

Cleveland+
Akron+ Canton+ Youngstown

On-Shore Market Access + Emerging Offshore Opportunity: A Comprehensive Look at Wind Energy in Northeast Ohio



PROVIDED IN PARTNERSHIP WITH NORTECH-ENSURING NORTHEAST OHIO'S TECHNOLOGY LEADERSHIP

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In this fast-paced, growing, global market, wind energy manufacturers and suppliers have many choices for location and expansion. The Cleveland Plus region makes companies successful. As the United States wind energy market grows, companies are looking to find the best location to maximize opportunity and minimize risk. Such companies need to consider a region's proximity to market and supply chain, workforce, and ease of transportation and logistics so that products can be easily distributed. In addition, companies are considering where they can access cutting-edge industry research, development, technology, training, and partnerships to accelerate growth.

The Cleveland Plus region is uniquely located within North America to serve the expanding wind energy market. Comprised of the 16 counties of Northeast Ohio—including the major manufacturing markets of Cleveland, Akron, Canton, and Youngstown—the “Plus region” encompasses an area of 6,000 square miles, an economy of \$168 billion dollars USD, a population of 4 million, and a talented workforce exceeding 2 million. Plus, only Cleveland Plus offers onshore market access and offshore opportunity.

Summary

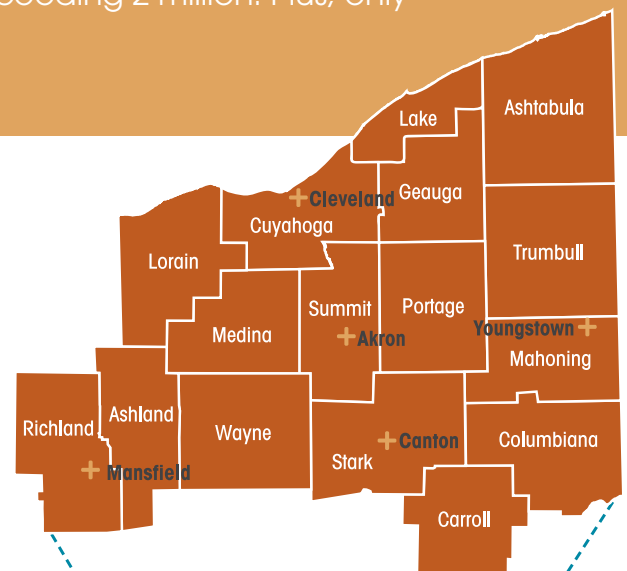
With its central location, multimodal shipping, committed work ethic, rich natural resources, materials expertise, industry-leading innovation, favorable energy policies, strong civic support and deep training capacity, the Cleveland Plus region offers more opportunity than neighboring Midwest states to build a successful business in the wind industry. Moreover, with more than 400 suppliers to the Cleantech sector — including some of the largest corporations in the world actively selling into the wind sector, such as Timken and Sherwin-Williams — wind energy companies worldwide are already experiencing the reasons why the Cleveland Plus region is a superior choice to build their futures.

Location

Situated at the southern center of the Great Lakes freshwater system, Cleveland Plus is close to many of the major energy markets of North America, including New York City, Boston, Detroit, Chicago, Philadelphia, Washington DC, Toronto, and Montreal. Additionally, Cleveland Plus is situated between multiple states with Renewable Energy Standards, providing centralized access to neighboring markets with wind power needs. Long dubbed the “Best Location in the Nation,” the Cleveland Plus region has a highly integrated transportation infrastructure that promotes cost-effective, multimodal transportation options conducive to moving large, heavy components inherent to the wind industry throughout the midwestern, northeastern, and southern portions of the United States, as well as the most populous areas in Canada.

Transportation/Logistics

Transportation options include highly developed interstate freeway and railroad systems that connect to each of the



major North American markets. Cleveland Plus also boasts six maritime ports, which provide easy access to the hearts of the U.S. and Canadian economies as well as a route to Europe via the Saint Lawrence Seaway. Lastly, the East Liverpool port, in the southeast corner of the Cleveland Plus region, offers connectivity to southern U.S. and South American ports via the Ohio River–Mississippi River barge system.

Proximity to customer and supplier markets has contributed to the Cleveland Plus region's continued history as a North American center for manufacturing innovation and production, starting in the early 1900s. Led by entrepreneurs like John D. Rockefeller and Franklin Seiberling, the region benefited from the founding of industrial giants like Standard Oil, Goodyear, Timken, BF Goodrich, and Firestone.

Manufacturing Capabilities

Leveraging our steel production prowess and strong ties to the auto industry, the Cleveland Plus region spawned thousands of companies, covering the full spectrum of manufacturing capabilities. This manufacturing excellence affords Cleveland Plus a competitive advantage in the prospect for turbine assembly. For example, Cleveland Plus today is home to three of the five casting plants that are integral to wind component production in the United States. Notably, as the advanced energy industry has emerged, local companies have parlayed their production capabilities, quality, and talent into becoming some of the world's most significant suppliers of components for the wind energy industry.

Offshore Leadership

In addition to the region's strong onshore assets, Cleveland Plus is also well positioned to become a global leader in the development of the North American offshore wind sector. In May of 2010, the regional non-profit group Lake Erie Energy Development Corporation (LEEDCo) announced a preliminary agreement with GE to install in Lake Erie an initial 20 megawatt wind project with a target completion by end of 2012 to become the first operational offshore wind project in the United States. In response to this announcement, Popular Science Magazine noted that this offshore development "would more than likely open the floodgates for many, many more projects in the coming decades that could benefit many land-locked states in the upper-Midwest." As noted above, Cleveland Plus is well positioned to take advantage of these opportunities, and is the ideal location for wind energy companies and suppliers to succeed in the 21st century.

This document describes the Cleveland Plus region's capacity, capabilities, and services to help wind energy manufacturers and suppliers succeed. Making your business work is our expertise.

Situated at the southern center of the Great Lakes freshwater system, Cleveland Plus offers the most central access to other major North American energy markets. Plus, only the Cleveland Plus region also offers offshore innovation and growth opportunity.

“Ohio’s greatest potential for creating wind energy is offshore in Lake Erie, and this partnership marks a significant step forward. In Ohio, we have all the right assets to make offshore wind energy successful, including an innovative workforce and the manufacturing strengths that would allow us to build all the component parts for wind turbines.” —Ohio Governor Ted Strickland



PROXIMITY TO SOURCING, DISTRIBUTION, AND CONSUMPTION

Ohio is home to the headquarters of two major U.S. utilities, FirstEnergy and American Electric Power (AEP).

FirstEnergy is located in the Cleveland Plus region and with its recently announced acquisition of Allegheny Energy, will soon to be the largest electric utility in the country, with ten regulated electric distribution companies providing electric service to more than six million customers in Pennsylvania, Ohio, Maryland, New Jersey, New York, Virginia, and West

Figure 3: Ohio Department of Development, Strategic Business Investment Division, Ohio Energy Office, “Ohio’s Easy Access to Profitable Markets and Strong Transportation and Logistics Infrastructure Lowers Your Cost of Doing Business.”

Virginia, and nearly 20,000 miles of high-voltage transmission lines connecting the Midwest and Mid-Atlantic states.

FirstEnergy will own approximately 24,000 megawatts of generating capacity from a diversified mix of regional coal, nuclear, natural gas, oil, and renewable power—with more than 2,200 megawatts of energy coming from renewable power, including hydroelectric, contracted wind, and pumped-storage capacity.

In addition, Ohio is home to American Electric Power (AEP), whose headquarters are located in Columbus, Ohio. AEP is one of the nation’s largest generators of electricity, owning nearly 38,000 megawatts of generating capacity in the United States. AEP also owns the nation’s largest electricity transmission system, a nearly 39,000-mile network that includes more 765-kilovolt extra-high-voltage transmission lines, more than all other U.S. transmission systems combined. AEP’s transmission system serves, directly or indirectly, about 10% of the electricity demand in the Eastern Interconnection—the interconnected transmission system that covers 38 eastern and central U.S. states and eastern Canada—and approximately 11% of the electricity demand in ERCOT—the transmission system that covers much of Texas.

Combined, these utilities provide significant commercial opportunity for wind energy manufacturers and suppliers. As indicated in the figure below, Ohio is located within 1,000kilometers (621 miles) of 62% of all U.S. and Canadian manufacturing locations, and in close proximity to nearly 40,000 megawatts of new, renewable energy capacity required by Renewable Portfolio Standards in neighboring states.

With favorable energy policies and proximity to much of the sourcing, distribution and consumption of wind energy in the United States, Ohio is uniquely positioned to be at the center of growth in the North American wind industry.

The largest economic region within Ohio, Cleveland Plus offers additional benefit, including:

- + Access to the emerging U.S. onshore and offshore wind market
- + Leveraging the nation's top manufacturing expertise
- + A broad and diverse network of innovators and existing supply chain partners
- + Plus, significant support from regional economic development partners that assist with access to connections, partnerships and financial options

These benefits all converge in Cleveland Plus. Only the Cleveland Plus region of Ohio, USA offers access to emerging U.S. markets and production capabilities. Plus, with central location to many premier North American locations, strong supply chain, workforce and leading universities offering world-class research, training and partnership, the wind energy industry is advancing and rapidly expanding in the Cleveland Plus region. In fact, the wind energy industry was born in the Cleveland Plus region.

Industry experts throughout the Cleveland Plus region are still innovating and leading the industry today, especially through the development of new and innovative technologies for both onshore and offshore wind development. It is for this reason that some of the nation's leading suppliers to the wind energy sector, such as Timken and Sherwin-Williams, find success in the Cleveland Plus region. With this unique mix of assets, wind energy companies find Cleveland Plus offers more – more opportunity, more benefit and more value.



Left: the world's first wind-powered electric generator.
Right: NASA Glenn.

INDUSTRY INNOVATION

History

Cleveland Plus has a long history of involvement in the wind energy industry. The industry began here in 1888, when Charles F. Brush designed and erected the world's first wind-powered electric generator in Cleveland. The wind generator's wheel measured 56 feet in diameter, had 144 blades, and was attached to a 60-foot, 40-ton wrought iron tower with a generating capacity of 12 kw. The system operated for over 20 years, until 1909.

Beginning in 1978, NASA Glenn Research Center located in Cleveland, was authorized by the U.S. government to leverage its long-standing expertise in aerodynamics and propulsion

to play the lead role in the nation's wind energy program, with the goal of developing wind technologies and transferring them to private industry. NASA Glenn pioneered the design, development, and installation of numerous wind turbine designs, ranging in size from 1 to 4 megawatts, throughout the world. The smaller, experimental units were initially deployed at NASA's Plum Brook Station in Sandusky, OH. The largest, 4-megawatt turbine was installed in Medicine Bow, WY, in 1982 and remained the largest wind turbine in the world until 2004. Several of the technology experts who were involved in this program originally are still active at NASA Glenn or in academia or in the private sector in the Cleveland Plus region.

Research Institutions

From this heritage, resident experts at NASA Glenn continue to work in the following fields, all of which are critical to advancing wind turbine technologies: acoustics, icing, advanced materials, communications, structural design, computational fluid dynamics, multidisciplinary design and optimization, nondestructive evaluation, systems analysis, and engineering.

In addition to NASA Glenn, the Cleveland Plus region is home to many other high-caliber research institutions working in the wind energy field, including Case Western Reserve University (CWRU), Cleveland State University, the University of Akron, and Youngstown State University.

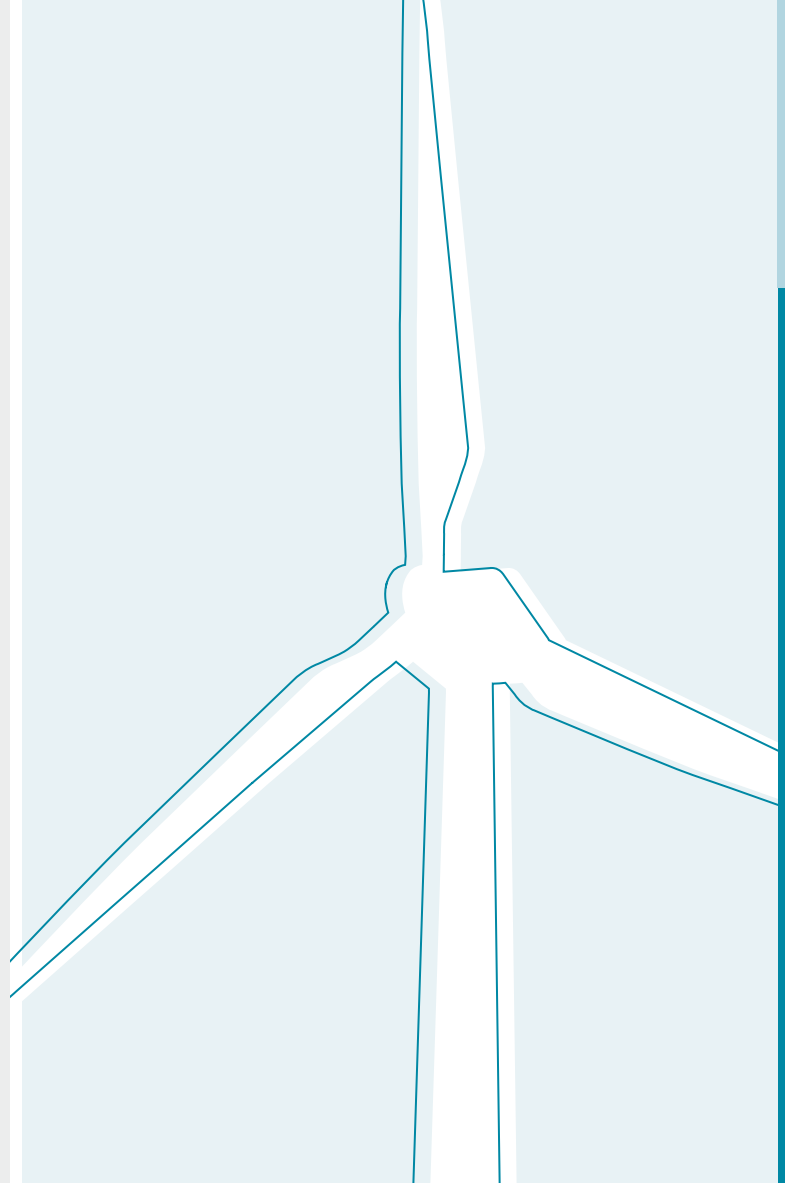
The Great Lakes Energy Institute at CWRU is emerging as a world-class research center for advanced energy, with a major focus on land-based and offshore wind energy. Wind energy research at the Great Lakes Energy Institute continues to grow stronger as new researchers join the institute and existing faculty members transition their research programs to focus on areas critical to the Great Lakes region, and Cleveland Plus specifically. Exciting developments include:

In 2009, Mario Garcia-Sanz, a world leader in control technology and turbine innovation, joined the faculty at CWRU. His work focuses on bridging the gap between fundamental and applied research in advanced control and systems engineering in energy innovation and wind energy. Garcia-Sanz worked with a wind turbine original equipment manufacturer for over a decade, leading many projects on large, multi-megawatt wind turbines.

The Great Lakes Offshore Wind Energy Foundation and Tower Program is advancing the state of the art in understanding and predicting tower and foundation longevity by developing ways to simulate in-service conditions and methods so that the degradation process can be better understood. The results will enable testing of retrofit mitigation strategies for compromised towers and foundations, as well as aid in the development of new design configurations.

The Ohio Wind Energy Research Consortium was recently created to install an array of wind turbines on or near the CWRU campus to serve as a test bed for new wind-related technologies. David Matthiesen—the principal investigator—and seven local industry partners support the Great Lakes Energy Institute, dedicated to wind turbine development and education, which is believed to be the largest university facility of its kind in the country.

The Bio-Inspired Sensing and Controlling for Resilient Wind Turbine Blades Project is aimed at developing bio-inspired sensing and controlling technology to enable smart wind turbine blades to mitigate structural damage/failures. The project ultimately aims at advancing the state of the art in smart sensing controlling technology for wind turbine blades.



Ohio ranks second of the 50 United States in the industrial potential for producing wind turbines and components, according to the Renewable Energy Policy Project in a 2004 report for the U.S. Department of Energy.

HOME TO INDUSTRY-LEADING COMPANIES

The region's history led to industry leadership. Cleveland Plus is now home to more than 400 suppliers relevant to the wind energy sector. Wind energy suppliers range from alloy steel and bearing maker Timken, in Canton, to ring-bearing maker Rotek, in Aurora, and Cardinal Fasteners, in Cleveland. Combined, the hundreds of suppliers create a strong network for enhanced partnership and collaboration.

EATON CORPORATION

Eaton Corporation, located in Cleveland, OH, is a leading diversified power management company, with technology and operations in various industries from electrical components to aerospace fuel to systems and services from industrial and mobile equipment. Eaton produces wind turbine electrical solutions, which operate in the nacelle's wind turbine control systems and in the base of the turbine tower.

LINCOLN ELECTRIC

Lincoln is the world's largest producer of welding consumables & equipment with 115 years of demonstrated success in fabrication productivity increases for industry. Lincoln has introduced ground breaking equipment and consumables in the last 5 years targeted at the Wind Tower production market, with recognized preference by tower manufacturers around the world. Lincoln Electric regularly hosts Wind Tower Manufacturing and Productivity seminars that have been acclaimed by some of the world's largest tower manufacturers. Lincoln Electric products are the standard and Lincoln has won over 75% of all new wind tower manufacturing installations in the US over the past 3 years. Lincoln Electric and its partners can design, build and install complete turn key wind tower fabrication lines, allowing any company looking to invest in the industry to have the confidence and capability to capture the local demand for wind towers.

LUBRIZOL

The Lubrizol Corporation, with headquarters in Wickliffe, Ohio, is an innovative specialty chemical company that produces and supplies technologies that improve the quality and performance of our customers' products in the global transportation, industrial and consumer markets. With the growth in wind energy opportunities, Lubrizol delivers a range of products to meet customer needs.

Cable and Wire Jacketing: Wind turbines operate in brutal environments, under extremes of hot and cold, for decades. Cable jacketing formulated with Estane® TPU offers exceptional durability, flexibility and high and low temperature performance.

Additives for Lubricants: Lubrizol offers lubricant additives designed specifically for wind energy applications. Industrial gear oil, hydraulic fluids and greases containing Lubrizol additive technology offer longer life, resistance to wear and compatibility with coatings and elastomers.

Sensor Technology: Monitoring oil identifies problems early and spares operators the expense of replacing gear boxes. Lubrizol's FluiCheck™ diagnostic system represents a novel approach to diagnostics for wind energy hardware.

PARKER HANNIFIN

For many years, Parker Hannifin, a Cleveland-based company which has manufacturing and engineering facilities around the world, has been a major supplier of quality components and systems solutions to the wind turbine industry. The company manufactures power units, pitch systems, electromechanical blade pitch control systems, gear pumps and motors, precision hydraulic valves and electronics, thermoplastic hoses, hydraulic fittings, grid-tie inverter systems, and subsea power cables. The company is also launching a line of high-speed brakes for wind turbines, similar to those used in helicopters.

ROTEK INCORPORATED

Rotek, located in Aurora, is expanding its facility by more than 300,000 square feet, adding nearly 150 new jobs to expand its business in the wind industry. Rotek is a world leader in the engineering, manufacturing, service and support of large diameter ring bearings, used primarily in wind turbines. The company also manufactures seamless rolled rings in aluminum grades, carbon, stainless and alloy steels.

THE SHERWIN-WILLIAMS COMPANY

Headquartered in Cleveland since its founding in 1866, Sherwin-Williams, through its protective and marine coatings business, delivers smarter asset protection and unmatched service and specification support to its customers from 4,400 locations worldwide. In the renewable energy space, Sherwin-Williams offers proven high-performance coatings engineered to protect steel wind turbine exteriors and blades. These time-tested coating systems meet or exceed the requirements of the ISO 12944 C3, C4, & C5I, C5M corrosivity classes required by all major wind energy OEMs. Sherwin-Williams coatings solutions deliver superior corrosion, abrasion and impact resistance as well as color and gloss protection to wind energy assets under extreme weather conditions. The company is also a global leader in environmentally responsible coatings, having invested early on in the technologies necessary to help its customers comply with the most stringent environmental regulations governing VOC and HAPs emissions.

TIMKEN

Timken, headquartered in Canton, OH, is a global supplier in the wind industry which supplies a broad range of wind-power solutions including: engineering design, high quality alloy steel, gearbox components and systems, bearings, seals, lubrication, and online condition monitoring. Wind Energy is a focused segment within Timken which is why the company has invested more than \$200M in the past three years to expand in this market. The company recently began producing ultra-large bore bearings for wind turbines in Xiangtan, Hunan Province, and retooled and expanded its U.S. facilities in Asheboro, N.C. and Tyger River, S.C. to serve customers in the industry. This is in addition to Timken's existing wind-bearing production in Wuxi, China; Chennai, India; and Ploiesti, Romania. The company also provides clean Timken® steel from its facilities in Canton, Ohio, for its own production and for various wind-energy components for other customers.

SUSTAINABILITY

With a number of entities working to become “green,” there is a strong and growing focus on sustainability in the cities of the Cleveland Plus region. In addition to the aforementioned work, organizations such as Green City Blue Lake, Entrepreneurs 4 Sustainability, the Corporate Sustainability Network, Green Energy Ohio, and EcoWatch Ohio, to name just a few, are growing and enhancing the region with sustainable principles that meet the needs of the present without compromising the ability of future generations to meet their needs. This culture of innovation and sustainability is permeating into all aspects of the Cleveland Plus region. In 2009, nearly 700 people from across the Cleveland Plus region and the nation attended the first Sustainable Cleveland Summit, with a theme of “Building an Economic Engine to Empower a Green City on a Blue Lake.” This three-day event, hosted by the mayor of Cleveland, jump-started Cleveland’s commitment to becoming a leader in the emerging green economy over the next 10 years. What was begun at the summit now continues with a number of specifically focused subcommittees as well as by the Sustainable Cleveland 2019 Council, who will advise the mayor on the strategic portfolio for harnessing and endorsing sustainability as an economic engine for innovation, growth, and to meet the Sustainable Cleveland 2019 vision.

“Offshore wind has the potential to create thousands of new jobs in Ohio and become a major source of economic growth. Working with LEEDCo we have made significant progress to make offshore wind in Lake Erie a reality.”
-Vic Abate, VP of GE Renewable Energies

This makes the Lake Erie project quite an important venture, not just for proving that the next generation of turbines can hack it in the field, but also that offshore projects in interior lakes can work.
-Popular Science

This commitment to sustainability and innovation is most evident in the 2009 development of the Lake Erie Energy Development Corporation (LEEDCo), based in Cleveland, Ohio. This regional nonprofit economic development corporation is leading efforts to build, install, and deploy an offshore wind farm on Lake Erie while spurring economic development in Northern Ohio’s wind energy industry.

Initially, LEEDCo is pursuing the installation of a 20-megawatt facility offshore near downtown Cleveland. This will be followed by subsequent projects with a long-term goal of 1,000 megawatts in the Ohio waters of Lake Erie by 2020, at a price competitive with other forms of electricity generation. LEEDCo was developed as a public-private partnership to lead the nation in offshore production. It is succeeding. LEEDCo recently announced a long-term partnership with GE to develop the first offshore wind project. Under the new partnership, GE will provide direct-drive wind turbines to LEEDCo’s 20-megawatt offshore wind project. In addition, LEEDCo and GE will create a strategic plan to identify opportunities to make offshore wind energy in the Great Lakes economically viable. The 20-megawatt offshore wind project is a significant step towards making

the Great Lakes a major economic engine, capitalizing on the region’s skilled workforce and expertise in advanced manufacturing.

On-Shore Market Access + Emerging Offshore Opportunity: It is the combination of centralized location, innovative partnerships, strong natural resources, and trendsetting offshore turbine developments that have made Cleveland Plus one of the premier destinations for wind-related businesses to call home.

CHAPTER 4 SUPPLY CHAIN

An extensive regional supply chain provides companies the flexibility to manufacture or outsource product design and development with minimum cost and risk, yet maximum opportunity. Because of Cleveland Plus's rich history in advanced manufacturing, the region offers greater access to supply chain than most U.S. locations.

As part of an ongoing effort to analyze the implications of the future emergence of a green economy, the California Labor Market Information (LMI) has compiled a Digest of Green Reports and Studies; in the digest, national studies have been aggregated to define the inputs required to manufacture products such as a wind turbines. The study found that many of the products in the advanced energy supply chain are the same materials and components used in automotive, aerospace, and other more traditional manufacturing industries. Given the region's historical industry mix, Cleveland Plus is home to thousands of companies who are experts in their respective fields and already producing components for advanced energy products. In fact, the industries designated within the digest as part of the advanced energy supply chain collectively represent \$12.5 billion of Cleveland Plus's economy—and more than 2,000 companies (see Figure 7).

Going a step further, NorTech Energy Enterprise, an organization championing the growth of the regional advanced energy industry in Cleveland Plus, has begun the process of identifying confirmed supply chain companies that are currently serving the advanced energy industry. The map below (Figure 8) shows the locations of these firms in the Cleveland Plus region. With more than 400 confirmed advanced energy companies, the Cleveland Plus region is poised to maintain its status as one of the nation's premier destinations for the production of goods to support the emergence of new sectors in the future economy such as wind energy.

Not only does the Cleveland Plus region have a strong, concentrated, existing supply chain, but the cluster of industries that form this sector are much stronger in this region than they are nationally. By viewing these businesses through the location quotient (LQ) lens, we are able to understand the Cleveland Plus region's relative strength compared to the United States as a whole. An LQ defines an area's gross product or employment in a given sector, relative to the national average. An LQ of 1.0 represents the national average. Therefore, anything above a 1.0 generally represents an exportable good or service.

POTENTIAL WIND-RELATED ADVANCED ENERGY SUPPLY CHAIN IN CLEVELAND PLUS

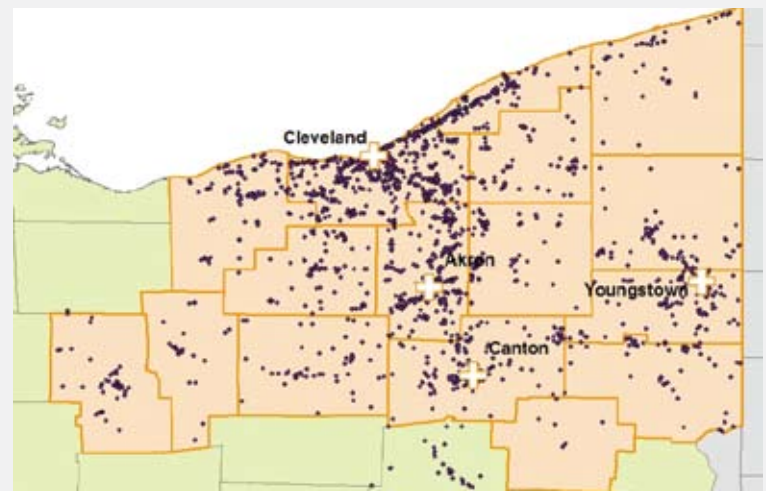


Figure 7: Source: Dun and Bradstreet, 2009

CONFIRMED ADVANCED ENERGY SUPPLY CHAIN IN CLEVELAND PLUS

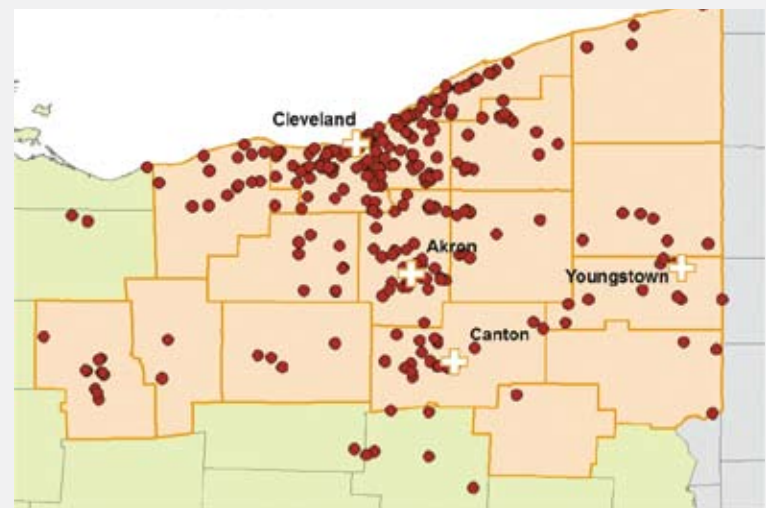


Figure 8: Source: NorTech Energy Enterprise 2009

Once again, based on the industries defined by the Digest of Green Reports and Studies as being essential inputs into advanced energy production, the Cleveland Plus region fares remarkably well when compared to the national average (see Figure 9). Industries such as fabricated metal production and steel mills are over 600% more concentrated in the Cleveland Plus region than the national average.

As states and regions rapidly develop policies for advanced energy generation, products such as wind turbines are increasingly in high demand. The materials—steel, composites, coatings, and bearings, for example—required to produce many of these products are the same inputs that propelled the Cleveland Plus region to prominence consistently during the twentieth century. Cleveland Plus and its strong legacy of manufacturing, as well as its vast supply chain network, are well poised to meet the growing business needs of the advanced energy sector.

CONCENTRATION OF ADVANCED ENERGY SUPPLY CHAIN SIGNIFICANTLY STRONGER IN CLEVELAND PLUS THAN U.S. AVERAGE

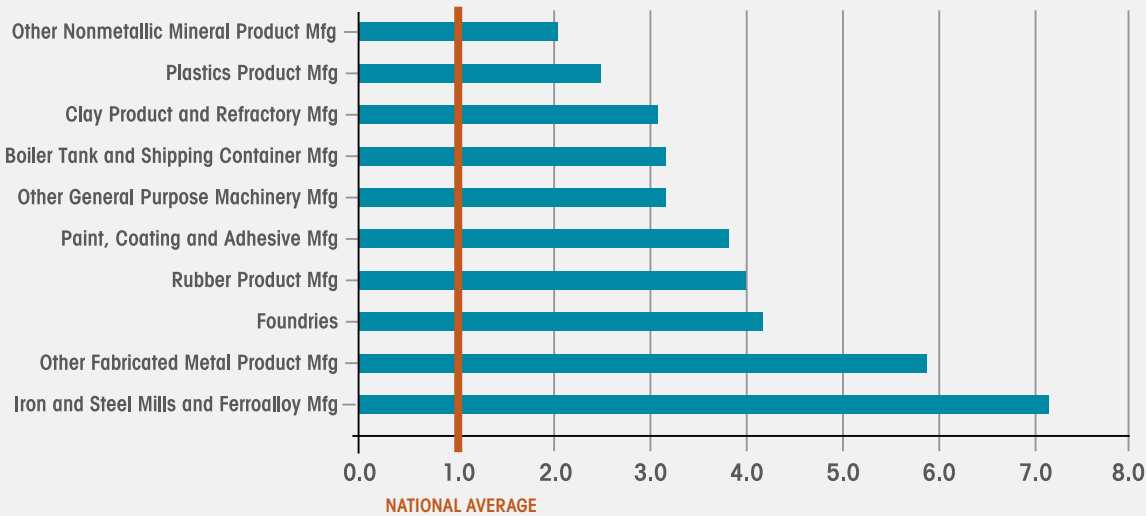


Figure 9: Source: Moody's Economy.com 2009

PROJECTED GROWTH IN ADVANCED ENERGY GRP

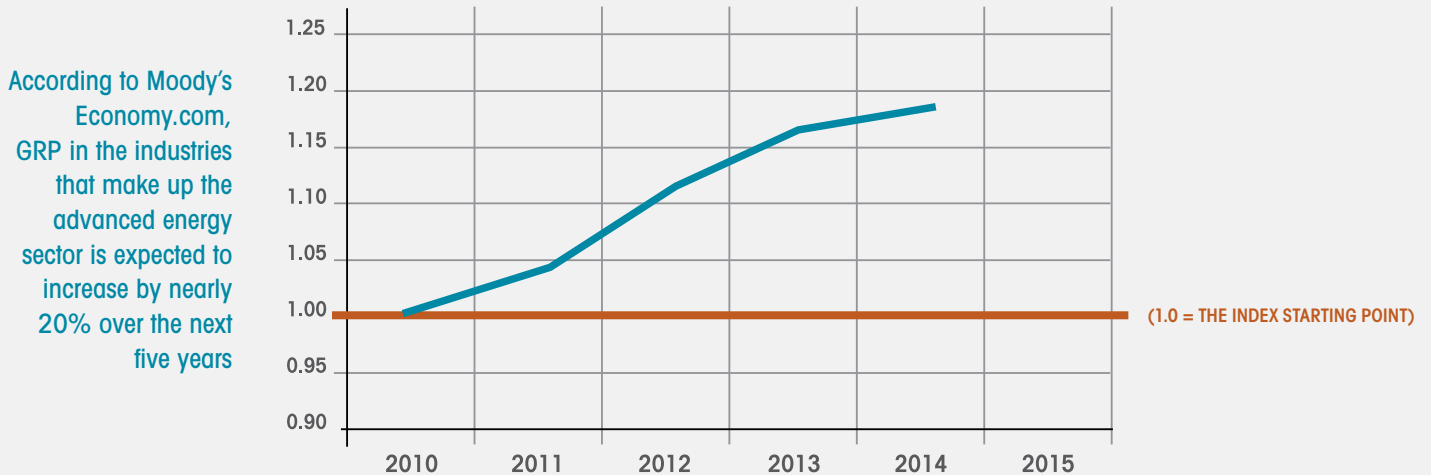


Figure 10: Source: Moody's Economy.com 2009

According to Moody's Economy.com, the Cleveland Plus region's Gross Regional Product (GRP) for the industries that make up manufacturing inputs to Advanced Energy sectors is expected to grow by more than 20% between 2010 and 2015

In addition to having a robust supply chain network in the region and opportunity for onshore and offshore wind, the Cleveland Plus region has a diverse and integrated transportation and logistics infrastructure that will maximize a company’s ability to quickly source supplies, ship products, and move employees to virtually any destination in the world.

Cleveland Plus is ideally situated within the United States to provide convenient access to significant U.S. and Canadian markets. In fact, within 500 miles of the Cleveland Plus region – a one-day drive - businesses have convenient access to:

- + 44% of all U.S. households,
- + 45% of all effective U.S. buying income,
- + 49% of all U.S. manufacturing employment,
- + 43% of the total U.S. population,
- + 46% of all U.S. earning power,
- + 56% of Fortune 500 U.S. headquarters.

In addition to having access to significant portions of the U.S. population and economy, the Cleveland Plus region also has access to major markets throughout Canada, including Toronto, Ottawa, and Montreal (See Figure 1).

Logistics

To complement its ideal location, the Cleveland Plus region offers a variety of logistical advantages. For companies that rely on mass market shipping carriers to deliver finished products as well as supplies and materials, Cleveland Plus offers timely and cost-effective commercial shipping options. A sample of a national mass market shipper shows that products and supplies can reach significant portions of the Midwest, East Coast, and Mid-Atlantic regions of the United States and parts of Canada with a next-day ground delivery.

Manufacturers, distributors, and suppliers are mindful of the direct costs attributed to the delivery speed of their products for just-in-time shipments and to avoid spoilage. As indicated below, being located in the Cleveland Plus region allows business owners to reach significant portions of the United States and Canada by utilizing mass market shipping companies for their next-day ground shipping needs.

For companies that need customized shipping solutions, the Cleveland Plus region offers a highly specialized and integrated multi-modal infrastructure move products, supplies, and materials. Companies can support their supply chain needs and ship their products and supplies via air, rail, highway, ship, or any combination of these options.

Figure 11



MAJOR CITIES IN CLEVELAND’S NEXT DAY DELIVERY AREA



Figure 12: Source: FedEx

Companies access the following transportation options in the Cleveland Plus region:

+ 5 interstate highways,

+ 3 Class I railroads,

+ 3 foreign trade zones,

+ 2 high traffic airports: Cleveland Hopkins International Airport (CLE) and Akron–Canton Regional Airport (CAK),

+ 2 intermodal terminals: CSX terminal and NeoModal terminal, and

+ 2 international waterway connections: Saint Lawrence Seaway and the Ohio River–Mississippi River system.

Figure 13 demonstrates the full capabilities of the transportation and logistics infrastructure available in the Cleveland Plus region. The region can effectively support the transportation and logistics needs of a company, regardless of the channel required and the destination of the shipped goods.

Companies that rely on shipping their products and materials using barges have multiple access points throughout Cleveland Plus. With access to the Great Lakes and significant rivers, the Cleveland Plus region has an abundance of barge-shipping channels, including the Saint Lawrence Seaway and the Ohio River–Mississippi River system. Plus, each of the barge access points are complemented with other transportation logistics to facilitate convenient transfers from railroads, highways, and deepwater ports.

Figure 14 illustrates the convenient river and large body waterways transportation sources throughout the Cleveland Plus region that allow products and materials to move easily throughout the United States, Canada, and the rest of the world via barge. The Great Lakes offer an efficient way to move ships to Canada and through the Saint Lawrence Seaway to gain access to European markets.

The Ohio River–Mississippi River system offers an established shipping lane to the western and southern regions of the United States. Moving products and materials south into the Gulf of Mexico offers companies based in Cleveland Plus access to world markets, including South America, Asia, and Africa.

The Cleveland Plus region offers companies convenient and reliable access to suppliers, partners, and customers throughout North America and the world. The Wellsville Cross-Docking site serves as one example of how the transportation and logistics infrastructure of the Cleveland Plus region provides companies with opportunities to easily combine a variety of transportation modes to achieve convenient and reliable shipping solutions.

The Wellsville Cross-Docking site, located along the Ohio River in Columbiana County, OH, is the ideal location from which to move products or supplies from railcars, trucks, or barges to a secondary form of transportation. The photo

+ 6 deepwater ports,

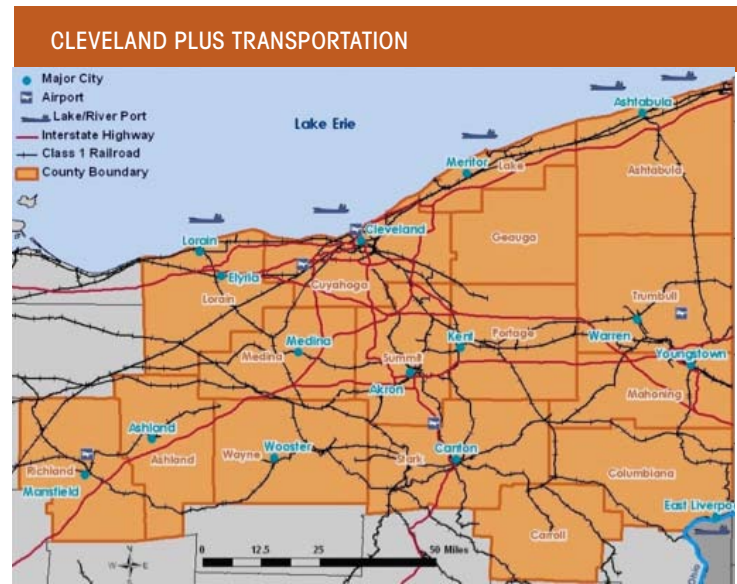


Figure 13-Source: Environmental Services Research Institute (ESRI), ArcView 9.3 application database

CLEVELAND PLUS AND U.S. MAJOR WATERWAYS



Figure 14- Source: Environmental Services Research Institute (ESRI), ArcView 9.3 application database

WELLSVILLE CROSS-DOCKING SITE



The Cleveland Plus region offers companies convenient and reliable access to suppliers, partners, and customers throughout North America and the world.

DIRECT FLIGHTS TO FORTUNE 500 HEADQUARTERS STRONG FROM CLEVELAND PLUS



Figure 15

Continental, Delta, United, and U.S. Airways, as well as low-cost carrier options like Southwest, AirTran, and Frontier.

For companies serving Fortune 500 customers, the Cleveland Plus region offers unique cost-effective access. In addition to the eleven Fortune 500 companies that are headquartered in the region, Cleveland Plus offers more direct flights to Fortune 500 company markets than many U.S. regions.

Cleveland Plus offers easy access to international markets. The region is within close proximity to many similar major markets. In addition to international flights directly from Cleveland Hopkins International Airport, travelers take a short connecting flight to Detroit (45 minutes), Chicago (1 hour), Philadelphia (1 hour), Dallas (2 hours), Houston (2 hours), Atlanta (2 hours) or Miami (2.5 hours). With as little as one connection, or a short drive, passengers based in the Cleveland Plus region can access virtually any major destination in the world.

of the cross-docking site shown on the next page offers a compelling image of how well our transportation logistical infrastructure is integrated.

In addition to being able to move products and materials around the United States - and the world - from the Cleveland Plus region, the region offers convenient options for business and personal travel. Cleveland Plus companies enjoy multiple, flexible options for visiting customers, suppliers, and major business destinations with ease and convenience.

Cleveland Plus has two high traffic airports, Cleveland Hopkins International Airport and Akron-Canton Regional Airport, offering hundreds of daily direct flights to major metropolitan destinations. Both airports offer a variety of airline options, including

CHAPTER 6 WORKFORCE CAPABILITY

In addition to the region’s strong supply chain and logistics for manufacturing wind energy turbines and components, the Cleveland Plus region’s workforce is also ideally suited for the wind energy industry. With the region’s strong base of industries and companies, the Cleveland Plus workforce has the skills and experience needed for wind manufacturing.

SKILLED WORKFORCE PROPELS INDUSTRY

The Occupational Information Network (O*NET), a branch of the U.S. Department of Labor, has identified 27 occupations expected to see a significant increase in demand due to the emergence of advanced energy-related industries in the coming years. According to O*NET, the occupations in demand are many of those that have been needed for traditional manufacturing applications, such as automotive and aerospace work. According to O*NET, these “green increased demand occupations (include) existing standard occupational classification (SOC) occupations.

This impact does not entail significant changes in the work and worker requirements of the occupation. The work context may change, but the tasks themselves do not.” Therefore, the skills of existing Cleveland Plus workers will be essential to the production of wind turbines (and other cleantech products). In many of these occupations, the Cleveland Plus region already has an above-average share of workers. In fact, Cleveland Plus has more than 130,000 workers in the 27 increased demand occupations identified by O*NET

GREEN INCREASED DEMAND OCCUPATIONS IN CLEVELAND PLUS, 2010

Occupational Description	NEO Employment
Industrial Production Managers	3,870
Industrial Safety and Health Engineers	240
Electronics Engineering Technicians	1,340
Chemists	1,400
Materials Scientists	260
Chemical Technicians	1,050
Commercial and Industrial Designers	500
Occupational Health and Safety Specialists	780
Production, Planning, and Expediting Clerks	4,880
Structural Iron and Steel Workers	850
First-Line Supervisors of Mechanics	6,060
Electrical Repairers, Commercial & Industrial Equipment	1,130
Industrial Machinery Mechanics	4,420
Millwrights	390
First-Line Supervisors of Production & Operating Workers	13,740
Electrical and Electronic Equipment Assemblers	3,040
Engine and Other Machine Assemblers	250
Structural Metal Fabricators and Fitters	1,460
Team Assemblers	17,030
Computer-Controlled Machine Tool Operators	5,660
Cutting, Punching, and Press Machine Setters	8,070
Drilling and Boring Machine Tool Setters	970
Solderers and Brazers	5,790
Chemical Plant and System Operators	390
Chemical Equipment Operators and Tenders	1,120
Mixing and Blending Machine Operators	2,950
Laborers and Freight, Stock, and Material Movers, Hand	43,980
Total	131,620

Figure 15—Source: O*NET, Green Increased Demand Occupations

Additionally, of these 27 occupations, the Cleveland Plus region has a Location Quotient (LQ) at or above 1.0 in 20 of them (see Figure 16 for the Top 10 occupations). This means that Cleveland Plus has a national competitive advantage not only in the industries producing advanced energy products but also in the workforce needed to manufacture those goods. In fact, the Cleveland Plus region has a larger concentration of these workers than most other Midwest regions, including Detroit, Pittsburgh, and Indianapolis.

CONCENTRATION OF TOP OCCUPATIONS FOR GREEN INCREASED DEMAND OCCUPATIONS IN CLEVELAND PLUS

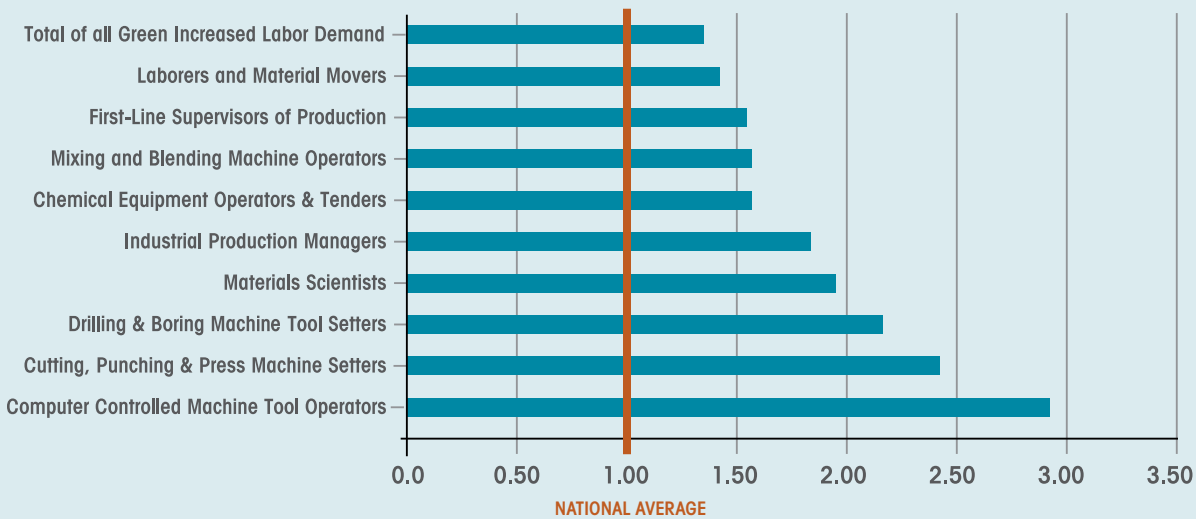


Figure 16—Source: O*NET, U.S. Bureau of Labor Statistics

Another way to identify potential workforce needs is through a second O*NET classification, “green enhanced occupations.” According to O*NET, green enhanced occupations include “economy activities and technologies resulting) in a significant change to the work and worker requirements of an existing SOC occupation. This impact may or may not result in an increase in employment demand for the occupation. The essential purposes of the occupation remain the same, but tasks, skills, knowledge, and external elements, such as credentials, have been altered.” Within green enhanced occupations, Cleveland Plus has more than 63,000 workers (see Figure 17), again more than other Midwest regions like Detroit, Pittsburgh, and Indianapolis. In total, the Cleveland Plus region has nearly 200,000 workers available to use their skills to enhance the success of advanced energy in the area.

GREEN ENHANCED DEMAND OCCUPATIONS IN CLEVELAND PLUS

Occupational Description	NEO Employment
Electro-Mechanical Technicians	140
Industrial Engineering Technicians	1,110
Occupational Health and Safety Technicians	160
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	5,130
Shipping, Receiving, and Traffic Clerks	12,200
Sheet Metal Workers	1,520
Maintenance and Repair Workers, General	16,850
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	3,120
Machinists	14,010
Separating, Filtering, Clarifying, Precipitating & Still Machine Setters, Operators	200
Inspectors, Testers, Sorters, Samplers, and Weighers	8,720
Total	63,160

Figure 17—Source: O*NET, U.S. Bureau of Labor Statistics

STRONG TECHNICAL WORKFORCE SUPPORTS RESEARCH, DEVELOPMENT AND PRODUCTION

While the Cleveland Plus region is recognized for its strong competencies in manufacturing, the area also boasts an above-average number of technical occupations and specialties, such as engineering and mathematics, which are essential to the design and development of new wind energy products. One way to view this workforce is through an analysis of high-tech employment as defined by economist Daniel E. Hecker. According to Hecker, the average percentage of high-tech employment within all industries throughout the United States is 4.9%. Therefore, any industry with at least twice the 4.9% average (9.8%) is considered high-tech. This is further broken down into Levels 1, 2, and 3. Level 1, the most significant, refers to industries where at least 24.7% (5 times the national average) of employment is composed of high-tech occupations. This includes 14 separate industries, ranging in scope from aerospace manufacturing to architectural design. Between 2003 and 2008, the Cleveland Plus region’s high-tech Level 1 industries significantly outpaced those in the rest of the United States—in terms of growth in Gross Regional Product (GRP)—growing at 51%, compared to the national average of 43% (see Figure 18). This means that the Cleveland Plus region is better suited for technology work than most regions in the United States, thereby ensuring higher quality work product for employers.

The Cleveland Plus region has also seen significant growth in professional, scientific, and technical services industries (NAICS Industry Code 54). Between 1993 and 2008, employment in this cluster of advanced industrial sectors grew significantly, with overall growth of more than 30% (see Figure 19). Additionally, sectors such as scientific and technical consulting and development witnessed staggering levels of employment growth, 81% and 98% respectively. This strength in high-tech employment industries means that Cleveland Plus can provide a broad spectrum of qualified labor for all phases of product development in the wind industry.

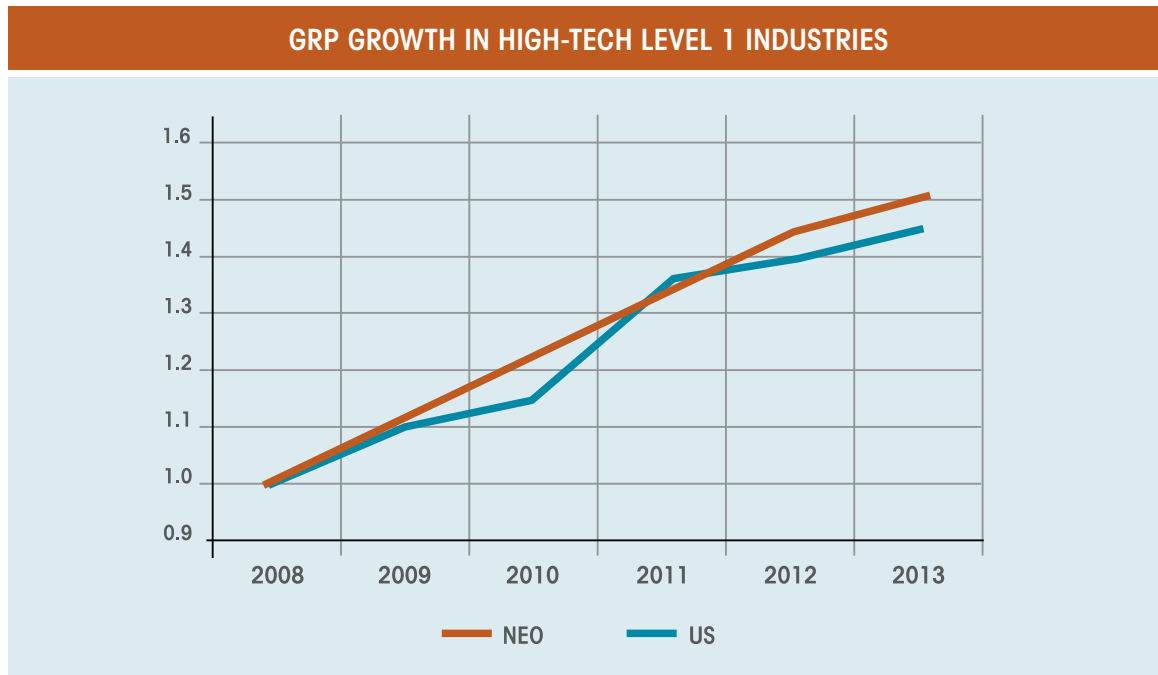


Figure 18—Source: U.S. Bureau of Labor Statistics 2009

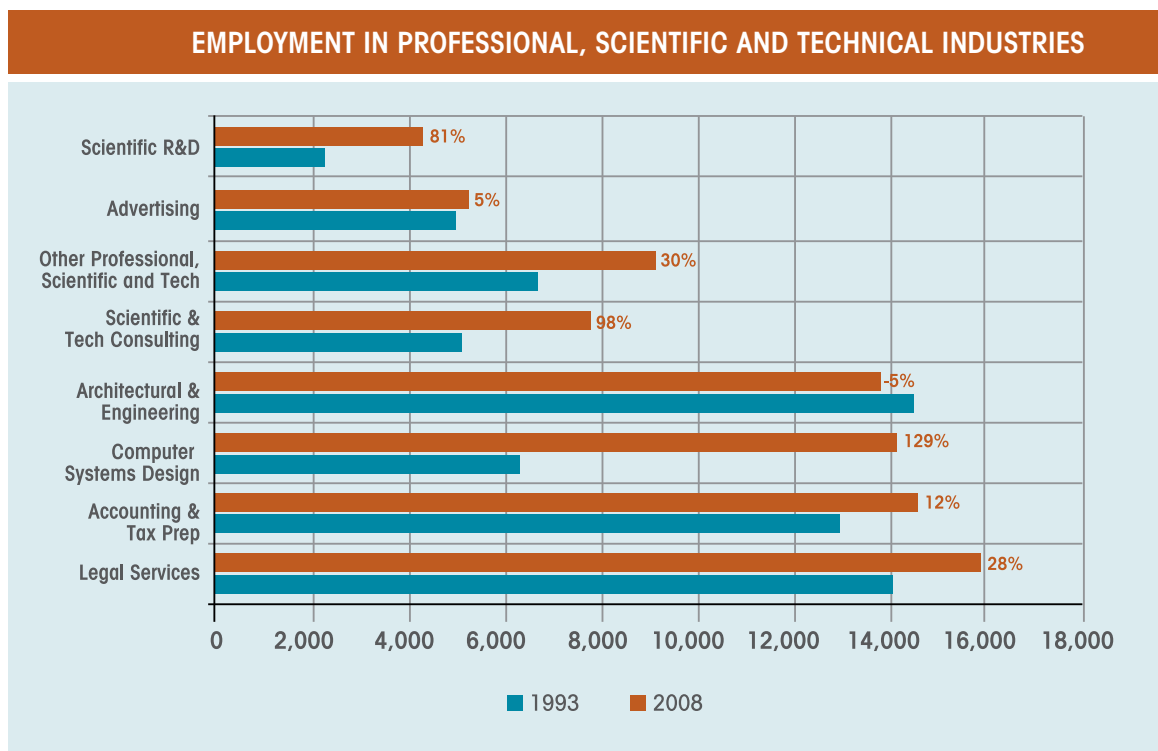


Figure 19—Source: Moody’s Economy.com 2009

COMPETITIVE WAGES IMPACTS BOTTOM-LINE

In addition to the quantity of labor available, the Cleveland Plus region also offers expanding companies competitive wages in the major occupational categories essential to the research, design, and production of wind-related materials. When compared to the national average for several major SOC groups relevant to the wind energy industry, it is clear that companies in the Cleveland Plus region enjoy lower workforce costs. For 8 of the 10 occupation groups selected, the Cleveland Plus region was between 1% and 17% lower (see Figure 20). For the two remaining groups, Cleveland Plus nearly mirrored the U.S. average.

Overall, the 2.1 million members of the Cleveland Plus workforce—ranging from traditional manufacturing to key sectors of research, design, and development—are well positioned to serve the diverse needs of the wind energy sector. It is this combination of skill and expertise that gives companies a competitive advantage in Cleveland Plus.

Cleveland plus has an affordable, above average concentration of the skilled and semi-skilled workforce needed to drive the advanced energy sector and keep businesses profitable.

CLEVELAND PLUS VS. U.S. WAGE COMPARISON BY MAJOR STANDARD OCCUPATION CLASSIFICATION (SOC) GROUP

Occupation Group (SOC Code)	U.S. Mean Annual Wage	Cleveland Plus Mean Annual Wage	Cleveland Plus % Difference
Management Occupations (11-0000)	\$100,310	\$99,674	-1%
Business and Financial Operations Occupations (13-0000)	\$64,720	\$59,625	-8%
Computer and Mathematical Occupations (15-0000)	\$74,500	\$65,556	-12%
Architecture and Engineering Occupations (17-0000)	\$71,430	\$64,632	-10%
Life Physical and Social Science Occupations (19-0000)	\$64,280	\$59,563	-7%
Legal Occupations (23-0000)	\$92,270	\$76,703	-17%
Sales and Related Occupations (41-0000)	\$36,080	\$34,704	-4%
Installation Maintenance and Repair Occupations (49-0000)	\$41,230	\$41,678	1%
Production Occupations (51-0000)	\$32,320	\$34,006	5%
Transportation and Material Moving Occupations (53-0000)	\$31,450	\$30,786	-2%

Figure 20-Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics 2009

CHAPTER 7 UNIVERSITY COLLABORATIONS AND NETWORKS

Another of the Cleveland Plus region's many assets is its remarkable network of colleges and universities. Ranging in scale from nationally-ranked doctoral programs to customized on-site training initiatives, the 30 colleges and universities in the region have ample expertise in a variety of wind-related occupations and fields to serve diverse product cycle needs. Plus, with close proximity to additional top-ranked universities such as the University of Michigan, The Ohio State University, the University of Pittsburgh and Carnegie-Mellon University, Cleveland Plus employers draw the nation's best and brightest talent.



Located in Cleveland, **The Case Western Reserve University (CWRU)** School of Engineering is one of the nation's elite colleges of engineering; its graduate program is ranked among the top 50 in the country by *U.S. News & World Report* and *Consumer Reports*. The school offers numerous degrees in fields related to wind energy, including electrical and mechanical engineering. In the 2008–2009 academic year, 267 CWRU students completed a bachelor's degree in engineering, 80 students completed a master's, and 58 students completed a doctorate, according to the National Center for Education Statistics' College Navigator Web site. CWRU is also home to the Great Lakes Energy Institute (GLEI), which was created "to enable the transition to advanced sustainable

energy generation, storage, distribution, and utilization, through coordinated research, development, and education." Additionally, CWRU has been awarded several grants to research various aspects of wind turbines, ranging from optimal materials development to the potential for offshore turbine development on Lake Erie.



Also located in the Cleveland Plus region is **Cleveland State University (CSU)**, home to the Fenn

College of Engineering. In the 2008–2009 academic year, 83 students completed a bachelor's degree in engineering, 120 students completed a master's, and 11 students completed a doctorate, providing an additional pipeline of technically skilled labor for companies looking to develop wind-related technology. CSU also offers both bachelor's and master's degrees in engineering technologies and multiple degrees in environmental sciences and sustainability. Additionally, CSU is home to a patented wind amplification turbine system, developed by CSU professors and students with the goal of producing higher levels of energy output in low-wind conditions. That system, which sits atop the CSU Plant Services Building, is a synergistic example of how collaboration between students and professors is driving advanced energy knowledge in the region.



The University of Akron offers several engineering-related degrees. In the 2008–2009 academic year, 179 students completed a bachelor's degree in engineering, 65 students have completed a master's, and 25 students completed a doctorate. During that same period, 74 students completed an engineering technologies/technicians associate's

degree, and 82 students completed a bachelor's degree in engineering technologies/technicians. Moreover, researchers at the University of Akron College of Polymer Science and Polymer Engineering are working on better ways to store energy from alternative energy sources, which will help make the use of wind energy more viable.

Community colleges too play an important role in providing technical training to the Cleveland Plus wind maintenance and development workforce. Three such colleges—Cuyahoga Community College (Tri-C), Lorain County Community College (LCCC), and Stark State College of Technology—offer programs specifically designed to address the installation, operation, and maintenance of wind turbines. These programs collaborate with local businesses to provide the training required for successful careers in the wind turbine industry.



Cuyahoga Community College offers a wide variety of advanced energy classes and training as part of

their Workforce and Economic Development Division. Developed as a component of the Unified Technologies Center for customized workforce needs, the Advanced Manufacturing and Engineering Center provides both students and businesses with the equipment, technology training, and education necessary to advance in the industry; more than 1,000 people are trained there each year. The program, designed and developed by industry professionals, addresses the most relevant industry needs. One program offered through the center is wind turbine technician certification, which includes 512 hours of lecture and hands-on labs to provide individuals with the skills they need to install, operate, and maintain wind turbines. The faculty, which has vast experience within the

industry and often integrates such experience it into their curriculum, keeps the program up-to-date by constantly learning new technical knowledge and skills.



Lorain Community College offers both degree and certificate programs

in wind turbine technology. The associate's degree in alternative energy technology-wind turbine major, the first in Ohio, will begin fall of 2010 and will provide the education and skills necessary for installing and maintaining wind turbines. A one-year certificate program currently offered at LCCC trains individuals on a wide variety of skills needed for the wind turbine industry, from electrical and mechanical maintenance to advanced energy-focused computer skills. The program received national attention in January of 2010 when President Barack Obama visited LCCC to speak and meet with students. During the 2008-2009 academic year, 15 students completed an engineering-related associate's degree, and 39 students completed an engineering technologies/technicians associate's degree.



Stark State College of Technology offers two one-year certificate programs

relevant to the wind industry. The first is a more general degree, focusing on sustainable/alternative energy. The second is wind turbine maintenance technology, which teaches individuals how to maintain commercial wind turbines. The program partners with local companies to offer individuals the training needed to evaluate and maintain the turbines. Both certificate programs are part of the Electrical Maintenance Technology department. During the 2008-2009 academic year, 20 students completed an engineering related associate's degree, and 191 students completed an engineering technologies or technicians associate's degree.

PREPARING OUR REGION'S YOUTH FOR GREEN JOBS

The Cleveland Plus region also offers numerous programs that provide technical training to high school students. One of these programs is the Cleveland-based Union Construction Industry Partnership Apprenticeship Skills Achievement Program (UCIP-ASAP), a five-day-a-week, 320-hour program designed to serve minority and disadvantaged men and women. It teaches the basics of blueprint-ready, construction safety, math, welding, trade orientation, nutrition, trade selection, and other useful career skills. Up to 20 participants at a time may be enrolled in each eight-week session. Upon completion, participants are often able to find placement in various apprenticeship programs in the area. Another program, Pathways Out of Poverty Through Green Jobs, is offered by Tri-C. It provides workforce training and education to prepare individuals for jobs in green industries.

The depth of education and training, the breadth of research and development, and the strong pipeline of workers provided through regional educational institutions are just three of the many competitive advantages Cleveland Plus can offer companies in the wind energy industry.

CHAPTER 8 REAL ESTATE AVAILABILITY

In addition to locating in a central and beneficial geography, finding job-ready sites is important to expedite expansion. European and Asian companies are geographically expanding into American markets to be logistically closer to the American wind market, which is growing exponentially. In more cases than not, these companies are looking to replicate manufacturing processes and layouts used in their home countries, or in other locations in the United States. With 6000 square miles of land and four urban core cities, the Cleveland Plus region's geography offers accessible job-ready sites for wind manufacturers and suppliers. Wind industry operations could entail manufacturing and assembly of nacelle units, towers, and blades. The real estate requirements for the wind industry are particularly challenging because of the need for high ceilings, wide bay widths, reinforced floors, external storage space, and multimodal transportation access. Given Cleveland Plus's strong manufacturing base, the region offers many existing and ready sites for wind energy production. Understanding a company's real estate needs allows our region to identify existing buildings and potential sites for wind energy component production. Below are common considerations for land and buildings, as derived from a draft study conducted for the State of Ohio in 2008 by McCallum Sweeney Consulting, titled "Competitive Assessment of Wind Energy Recruitment Potential," and wind energy project requirements compiled to date by local and state officials.

REQUIREMENTS FOR EXISTING BUILDINGS

For production of Nacelles (Nacelle units, Rotor hubs, and Gearbox units), companies typically look for 75,000 to 150,000 square feet of space with at least 30-foot high clear ceiling height, a capacity of 38,000 to 48,000 pounds for rotor hub and generator machine frame, or 300,000 to 350,000 pounds for completed nacelle units, bridge cranes, and preferably no columns.

To manufacture wind blades and wind towers, companies typically look for 250,000 to 600,000 square feet of space, with wide bay widths and ideally no columns in a large rectangular building for linear manufacturing. Building size is usually based on the size of the blades and towers, and the number of mold sets and tower sections to be manufactured, so understanding customer needs is critical in the real estate search.

Cleveland Plus offers a vast array of buildings that meet these requirements. In addition to the examples below, many building are available for inspection. In understanding specific company specs, the region can best identify potential locations for optimal business expansion.

Similar to building requirements, there are key needs for land sites. Nacelle producers seek 15 – 30 acres typically, while wind blade and wind tower manufacturers usually seek 23 – 71 acres, depending on product size. In addition, it is critical for property to have ample acreage for storage.



Both building and land options will need an additional 25 to 55 acres for external storage, again depending on size of final product. In addition, a company's ability to send final product directly to a marshalling yard is a benefit. Similarly, surrounding land use is important. Wind turbine and component manufacturers require constant flow of trucks rail service to and from the facility, and the area must have easy, uncongested highway access for employee commuting as a company typically requires multiple production shifts.

The Cleveland Plus region understands that sites and buildings must be ready, developable, and with risks that can be easily and quickly mitigated according to the client's needs. The expansion of the suburban

population in the Cleveland Plus region has led to the development of new industrial parks well suited to the wind industry. Often these parks are located between two or more MSA's allowing for employers to draw from a larger labor pool. In addition, suburban parks are equipped with ample outdoor storage space, wide turn radices for truck traffic, and the ability to run multiple shifts away from neighborhoods and populous areas.

With multiple interconnecting highway access points, Cleveland Plus's average commute time is 24 minutes, so regardless of location, company employees enjoy close proximity to work, home and community.

The expansion of the suburban population in the Cleveland Plus region has led to the development of new industrial parks well suited to the wind industry. Often these parks are located between two or more MSA's allowing for employers to draw from a larger labor pool. In addition, suburban parks are equipped with ample outdoor storage space, wide turn radices for truck traffic, and the ability to run multiple shifts away from neighborhoods and populous areas. With multiple interconnecting highway access points, Cleveland Plus's average commute time is 24 minutes, so regardless of location, company employees enjoy close proximity to work, home and community.

The region has many sites for which a Phase I Environmental Site Assessment has been completed. The Cleveland Plus region is home to many greenfields, for which archaeological, historical, and cultural studies have been completed with the same conditions as the Phase I. As there are many job ready sites in Cleveland Plus, the region is prepared to discuss specific company needs so that organizations can find the ideal property that suits its unique needs.

RELIABLE, EFFICIENT PERMITTING

The State of Ohio and the local municipalities in Cleveland Plus recognize the urgency involved in the site selection process. It is not unusual for some companies to make a decision and to expect to have the facility up and running in nine months to a year. Most regional sites are pre-permitted for manufacturing usage. Express permitting is available in many locations as well as dedicated staff assigned to a project location to ensure permitting success. With its long history of manufacturing excellence, the region boasts well-established urban centers with existing assets that well meet the needs of the wind industry. The density of the industrial centers allows manufacturers to be close to their suppliers as well as training and research facilities. The region's manufacturing legacy has established a multimodal transportation infrastructure as well as access to dual power sources, and an ample water and sewer system. Furthermore, as the Cleveland Plus region is an area of 6,000 square miles, Cleveland Plus includes acres of greenfields, in addition to its four urban core cities. Within this large, yet well-connected geography lies several job-ready sites And many acres of land ripe for wind-turbine and component manufacturing.

Cleveland plus offers access to abundant greenfields and more than 400 million square feet of industrial space, empowering business with numerous location choices to maximize their customer relationships.

BLUESTONE INDUSTRIAL PARK



WELLSVILLE INTERMODAL FACILITY

The Cleveland Plus region understands that sites and buildings must be ready, developable, and with risks that can be easily and quickly mitigated according to the client's needs.

CHAPTER 9 GOVERNMENT ASSISTANCE AND SUPPORT

Ohio's commitment to the advanced energy industry is evident in the innovative government-sponsored programs, grants and incentives outlined below. By focusing on high-tech industries of opportunity, the State of Ohio is rapidly advancing the industry and opportunities for its residents. Hundreds of companies have enjoyed profitable growth with the following programs.

OHIO THIRD FRONTIER ADVANCED ENERGY PROGRAM

Administered by the Ohio Department of Development, Ohio Third Frontier has transformed the state's economy through investments in emerging industries and technologies while leveraging an additional \$6 billion in federal and private-sector support. The Advanced Energy Program encourages commercialization of solar, wind, biofuel, energy storage, and energy efficiency products. Various competitive funding opportunities are also available, including access to a powerful pre-seed equity investment pool. Since 2002, Ohio Third Frontier has invested more than \$100 million in energy-related research, development, and product commercialization.

OHIO THIRD FRONTIER RESEARCH AND DEVELOPMENT FUNDING

Ohio's 10-year, \$1.6 billion research and development funding program includes a significant focus on advanced energy. The project is the state's largest-ever commitment to expanding high-tech research capabilities, promoting innovation and company formation, and creating high-paying jobs—many of which will be filled by Ohio's developing green-collar workforce.

ADVANCED ENERGY JOB STIMULUS PROGRAM: INCREASED ENERGY TECHNOLOGY DEVELOPMENT

Ohio has earmarked \$84 million for renewable energy funding

over three years to increase the development, production, and use of advanced energy technologies. The program is administered by the Ohio Air Quality Development Authority; funding is provided through grants and loans.

OHIO AIR QUALITY DEVELOPMENT AUTHORITY (OAQDA)

The OAQDA provides financing assistance for public and private investments in facilities that contribute to better air quality in Ohio. Although each project is different, benefits of OAQDA financing include federal and state tax incentives, as well as flexibility in financial structuring. Since 1972, the OAQDA has financed 393 projects, totaling more than \$7.1 billion. Awards range from \$14,000 to \$234 million for individual projects.

OAQDA also has the ability to finance power purchase agreements through prepaid federal-tax-exempt bonds for non-investor-owned utilities (i.e., municipal electric utilities) and taxable bonds for investor-owned utilities. Bonds are issued at the beginning of a project and may finance new construction or upgrades. There are no caps on the amount for the power purchase agreements.

THE OHIO JOB CREATION TAX CREDIT PROGRAM

Established in 1993, this program provides a refundable tax credit against a company's corporate franchise or income tax, based on the state income tax withheld from new, full-time employees. The Ohio Tax Credit Authority, a five-member independent board consisting of taxation and economic-development professionals from throughout the state, is responsible for reviewing and approving applications for tax credit assistance and setting the benefit level.

OHIO ENTERPRISE BOND FUND

Provides loans for land and building acquisition, construction, expansion or renovation, and equipment purchases for eligible businesses—typically financing between \$1.5 million and \$10 million.

166 DIRECT LOAN

The 166 Direct Loan Program provides loans for land and building acquisition, expansion or renovation, and equipment purchases. The program may finance up to 30% of eligible project costs directly related to the fixed-asset purchase. The minimum loan amount is \$350,000 and the maximum is \$1 million.

RESEARCH AND DEVELOPMENT INVESTMENT LOAN FUND

Provides assistance in the form of a low-interest loan, partnered with a tax credit. Businesses that are meeting the program requirements (e.g., job creation commitments, timely loan repayments, commitment to research and development activities, etc.) will be eligible for a dollar-for-dollar credit against their Ohio tax liability, equal to the amount of principal and interest repaid on the loan. The maximum annual credit is \$150,000; the credit will be nonrefundable but may be carried forward. The Research and Development Fund can finance up to 50% of a project's allowable costs, with loans ranging in size from \$1 million to \$5 million.

Few states – if any – have as comprehensive a package for advanced energy companies as the State of Ohio. The state is deeply committed to leveraging our strong, innovative roots in advanced manufacturing and technology development to propel the industry forward. Furthermore, with local incentives available throughout the 16 counties and hundreds of communities within Cleveland Plus, the region offers unparalleled benefit to accelerate your business.

CHAPTER 10 BUSINESS ECOSYSTEM

Cleveland Plus is at the heart of North American business. Centrally located with tremendous logistics and a heavy concentration of businesses, companies can access more bottom-line benefit at less cost and risk in the Cleveland Plus region. Moreover, with low business taxes and a strong support system, businesses have more opportunities to thrive here.

In fact, Cleveland Plus has the seventh-largest concentration of Fortune 500 companies in the United States, with 70% of the organizations having a presence in the region, and 11 Fortune 500 headquarters. For growing businesses, this provides greater access to partnerships, supply chain, and talented workforce. Furthermore, with two high-traffic airports and nearly 300 direct flights daily, companies find easier flight access to customers, suppliers, and colleagues worldwide.

The Cleveland Plus region also offers some of the nation's top professional, scientific, and technical services firms. One of the United States' five largest legal markets, and home to some of the world's strongest accounting, finance, and back office service firms, Cleveland Plus offers the support growing companies need to launch and expand their business.

The Cleveland Plus region is also one of the best for entrepreneurs. In fact, for several years running, Entrepreneur magazine ranked the Cleveland Plus region as better for entrepreneurs than San Francisco, Boston, Seattle, and New York. Moreover, the Intelligent Community Forum listed the area (the only region in the United States to get the nod) as a "Top 7 Intelligent Community," for our high-speed fiber optic network, which enhances business performance and capacity.

Added together, Cleveland Plus offers access to more business opportunities and results for growing companies.

SUPPORT ORGANIZATIONS

Companies feel welcome and find customized assistance when expanding into the Cleveland Plus region. With a robust and collaborative economic development system in place to help connect expanding companies with the data, real estate, incentives, research, training, and other partnerships they need, Cleveland Plus offers companies a low-risk, low-cost, and easy transition.

TEAM NORTHEAST OHIO/CLEVELAND PLUS BUSINESS (TEAM NEO) assists relocating and expanding companies by serving as a central dissemination point for information, connections, and assistance. Team NEO also helps companies with workforce and supply chain information, state and local incentives, research and training partnerships, location searches, and connections to enable business. www.clevelandplusbusiness.com

Team NEO will help companies connect with the following organizations that specifically work to help advanced energy companies:

NORTECH ENERGY ENTERPRISE is leading collaborative efforts to drive growth in advanced energy in Cleveland Plus. By serving as the champion for advanced energy to accelerate commercial activity; convene public, private, and academic partnerships; and recruit talent, companies, and funding to the Cleveland Plus region, NorTech Energy Enterprise can help expanding companies connect with industry experts and partners for enhanced success. www.nortechenergy.org

NorTech Energy Enterprise led the effort to launch **LEEDCO**, which was incorporated in late 2009. Described in Section 3, the Lake Erie Energy Development Corporation (LEEDCo) stems from the efforts of the Great Lakes Energy Development Task Force, chaired by Cuyahoga County Prosecutor Bill Mason, to explore offshore wind. LEEDCo's founding partners include the Cleveland Foundation, the City of Cleveland, Cuyahoga County, Lorain County and NorTech. www.leedco.org

NorTech works with several wind energy partners that can offer additional help to companies serving the wind energy market. **THE GREAT LAKES WIND NETWORK** helps market regional wind energy suppliers and OEM's to domestic and international investors, who are expanding wind operations across North America. The group helps cultivate the wind supply chain, thereby assisting companies to expand and succeed. www.glwn.org

With a strong heritage and profitable history in manufacturing, the Cleveland Plus region offers additional resources to wind energy manufacturing companies. Organizations like **MAGNET** and **WIRE-NET** help expanding regional manufacturers remain globally competitive and prosperous by assisting with research, product development, management consulting, exporting, and industry connections. www.magnetnetwork.org and www.wire-net.org

Furthermore, with Cleveland Plus's entrepreneurial engine, **JUMPSTART**, plus technology assistance programs and more than five successful incubators, entrepreneurs enjoy unparalleled professional assistance. www.jumpstartinc.org

CHAPTER 11 THE HIGHEST QUALITY OF LIFE AT MINIMAL COSTS

The Cleveland Plus region offers the assets and opportunities of a large metropolitan area, without the cost and hassle often associated with mega-regions. With a cost of living nearly 10% below the national average, and commute times throughout the region averaging only 24 minutes, Cleveland Plus affords an opportunity to enjoy tremendous resources without breaking the bank. Cleveland Plus's assets include:

- + 3 professional sports franchises (Browns, Cavs, Indians)
- + The second-largest performing arts district in the nation
- + World-class health care, anchored by the Cleveland Clinic and University Hospitals
- + Median home price of \$138,000
- + The Cleveland Orchestra, one of the world's top 3 orchestras
- + The best public transportation (RTA) in the nation in 2007

The Cleveland Plus region is also known for its more than 120 ethnic communities, its deep philanthropic base, and its strong network of professional organizations. In fact, Cleveland was named the most livable city in the country in 2005 by the Economist. Thomas Murphy, president of local pharmaceutical giant Ben Venue, summed it up well when he noted, "The quality of life offered by Cleveland Plus couldn't be better for our employees. Housing is very affordable with many different community options. The region supports the arts, history, culture, entertainment, sports, and so much more, giving many choices to our employees."

Fortunately, residents enjoy these big city assets at a fraction of the cost. In fact, when adjusted for cost of living, Cleveland Plus offers more for your dollar than many other metropolitan areas in the United States (See Figure 21).

2006 PER CAPITA PERSONAL INCOME BY METROPOLITAN AREA
ADJUSTED FOR COST OF LIVING

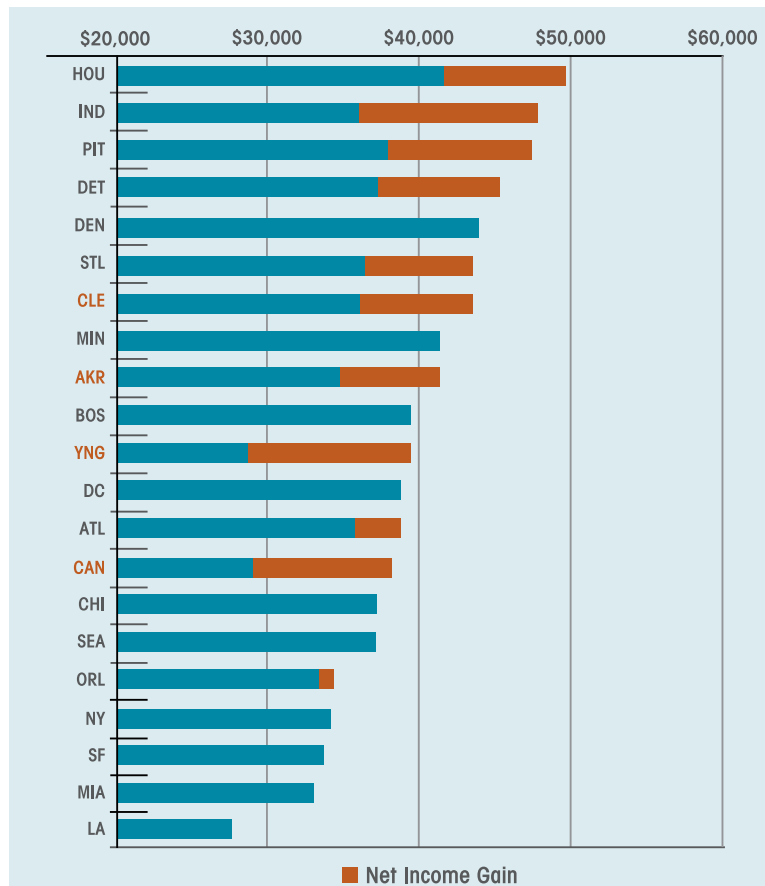


Figure 21-Source: U.S. Bureau of Economic Analysis



IN SUMMARY: CLEVELAND PLUS IS A PLUS FOR BUSINESS GROWTH

Featuring sophisticated manufacturing, supply chain depth, an ideal location on the shores of Lake Erie, a primed and capable workforce, low cost of labor, some of the industry's leading companies and research institutions, and innovative efforts for offshore wind development, the Cleveland Plus region has all the right components to accelerate business growth in the wind energy sector. Companies of all sizes from around the world are choosing to build their future here, and with good reason: Cleveland Plus has a solid foundation upon which to build profitably. All the pieces add up to Cleveland Plus.

CONTACT INFORMATION:

While the Cleveland Plus region offers advantages to the entire industry, we also understand that each business has unique needs. We are ready to help. For additional information and a customized consultation about your specific needs, please contact:

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PREPARED WITH THE ASSISTANCE OF:

Eaton
Great Lakes Wind Network
Lincoln Electric
Lubrizol
MFG
Nortech
Parker Hannifin
Rotek
Sherwin Williams
Timken

On-Shore Market Access + Emerging Offshore Opportunity:

It is the combination of centralized location, innovative partnerships, strong natural resources, and trendsetting offshore turbine developments that have made Cleveland Plus one of the premier destinations for wind-related businesses to call home.