies a pathway to the next level in professional development. From the lucrative opportunity presented to graduates entering the field, springs a look over the horizon at what lies ahead.

By engaging students with a certified career coach early and often, conversations that focus students on how to take the next steps expand the graduate's understanding of what motivates them and how to achieve it.

If a person chooses to gain experience in the field and then lead people, students are linked to options tailored to give working adults a degree that develops those skills. If a person wants to pursue engineering after valuable field experience, we identify a pathway to becoming an engineer who is more than just a designer.

No matter the graduate's dreams, a plan, a pathway, and experience in how to make it happen are essential. These so-called soft skills are the hardest to earn and take the longest time to develop. Our deliberate approach to engaging students in the process continuously produces graduates with transferrable skills, prepared to go farther.

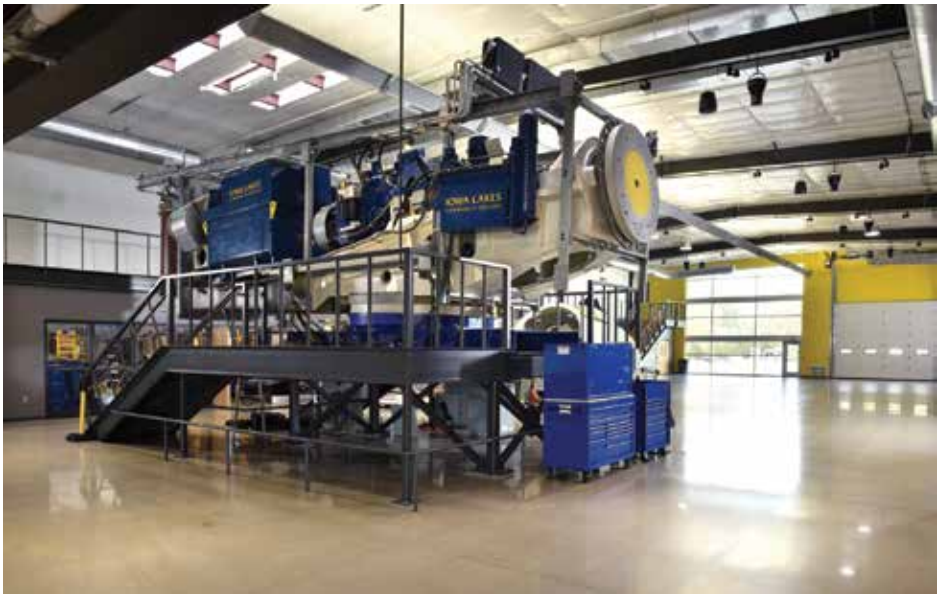
To reinforce the value of core transferrable skills, take it from Ross Raymond, a 2018 graduate of Iowa Lakes' Engineering Technology program.

"As a 27-year-old mechanic, unhappy with my job, I made the decision to go back to school in the hope of finding a career that I enjoy," Raymond said. "I chose the Engineering Technology program at Iowa Lakes Community College. At Iowa Lakes, numerous opportunities became available to me. I completed an internship with a major soybean processing facility and am currently working at a company called Windtest here at the college that does a variety of testing on wind turbines.

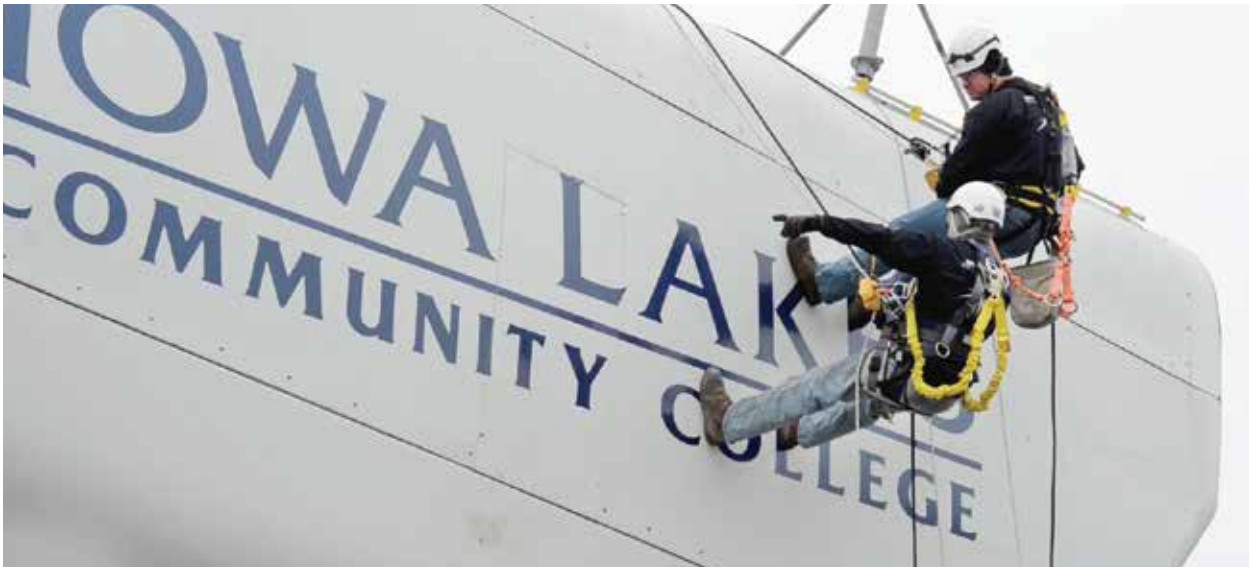
"These opportunities would not have been available to me had I not made the decision to further my career in renewables," he said. "I look forward to what the future has in store for me, and I'm thankful for the help and guidance that the staff at Iowa Lakes provided."

By establishing a connection to adulthood, from high school, through an effective community college experience, Iowa Lakes

In January 2011, the Wind Energy & Turbine Technology program at Iowa Lakes Community College was one of the first three programs nationwide to earn the American Wind Energy Association's Seal of Approval for Wind Turbine Service Technician Programs. (Courtesy: Iowa Lakes Community College)



Classes in the Wind Energy & Turbine Technology program at Iowa Lakes Community College cover many aspects of the wind-energy industry, including safety training as well as extensive training in electrical theory and practical application, mechanical systems, hydraulic theory, and practical application and field training. (Courtesy: Iowa Lakes Community College)

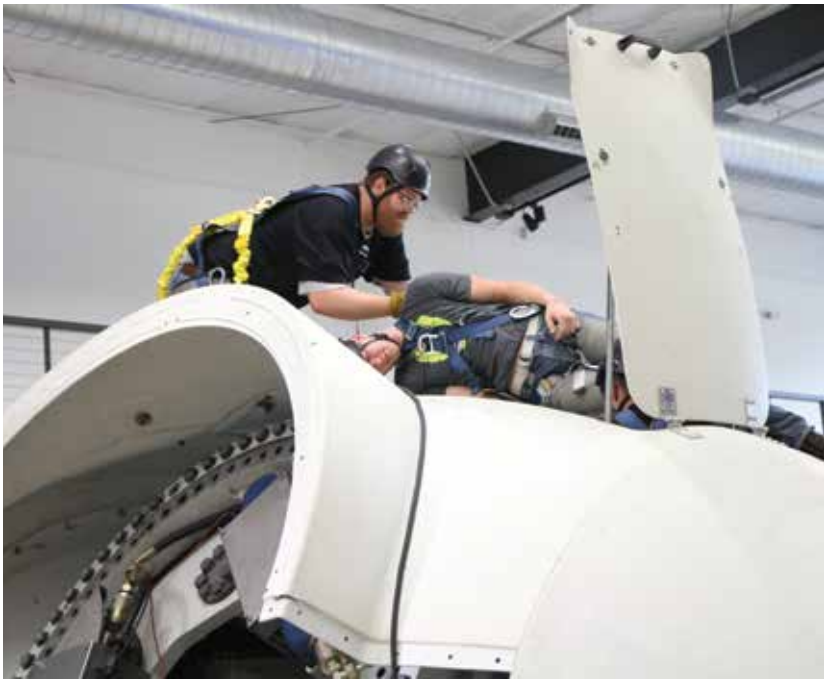


Iowa Lakes Community College students use a 1.65 MW working turbine about a mile and a half south of the Iowa Lakes Community College's Estherville campus as an educational laboratory. (Courtesy: Iowa Lakes Community College)

builds understanding of professional development and lifelong learning. It breaks through myths to produce versatile, self-reliant technicians, with recession-proof, core-transferrable skills every industry needs.

To produce critical thinkers and competent problem solvers, Iowa Lakes integrates teaching young people how the world works and what core values are in practice. It produces competence through experiential learning that puts integrity first and focuses on excellence in personal and professional mastery.

An understanding of what it means to have an impact on America's energy future is vital to building a sense of service to people who may never know a graduate's name yet will benefit from their drive to make a difference.



Students in the Wind Energy & Turbine Technology program use ground trainers and laboratories as well as the college's working utility scale turbines. (Courtesy: Paul Gates Photography)

Dan Lutat is director for Sustainable Energy Resources and Technologies (SERT) studies at Iowa Lakes Community College in Estherville, Iowa. A 28-year Air Force veteran, he and his team connect intuitive dots that link technology, the environment, and sustainability.

Competency-based training

The Wind Turbine Technician Academy at Kalamazoo Valley Community College teaches master skills that are highly sought after in the wind-energy industry.

Kalamazoo Valley WTTA graduate Tory Jones on site at Stoney Corners Wind farm in McBain, Michigan — owned by Heritage Sustainable Energy. The turbine is a Fuhrländer FL2500 2.5MW machine. (Courtesy: WTTA)

By Thomas Sutton and Delia Baker

Creating an educated workforce skilled to meet the demands of a changing economy is the focus at Kalamazoo Valley Community College's Groves Campus. Originally opened in 2001 as one of 18 M-TEC facilities across the state, the Groves Center was financed by a $5 million grant from the Michigan Economic Development Corporation, plus $6 million in matching funds provided by area companies and foundations. It offers a variety of training programs for those looking to embark on a new career path, including fast-track training academies that are designed with input from local employers.

One of its most notable programs is the Wind Turbine Technician Academy (WTTA), which was launched in 2009 and has quickly earned a reputation as one of the premier training sources for wind-industry professionals.

The Wind Turbine Technician Academy provides an opportunity for individuals to learn, develop, and master skills that are highly sought after in the wind-energy industry.

The WTTA is a competency-based, 24-week training program designed to teach individuals the skills necessary to work as wind-turbine technicians. Upon successful completion of the program, students typically enjoy a high placement rate within the wind-energy industry.

The program meets Monday through Friday from 8 a.m. to 4:30 p.m. During scheduled service trips, students can expect to work 10 to 12 hours a day to complete the scheduled tasks.

The college has educational affiliations with two Michigan-based utility companies that give the WTTA sole responsibility for five utility-grade turbines in the state. Students can expect to spend at least two weeks working in the field on these turbines.

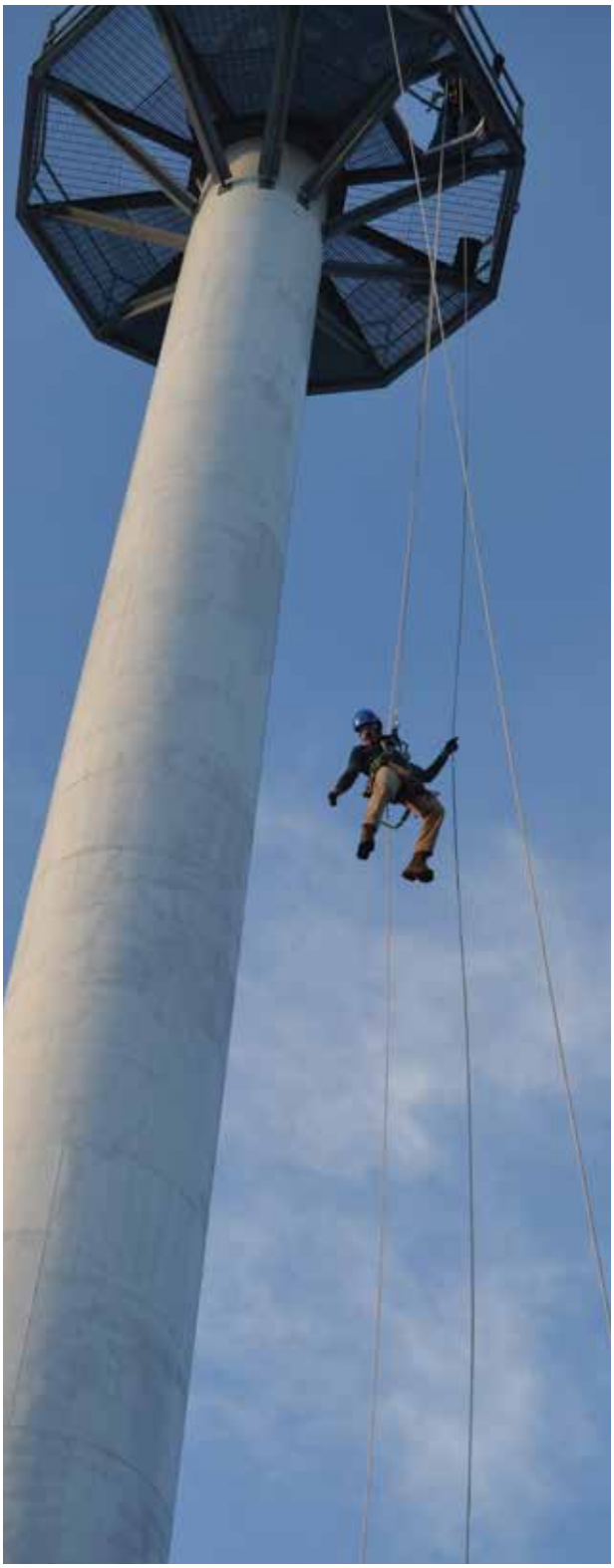
COMBINING KNOWLEDGE AND APPLICATION

The field service trips are a unique way for WTTA's trainees to combine the theoretical knowledge and laboratory application on turbines that are producing electricity to the grid. Graduates receive real-world experience well before they are hired by an employer in the wind industry.

Kalamazoo Valley WTTA graduate Justin Barget on site in Mackinaw City, Michigan — now owned by Mackinaw Power. The turbine is a NEG Micon NM52 900 kW machine. (Courtesy: WTTA)

Kalamazoo Valley's WTTA differs from similar programs in the U.S. in that it is competency-based rather than credit-based. Each competency has been validated by the industry as a necessary skill for wind-turbine technicians. Students must demonstrate with 100 percent proficiency that they can complete the tasks. These competencies are proven by hands-on demonstrations completed in the presence of one of the instructors or representatives from industry who may be visiting.

As students are completing the competency demonstration, they will need to describe what they are doing as well as answer questions from the person evaluating them. This provides opportunity for stu-



Current Kalamazoo Valley WTTA trainee Jeff Condry demonstrates a controlled descent from the 100-foot tower at the Groves Center on the first day of class. (Courtesy: WTTA)

dents to learn the theory and reasoning for the tasks they are performing. Instructors work closely with each student to develop and strengthen troubleshooting skills. There is not always one solution to each problem encountered in the industry, so instructors try to guide students to discover the most preferred solutions.

Learning the skills necessary to be successful as a wind-turbine technician requires hours of hands-on practice. So, as a general rule, the college aims to keep the class time to a minimum, spending about 85 percent of their time in the laboratory or in the field.

TRAINING SERIES

Additionally, students enrolled in the academy must complete ENSA GWO BST training series, which includes working at heights, first aid, fire prevention, and manual handling. All work at heights training is completed on the college's 100-foot climbing tower or on the indoor climbing structure.

In order for this type of training to be successful, class sizes must remain small. The college only accepts a maximum of 12 students each session, allowing it to maintain an ideal student-to-instructor ratio. Acceptance into the academy is based on a detailed application process.

"Individuals are required to apply for the academy with an application similar to a job application. They need to provide contact references, pass a mathematics test, as well as conduct an interview. This application process allows the WTTA team to identify individuals with the most potential for success.

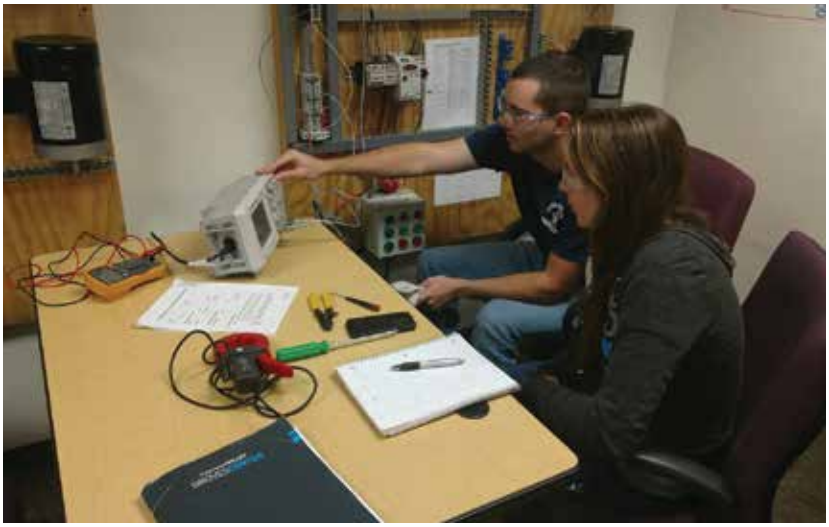
Graduates of the WTTA typically take positions as wind-turbine technicians either on a wind farm or as a traveling technician for virtually every major OEM and service and maintenance provider in the U.S. wind industry. New wind-energy projects are being constructed throughout the U.S., and they will require technicians to maintain and service wind turbines. The demand for highly trained wind-turbine technicians will continue to rise as more projects are constructed.

CAREER OPPORTUNITIES

The WTTA team is constantly being notified of career opportunities in the wind industry. The school maintains a private network in order to inform previous graduates of available opportunities.

In order to meet goals put in place by the U.S. Department of Energy, the wind-energy industry will need to continue growing.

Currently trending in the U.S. wind industry is more corporate ownership of wind assets every year



Kalamazoo Valley WTTA graduates Eric Wanczak and Claire Bagniewski practice some electrical work in the motor controls laboratory at the Groves Center. (Courtesy: WTTA)

as it allows a corporation to identify its actual energy costs for many years — sometimes up to 20 years. With the increased demand from private industry, wind energy will continue to grow. The growth in wind energy is coupled with a steady increase in employment for people to support the increased wind capacity.

At the same time, technology is ever changing, and turbines are becoming more efficient and sophisticated every year. This requires a workforce with diverse skill sets in order to maintain and repair legacy machines as well as the newer and more advanced machines. WTTA's close working relationships and validation from the industry, coupled with its competency-based program, allows the college to continuously improve to make certain its graduates receive the knowledge and skills needed to satisfy all of the requirements of the industry.

CERTIFICATIONS

Kalamazoo Valley's WTTA has earned both the American Wind Energy Association (AWEA) seal of approval and certification by the Bildungszentrum für Erneuerbare Energien (BZEE) Renewable Energy Education Center. Upon successful completion of a series of written and practical tests, as well as a completion of the field service, students receive certification as a service technician for wind-turbine engineering through the BZEE.

Companies in the wind industry have become familiar with WTTA's program. Employers benefit from hiring its graduates because they are not only hiring an employee who is fully certified and competent, but they also have gained experience on real components and actual field experience all within the 24-week training period.

Kalamazoo Valley runs two academies per year; one typically starts during the first week of January, and the other normally starts the first week in July.

Established in 1966, Kalamazoo Valley Community College is a comprehensive, fully accredited, public, two-year college with about 10,000 students. Kalamazoo Valley offers certificate programs in more than 20 areas of study and associate degrees in 25 others. In addition to associate degree and certificate programs in business, health care, human and public service, technical occupations, and industry, the college also provides a quality experience for students preparing to transfer to four-year institutions following graduation.

To learn more about the WTTA, contact Delia Baker at dbaker2@kvcc.edu or (269) 353-1554.

Thomas Sutton is the director of Wind Energy and Technical Training Services. In 2008, he became a key developer of the Wind Turbine Technician Academy at Kalamazoo Valley Community College including the Quality Management system. Sutton is an active member of the International Technical Committee and travels to Europe where he helps develop global work-safety-at-heights standards. He is also active in the American Wind Energy Association and is serving on the Safety Steering Committee. Sutton also delivers safety-at-heights training to the wind academy and general industry as a College Instructional Partner with ENSA North America.

Delia Baker is program coordinator for Technical Training Services. Baker obtained a Bachelor of Business Management from Western Michigan University in 2012. She joined the team at Kalamazoo Valley in September 2017 after several years working in sales for a relocation company.

Rising Costs of Wind O&M and the Importance of the Human Factor

Advanced mobile and cloud-information technology can be a potent tool in helping wind technicians and their managers get better results.

O&M costs associated with wind turbines are significant, making up, on average, 20 percent to 25 percent of the total levelized cost per kWh produced over the lifetime of a turbine. (Photos courtesy: Scoop MAE)

By Babak Sardary

As fleets age and the cost of wind-energy O&M rises, wind-farm owners and operators look far and wide for ways to achieve efficiency. In this article we look at the importance of the human factor and examine key challenges faced by companies and their employees. We look at how readily available advanced mobile and cloud-information technology can be a potent tool in helping wind technicians and their managers battle complexity and get better results while significantly lowering the cost of wind turbine O&M.

Wind is an abundant, affordable and scalable source of renewable energy. According to a report released by the U.S. Department of Energy, "Wind Vision: A New Era for Wind Power in the United States," by 2050, wind energy in the U.S. alone has the potential to create 600,000 jobs and provide consumers with $149 billion in savings. Today's wind turbines are not the prairie windmills of yesteryear. They are massive, highly sophisticated machines. A modern wind turbine has a whopping 8,000 components.

Wind-turbine fleets are aging and O&M costs are going up. According to IHS Markit, "the majority of installed wind-turbine equipment averages more than five years in age, and operations and maintenance (O&M) expenses cost the industry $3 billion to $4 billion annually (in the U.S.)" In fact, this increase in O&M costs is what's driving significant growth potential for employment in the sector, making wind-energy technicians the fastest growing occupation.

According to the U.S. Bureau of Labor Statistics, the demand for these workers will double in the next seven years.

O&M costs associated with wind turbines are significant, making up on average, 20 percent to 25 percent of the total levelized cost per kWh produced over the lifetime of a turbine. In recent years, as fleets age, a good deal of attention has been given to methodologies and technologies that can help reduce wind-turbine O&M costs. Specifically, advances have been made in areas of predictive maintenance, condition monitoring systems, and even use of aerial drone technology for automated blade inspections. However, as is often the case, some of the more basic but perhaps less glamorous factors related to how wind companies enable O&M teams to organize, gather data, and communicate have been ignored. In this article we analyze the key challenges in these areas and how relatively inexpensive and easy-to-deploy information technology solutions can produce an outsized effect. We describe how these innovative solutions can boost the effectiveness and efficiency of wind-turbine inspections and O&M programs.

THE HUMAN FACTOR IN WIND O&M

Maintaining wind turbines is hard work. Wind turbine O&M field work is physically demanding labor, requiring early hours, long drives over backroads, and 300-foot ladder climbs just to get to the office. Wind technicians and field personnel are under tremendous time pressure to complete jobs quickly and efficiently. With wind installations in remote areas and the move toward more offshore installations, the completeness and accuracy of site visits is becoming ever more important. The human factors involved in the operations therefore deserve special attention.

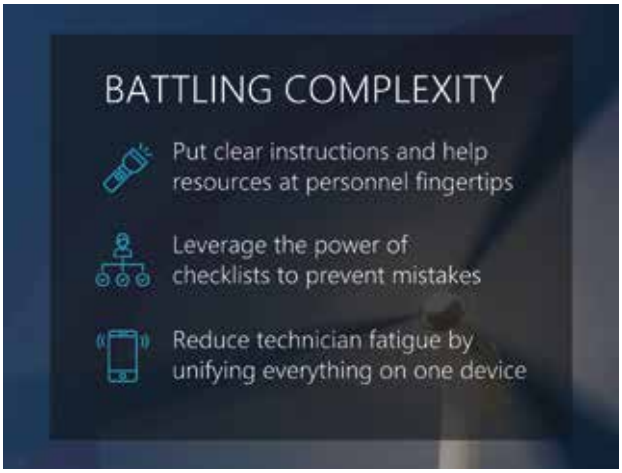


Figure 1: Wind-turbine maintenance crews carry out physically demanding, complex work. Reduce their workload and help them overcome complexity by putting clear instructions and the means to collect good data right at their fingertips.

BATTLING COMPLEXITY

Wind-turbine inspectors and O&M personnel work remotely on complex equipment. The number of components and steps involved in maintenance routines can be mind-boggling. In this environment, lack of clear instructions and on-the-spot contextual information can lead to mistakes and less-than-optimal results or, worse yet, serious incidents or accidents.

Classroom training, on-the-job shadowing of more experienced personnel, and daily crew meetings are important tools for imparting knowledge and know-how to employees. However, work in wind energy is a classic example of how in today's ever-growing complex world, the human performance factors can come into play in a major way. To take an example from the aviation world, where the cost of mistakes is rather high, even the most experienced pilots are required to follow detailed step-by-step checklists. Studies from the medical world similarly point out the power of checklists in preventing mistakes. In his highly acclaimed book "The Checklist Manifesto: How to Get Things Right " author Atul Gawande says: "The modern world has given us stupendous know-how. Yet avoidable failures continue to plague us in health care, government, the law, the financial industry — in almost every realm of organized activity. And the reason is simple: The volume and complexity of knowledge today has exceeded our ability as individuals to properly deliver it to people — consistently, correctly, safely."

With the rapid growth in demand for wind-turbine maintenance services and the corresponding demand for technicians, companies will be faced with hiring less-experienced resources.

Companies need to not only arm all employees with easily accessible instructions and information to do their job but do so within an accountable and trackable framework that ensures the steps are in fact followed.

Advances in mobile computing in the last decade and creation of flexible software platforms have made it possible to quickly create and provide clear, checklist-driven instructions to field personnel — even in remote areas where they may not have access to cellular or WiFi connectivity. Checklists can be set up to require mandatory completion of each item, addition of pictures, and annotations. Additionally, some of the more advanced software options allow embedding drawings, reference manuals, and how-to video clips right into the checklist, making these much more likely to be referenced and used.

GETTING TO GOOD AND GREAT WITH DATA

Wind-energy maintenance visits are costly. A one-day visit with three to five people can easily run in the multi-thousand dollar range when you factor in labor, tools, transportation, and, of course, wind-turbine downtime. With the shortage of resources, there is also the

Figure 2: An example of the mobile Work App configured on the Scoop® Wind platform (www.scoopwind.com) for wind-turbine inspection preventative maintenance and troubleshooting. Wind clients can use the drag-and-drop App Builder™ to customize their own checklists and multimedia collection fields.

opportunity cost to consider. Crews that are visiting one wind farm are not available for other sites with perhaps more pressing maintenance tasks. It's important to maximize the results from each trip. A key consideration is to ensure all necessary data is collected in the most complete and accurate manner while crews are onsite. Often this data can be critical to analysis back at the office and/or creation of client-facing reports that are required before invoicing for services. Repeat site trips as a result of crews leaving a wind farm without a complete set of data are significant contributors to the overall cost of O&M.

As mentioned above, checklists can be used to guide wind technicians to follow the correct procedural steps to perform a PM routine or to diagnose, fix, and verify a reactive maintenance task. Similar digital checklists can also be used to ensure a complete set of data is gathered while onsite.

Given how busy and time-pressured technicians are during a typical visit, wind-farm operators and service providers need to do all they can to reduce the fatigue and workload. Juggling notebooks, paper forms, spreadsheets, laptops, and cameras while wearing PPE and harnesses is exhausting and significantly slows down work. Reducing the number of devices and media can thus be hugely beneficial. With modern mobile devices and field apps, technicians can focus on their work steps on a single device. The mobile app guides them as to the steps to follow, list of data to collect including measurements, drop-down choices for standardized conditions of equipment, and prompts to capture multimedia and comments when warranted.

CAPTURING AND TRACKING CORRECTIVE ACTIONS

During a typical visit, wind-turbine inspectors may notice numerous issues: a lubrication pot that's nearly empty, corrosion that's creeping up on a cooling fan housing, vibration emanating from a damaged blade, or a missing safety guard rail. All of these are examples of issues that need to be recorded and reported.

The complexity of the work combined with time constraints and work fatigue can conspire to have these observations fall through cracks, denying the team the opportunity to investigate and resolve them while the opportunity still exists. Study after study shows that major failures and tragic safety incidents are rarely due to a single factor but rather arise when multiple seemingly simple issues come together. Apart from the simple fact of recording an issue or corrective action, wind-farm operators need to pay attention to how well corrective actions are described, assigned, and tracked to resolution. With rudimentary tools such as paper notes and spreadsheets, descriptions of issues are often illegible or lack sufficient detail. Additionally, given the need for data re-entry, issues are not centralized in a unified database and can easily be overlooked.

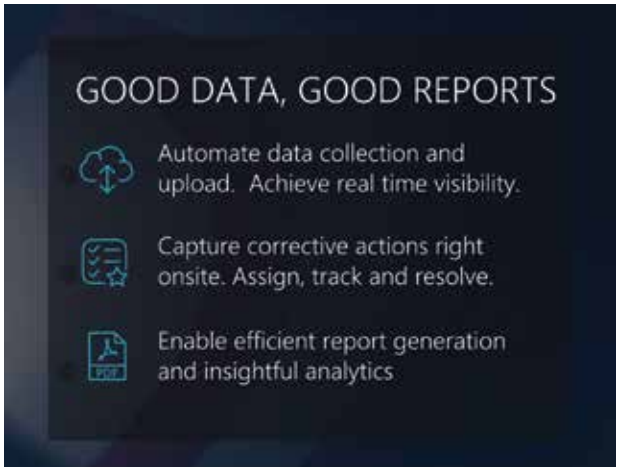


Figure 3: By establishing real-time, two-way data flow across field and office, wind-farm owners and service providers gain true visibility into the status of operations. Key issues, tasks, and corrective actions are reliably gathered, tracked, and resolved while back-office managers are able to generate client-facing reports and analytics efficiently.

Today's mobile IT field technology makes it exceedingly easy for technicians to log corrective actions and observations the moment they are encountered. The technology can be used by technicians in an ad-hoc fashion and/or be set up to automatically prompt the technician to record a corrective action task when a failed condition is observed within a checklist. Pictures and even video clips can be recorded seamlessly and attached directly to tasks providing an accurate description of the issue to folks back at the office or subsequent crews. Given the cloud connectivity of many such tools, corrective actions are automatically transmitted to a centralized dashboard for management tracking and resolution by personnel.

RAPID TURNAROUND AND REPORTING

It is important to remember that wind-farm visits and turbine inspections are not done in a vacuum. Often one or more downstream business processes depend on the results of a site visit. For example, the inspections could be part of a due diligence study performed on behalf of a potential investor. Or, they may be part of a contractual preventive maintenance program offered to a wind-farm owner or may be part of a reactive maintenance trip to fix an issue and bring a turbine back online.

Regardless of the purpose, rapid turnaround of the inspection process and the ability to get eyes on reliable data evidencing and documenting the visit is crucial. Traditionally, given the remote location of wind farms, it can take days to receive this data when you combine the need for technicians to collect, tabulate, and package the data, complete with comments, notes, and pictures, into a comprehensive archive and

ultimately transmit this to the office. In this space of time, management, engineering, and other reviewers back at the office are stalled when it comes to the status of work and ability to generate reports or certify the work as complete.

Bridging the time and space gap across field and office is a crucial area that can benefit wind-farm operators, owners, and service providers. Establishing a near-real time data pipeline and visibility into the status of work being performed cannot only ensure data is available for analysis, validation, and reporting right away, it can also stimulate collaborative problem-solving between field personnel and remote managers or subject matter experts. With advances in cloud and mobile communication, it is now possible to cost-effectively achieve this level of data synchronization and communication with personnel at wind farms.

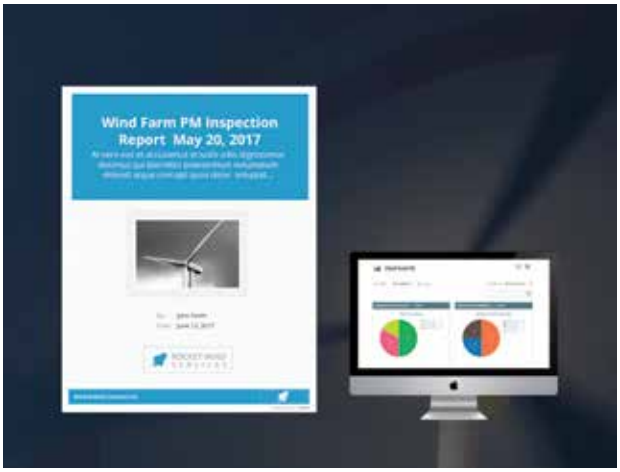


Figure 4: An example of client-facing PDF report and analytic charts showing aggregate stats on wind-turbine data configured in the Scoop® Wind platform [www.scoopwind.com]. With real-time data and automated report templates, wind companies can cut report generation lead time from two to three days after visit completion to a just a few hours.

SOURCING RAW INGREDIENTS FOR ANALYSIS

In recent years, a great deal of emphasis has been placed on the importance of predictive maintenance and use of advanced AI and machine learning algorithms for predicting when failures are likely to occur. The lifeblood of all such methodologies is copious amounts of data. Today's modern wind turbines are increasingly equipped with a variety of sensors measuring temperature, wind speed, vibration, fluid quality, and other parameters that are recorded and made available via SCADA systems. While this data forms a valuable baseline, its utility in prediction can be greatly enhanced when combined with onsite human observations and measurements. In order for the human-generated data to successfully mesh with machine SCADA data, the former needs to be organized, standardized, and structured. Digitizing the technician data collection process using mobile technology makes it possible to achieve this goal. In this fashion, not only a single centralized body of data is available, but every data item is properly referenced to the correct wind turbine, component, and serial number. This data can then be correlated reliably with SCADA data for a powerful comprehensive picture of each asset and its subcomponents.

ATTRACTING AND KEEPING TOP TALENT

Last but definitely not least, as we enter an era of mass-retirement (12,000 baby boomers retire every day in the U.S. alone — being replaced by the mobile, social-media native generation) and the demand doubles for wind-turbine technicians in the next seven years, wind-farm operators and service providers are increasingly searching for ways to recruit, train, and retain top talent.

Being active in the wind-energy community and establishing a track record and reputation for innovation is a huge asset when it comes to attracting the best resources. However, once an employee is onboard, actual experience with the work environment and interactions with colleagues and managers must continue to validate and reinforce this image. When a company projects a great forward-looking exterior but continues to operate based on outdated methods and tools, employees quickly become disillusioned and begin to look elsewhere. Digital technology can play an important role in not only projecting a progressive image but empowering and engaging employees in real and practical ways.

Given the remote and often isolating nature of work in wind energy, mobile technologies that enable connectivity provide an important lifeline to employees. The ability for field employees to report what they see in a visible manner contributes to their engagement. Being able to essentially tell a story of what they encounter and having the opportunity to interact in real time with the rest of the team and management, provides them with the sense that they have a voice, and their contribution is noticed and appreciated.

Babak Sardary is CEO and co-founder at Scoop®, a mobile cloud-based Field Project Management and Workflow Automation platform for renewable energy operations. Sardary has a Master's degree in mechanical engineering from the University of Waterloo, Canada, and is a veteran of the intelligent systems software industry. During his career, Sardary has initiated and led strategic relationships with major corporations including ABB, Ford Motor, Toyota Motor, General Motors, Microsoft and LG. For more information, go to www.scoopwind.com